

# **Source Control Measure Effectiveness Monitoring and Assessment Report**

**City of Portland Outfalls Project  
ECSI No. 2425**

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**Prepared by  
City of Portland  
Bureau of Environmental Services**

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# Abbreviations and Acronyms

µg/L	microgram per liter
AOPC	area of potential concern
ARAR	applicable or relevant and appropriate requirement
BEHP	Bis(2-ethylhexyl)phthalate
BES	City of Portland, Bureau of Environmental Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
City	City of Portland
CUL	cleanup level
DEQ	Oregon Department of Environmental Quality
DQO	data quality objective
ECSI	DEQ's Environmental Cleanup Site Inventory
EPA	U.S. Environmental Protection Agency
IGA	intergovernmental agreement
JSCS	Portland Harbor Joint Source Control Strategy
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
RM	river mile
ROD	record of decision
SAP	sampling and analysis plan
SCM	source control measure
SLV	screening level value
SOP	standard operating procedure
TM	technical memorandum
TSS	total suspended solids

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# 1. Introduction

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This report presents the findings of monitoring completed in 2017 at specific City of Portland (City) stormwater outfalls on the Willamette River within the Portland Harbor Superfund Site. The monitoring evaluated the collective effectiveness of a wide array of source controls implemented by multiple parties within the drainage basins for City outfalls in Portland Harbor. This report is the final requirement needed to complete the intergovernmental agreement (IGA) between the City and the Oregon Department of Environmental Quality (DEQ) for remedial investigation and source control in the municipal stormwater conveyance systems discharging to the Portland Harbor Superfund Site (DEQ, 2003), and provides supplemental documentation to support a DEQ Source Control Decision for City outfalls.

The term “source control” as used in this report refers to the prevention or control of releases of pollutants that may reach the Willamette River through contact with stormwater runoff that discharges to the river. Sources of these pollutants vary, with industrial operations (including historical activities) typically being the major primary sources to Portland Harbor. The City’s approach to source control under the IGA has included:

- Identifying which pollutants (if any) are present in stormwater discharging from a given City outfall within Portland Harbor at levels that may contribute to recontamination of the Portland Harbor Superfund Site.
- Tracing where these pollutants are entering the City’s stormwater conveyance system.
- Referring sites discharging pollutants to the City’s stormwater conveyance system to the appropriate DEQ or City program for source control.

This approach results in sustainable, long-term source control by preventing the vast majority of pollutants from entering the City stormwater conveyance system. It engages the sites producing pollutants in the solution for a cleaner river by addressing pollutant migration pathways via the stormwater conveyance system to the river and encouraging best management practices for stormwater at properties throughout the Portland Harbor drainage area.

In addition – and separate from the IGA – the City has long-term, City-wide programs aimed at reducing stormwater runoff and improving stormwater quality (such as street sweeping, street-side stormwater infiltration planters, and requirements that new development/redevelopment projects incorporate stormwater treatment).

The City has conducted its innovative and extensive outfalls project in Portland Harbor (City of Portland Outfalls Project; Outfalls Project) under the IGA for nearly 2 decades. Although this project is now complete and this report represents the final submittal under the IGA, the City will continue its active partnership with DEQ and proactive engagement with local industries, private citizens, and other stakeholders to continue to improve stormwater management and protect Portland Harbor as a resource for current and future generations of Portlanders.

## 1.1 Purpose and Relationship to Other Documents

Under the Outfalls Project IGA, the City conducted investigations in municipal outfall basins within the Portland Harbor drainage area to assist DEQ with the identification of significant contaminant sources and to determine if source control measures (SCMs) are needed. In December 2013, the City submitted the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report; BES, 2013), which documents the completion of these investigations. The Municipal Report describes – programmatically and by outfall basin – the various source controls being implemented through state and City programs and concludes that recontamination of in-river sediment in Portland Harbor via discharges from City outfalls is unlikely after all source control activities under these programs have been completed.

To support the Municipal Report conclusions, a DEQ Source Control Decision for City outfalls, and a DEQ final determination of closure for the Outfalls Project IGA, DEQ requested that the City demonstrate the collective effectiveness of the various stormwater source control programs (i.e., City and state water quality programs and state and federal cleanup programs) through collection of new basin-scale stormwater data for outfalls representative of a variety of conditions. The City collected the requested data in accordance with the *City of Portland Outfalls Project Revised Sampling and Analysis Plan* (SAP) submitted to and approved by DEQ in February 2016 (BES, 2016b; DEQ, 2016). This report presents the findings of the SCM effectiveness monitoring conducted under the SAP. A full data report (Data Report) is provided as Appendix A.

The purpose of this report is to support the earlier conclusion of the Municipal Report, that the collective effect of site and basin source controls implemented under City, state, and federal programs will meet Portland Harbor sediment and water quality objectives after the remaining identified sources are controlled under DEQ oversight. This report builds upon the more than 50 previous documents the City has submitted to DEQ during implementation of the Outfalls Project IGA, representing more than a decade of coordinated, targeted work investigating sources to the municipal stormwater conveyance systems in Portland Harbor and identifying mechanisms to ensure their long-term control. Key documents include:

- *Stormwater Evaluation Report* (January 2010; BES, 2010). Presents the results of basin-scale stormwater sampling and data evaluation for a broad suite of analytes in 25 City outfall basins in Portland Harbor to identify basins where further source tracing was warranted.
- *Municipal Stormwater Source Control Report for Portland Harbor* (December 2013; Municipal Report; BES, 2013). Summarizes City stormwater source control programs and presents a Completion Summary for each of the 39 City outfall basins in Portland Harbor that describes the source evaluations that were completed and the SCMs that have been implemented or are planned in each basin.
- *Source Control Measures Effectiveness Demonstration* (September 2015; SCM Effectiveness Demonstration; BES, 2015). Presents and evaluates stormwater data and other information to identify basins where additional data were needed to show the effectiveness of SCMs implemented by the City under the Outfalls Project IGA. Includes an initially proposed SAP for the additional data collection.

- *Response to DEQ Comments dated December 28, 2015, on Source Control Measures Effectiveness Demonstration* (February 2016; BES, 2016a). Letter and the following attached documents that collectively provide the City's response to DEQ's comments on the SCM Effectiveness Demonstration report:
  - *Revised Sampling and Analysis Plan* (February 2016; BES 2016b). Revises the monitoring approach and scope proposed in the SCM Effectiveness Demonstration to meet broader objectives identified in DEQ's December 2015 comments; namely, to monitor the effectiveness of SCMs implemented by private landowners and under City-wide programs, in addition to SCMs implemented by the City specifically under the IGA.
  - *Selection of Outfall Basins for Source Control Measure Effectiveness Monitoring* (February 2016; BES, 2016c). Presents the rationale for the outfall basins selected for effectiveness monitoring under the revised SAP, and identifies how the selected basins meet DEQ's specific objectives for the effectiveness monitoring.

DEQ in its December 28, 2015, comment letter also requested two other components for IGA completion in addition to the SCM effectiveness monitoring: (1) demonstrate that stormwater discharges from City outfalls in Portland Harbor do not pose unacceptable in-water risk, and (2) provide additional information related to City rights-of-way in the harbor (DEQ, 2015). These components are addressed in this report, in Section 5 and Appendix B, respectively. Appendix C presents the comments from DEQ's December 28, 2015, letter and how they are addressed in this report.

## 1.2 Report Organization

- **Section 2 – Background.** Provides a brief overview of the Outfalls Project.
- **Section 3 – Objectives and Approach.** Describes the objectives for the SCM effectiveness monitoring and explains the data evaluation approach used to determine the effectiveness of the range of SCMs implemented in City outfall basins in Portland Harbor.
- **Section 4 – Results.** Describes the results of the SCM effectiveness monitoring.
- **Section 5 – Discussion.** Provides an evaluation of the monitoring results and discussion of the effectiveness of source control for City outfalls. This includes an analysis of the SCM effectiveness monitoring results in relation to the objectives described in Section 3, and an analysis of potential in-water risk resulting from stormwater discharges from City outfalls.
- **Section 6 – Conclusions.** Summarizes the status of source control for City outfalls, including justification for a DEQ Source Control Decision.
- **Section 7 – References.**

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## 2. Background

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This section provides a brief overview of the work completed by the City under the Outfalls Project IGA and the context for the SCM effectiveness monitoring and assessment presented in this report. Additional background and detail on work that has been conducted for the Outfalls Project is provided in previous reports (BES, 2010, 2013, and 2015).

### 2.1 Outfalls Project Overview

The Outfalls Project covered 39 City outfalls located in the Portland Harbor Study Area, which extends from River Miles 1.9 to 11.8 on the Willamette River. More than 400 non-City outfalls also are present in Portland Harbor (see Figure 1), most of which are being evaluated under separate agreements between DEQ and the parties that use those outfalls. City outfall drainage to Portland Harbor represents approximately half of the stormwater drainage to the Study Area (see Figure 2), and almost two-thirds of this drainage is Forest Park and other open space (see Figure 3). Other land uses served by City outfalls include industrial, major transportation (state highways), commercial, and residential, as shown in Figure 3.

Based on the Outfalls Project work plan (CH2M HILL, 2004) and foundational studies, the City conducted “up-the-pipe” investigations, such as stormwater and inline solids sampling in the City stormwater conveyance system, and supported DEQ site discovery efforts to identify specific sources within basin drainage areas. Although all basins were evaluated for their source potential, some basins did not warrant up-the-pipe investigation because factors such as basin size, land use, and sediment quality near the outfall did not indicate that source control was needed.

The City summarized the results of the basin investigations and source control recommendations in more than 50 technical reports that are on file at DEQ. To verify conclusions regarding completion of source tracing for each basin, the City also conducted a comprehensive evaluation of City outfall stormwater data (BES, 2010). That evaluation resulted in additional source tracing work in two basins, which was completed by 2012.

In December 2013, the City completed the Municipal Report, which provides a summary of various City-wide stormwater source control programs and includes a Closure Report conducted under the Outfalls Project IGA. The Closure Report is composed of individual completion summaries that summarize the investigation approach used in each City basin in the study area, the rationale for concluding that additional City source tracing is not warranted, and a general description of the SCMs that have been implemented (or are planned) in each basin.

Following DEQ review of the Closure Report, the City and DEQ began collaborating on an approach for determining where additional monitoring by the City is needed. In September 2015, the City submitted the SCM Effectiveness Demonstration describing SCMs implemented by the City under the IGA and identifying basins for which additional monitoring by the City is warranted to demonstrate that these SCMs are effective. At DEQ’s request, the report also included a weight-of-evidence for why additional City monitoring at the basin scale is unwarranted for most basins and to provide support for the City’s conclusion that City outfall

basins are an unlikely significant current or future pathway for contaminants to reach the Harbor (i.e., the recontamination potential is low) after identified sources have been controlled.

In response to the comments provided by DEQ (DEQ, 2015) on the SCM Effectiveness Demonstration requesting a broader demonstration of SCM effectiveness (e.g., addressing not just City-implemented SCMs but also SCMs implemented by others), the City and DEQ collaborated on a methodology to meet those objectives. The result was the SAP (BES, 2016b), submitted in conjunction with the *Selection of Outfall Basins for Source Control Measure Effectiveness Monitoring* technical memorandum (Basin Selection TM; BES, 2016c), which the City developed to demonstrate the rationale for the outfall basins selected for monitoring under the SAP and how these basins meet DEQ's specific selection criteria (DEQ, 2015). DEQ approved the SAP in February 2016 (DEQ, 2016).

## 2.2 Project Status and Completion

Under the IGA, the City completed source identification in all Portland Harbor basins and referred all identified sources to an appropriate City, state, or federal program for control (BES, 2013). Approximately one-half of the basins were found to include sources, and SCMs have been implemented (or are pending) in these basins. As anticipated in the IGA, source control in City outfall basins requires a combination of controls implemented at specific sites and controls implemented in the City stormwater conveyance system. Responsible parties also have implemented controls in selected portions of the City stormwater conveyance system (e.g., pipe lining or cleaning) in response to offsite migration of contaminants from their sites. In some basins, the City implemented controls (e.g., abandoning historical connections and cleaning lines for which a responsible party could not be identified). As described in this report, the City has demonstrated the effectiveness of SCMs that have been implemented in City outfall basins, using data collected from basins selected in coordination with DEQ to represent a range of categories of source control status, land use, and other basin characteristics (see Appendix A). In addition, this report provides an analysis that demonstrates City stormwater outfall discharges are unlikely to contribute to unacceptable in-water risk. Finally, this report presents supplemental information and weight-of-evidence evaluation regarding potential contaminant contributions from City roadways to the stormwater conveyance systems, the findings of which indicate City roadways are not a major source of stormwater contamination (see Appendix B).

# 3. Objectives and Approach

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## 3.1 Objectives

The objectives for the SCM Effectiveness Monitoring and Assessment were identified in collaboration with DEQ. The overarching objective is to assess the collective effectiveness of various stormwater source control programs (i.e., City and state water quality programs and state and federal cleanup programs) in City outfall basins, to determine whether source control is complete and whether stormwater may be contributing to in-water risk. Supporting objectives are to: (1) collect a monitoring data set that, in conjunction with the existing data set, will allow a meaningful evaluation of SCM effectiveness and also will meet additional basin representativeness objectives identified by DEQ (see Section 3.2.1.1); and (2) demonstrate that the collective effect of site and basin source controls, implemented under the water quality and cleanup programs, will meet Portland Harbor sediment and water quality objectives after identified sources are controlled.

## 3.2 Approach

### 3.2.1 Monitoring Approach

The City conducted stormwater sampling for the SCM effectiveness monitoring in accordance with the DEQ-approved SAP between September 2015<sup>1</sup> and February 2017. Details of the monitoring approach are described in the Basin Selection TM, SAP, and the Data Report. A summary is provided below.

#### 3.2.1.1 Selection of Basins for SCM Effectiveness Monitoring

A key part of ensuring that the data collected would address the SCM effectiveness monitoring objectives was selection of the basins to be monitored. Given the monitoring objectives, source control status was the primary consideration in the selection of basins to be monitored. City outfall basins fall into four categories of basin source control status as shown in the following table.

Category	Source Control Status	SCM Type(s)
1	Controlled	City and state water quality programs only
2	Controlled	City/state water quality programs and DEQ/EPA cleanup programs
3	Mostly controlled	City/state water quality programs and DEQ/EPA cleanup programs
4	Uncontrolled	City and state water quality programs in place, but uncontrolled DEQ cleanup sites remain

Notes.

City = City of Portland

DEQ = Oregon Department of Environmental Quality

EPA = U.S. Environmental Protection Agency

SCM = source control measure

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<sup>1</sup> Three of the four grab samples from Outfall 17 were collected during the fall of 2015, to take advantage of the extremely low river levels that allowed the samples to be collected directly from the outfall (which is typically submerged). All other sampling was conducted following approval of the SAP in February 2016.

Basins most suitable for SCM effectiveness monitoring are those deemed “controlled” and are either in Category 1 (for assessing the effectiveness of City and state water quality programs) or Category 2 (for assessing the collective effectiveness of water quality and cleanup programs). However, because only a relatively small number of basins (six) fall into Category 2, Category 3 basins also were considered suitable for monitoring to bolster the data set for evaluation of the effectiveness of SCMs implemented under state and federal cleanup programs. “Uncontrolled” basins (Category 4) are not suitable for monitoring because SCM implementation at sites in these basins remains substantially incomplete.

In consideration of the basin source control status and the additional DEQ selection elements identified by DEQ (DEQ, 2015), the following eight City outfall basins were selected for SCM effectiveness monitoring: Basins 16, 17, 19, 44, 45, 52D, 53A, and M-2. The specific rationale for the selection of each basin is described in the Basin Selection TM. Table 1 summarizes how the various DEQ selection elements are represented by the suite of basins selected for monitoring. As indicated in Table 1, these eight basins each fall into one of the monitoring-suitable source control status categories (Categories 1 through 3) and collectively represent all but one of DEQ’s additional selection elements. The only exception is basins that do not discharge to an identified in-water area of potential concern (AOPC) within the Willamette River are not represented. However, DEQ approved this omission based on the City’s rationale that such basins are adequately represented by existing data and/or drain small areas that have been almost entirely redeveloped and include stormwater treatment (BES, 2016c; DEQ, 2016).

### 3.2.1.2 Monitoring Locations

Because the overarching objective of the monitoring was to evaluate SCM effectiveness on a basin scale, the monitoring locations for each outfall basin were selected to represent discharge from the whole basin. Basin-scale samples in the City conveyances system in Portland Harbor typically are not collected directly at the outfalls because outfalls are often at least partially submerged during the wet season and, therefore, are not conducive to collecting samples representative of the basin. However, each stormwater conveyance system in the basins selected for monitoring has one or more manhole locations that receive drainage representative of the entire basin.

Given the relatively low elevations of some of the outfalls, river water can back up in the system at high-stage river elevations and can prevent collection of representative samples at some manholes during storm events. Because of the importance of collecting all data from a given basin at the same location to allow for comparability between storm events, the manholes selected for monitoring represent the best locations where all or most of the drainage area is represented and which are least likely to be inundated during high river stages. (An alternative monitoring location was identified for Basin 17, in case the preferred monitoring location – in this case, the outfall itself – was not accessible.)

In accordance with the basin-specific objectives for Basins 16, 19, and 52D, additional sampling locations were included in these three basins to monitor discharges from specific sites that had been identified as notable sources to these City stormwater conveyance systems. Samples were collected from these additional (“paired”) sampling locations concurrently with the samples from the basin-scale monitoring locations.

Ten sampling locations (plus one alternative location) were used for the SCM effectiveness monitoring. In Appendix A, these monitoring locations are described in Table A-1 and shown in Figures A-2 through A-9.

### 3.2.1.3 Sampling and Analysis

In accordance with the SAP, the sampling approach was to collect stormwater data sets in general accordance with the *Portland Harbor Joint Source Control Strategy* [(JSCS); DEQ/EPA, 2005, as amended 2007] that, where applicable, can be compared to the existing data sets in order to evaluate the significance of concentration trends. Details of the sampling approach are provided in the Data Report. Sampling was conducted in general accordance with the SAP, except for the minor deviations identified in the Data Report.

All stormwater samples collected for the SCM effectiveness monitoring were analyzed in accordance with the SAP for polychlorinated biphenyl (PCB) congeners, polycyclic aromatic hydrocarbons (PAHs), phthalates, metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver and zinc), and total suspended solids (TSS). In addition, samples from Basins 17 and 44 also were analyzed for organochlorine pesticides. Specific laboratory methods used and the associated method detection limits are indicated in the Data Report.

## 3.2.2 Evaluation Approach

The SCM effectiveness monitoring data were evaluated relative to the data quality objectives (DQOs) specified in the SAP. As established in the overall DQO for monitoring (“DQO 1: Representative Basin Sampling for City Outfall Effectiveness Monitoring”), the evaluation is designed to address two main questions:

- Does stormwater quality from controlled basins (Categories 1 and 2) demonstrate that existing programs are effective?
- Does stormwater quality from nearly controlled basins (Category 3) demonstrate a downward trend (or already below relevant screening levels), indicating that after controls are in place the existing programs will be effective?

The contaminants of focus in this evaluation were agreed upon with DEQ, and are contaminants typically associated with industrial stormwater, based on an extensive data set of industrial stormwater discharges to Portland Harbor (DEQ, 2009). The monitoring results for each of these contaminants are evaluated in relation to the DQOs outlined in the SAP, and as part of a lines-of-evidence approach to evaluating whether SCMs are effective, which includes comparison to the DEQ stormwater guidance curves, Portland Harbor surface water CULs as identified in the Record of Decision (ROD; EPA, 2017), and JSCS screening level values (SLVs), as well as an evaluation of the potential for stormwater to contribute to in-water risk.

The SCM effectiveness monitoring data, together with any previous basin-scale data for the basins monitored, are plotted on the DEQ stormwater guidance curves and provided as Figures 4 through 15. The results of the SCM effectiveness monitoring are presented in Section 4 below, and a discussion of the findings is provided in Section 5.

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## 4. Results

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This section presents the data results in the context of the DQOs and basin categories established in the SAP and presented in Section 3.

A summary of results for each basin, including the number of individual samples above the typical range on DEQ industrial stormwater curves and the percent change in geomeans from previous sampling, are provided in Table 2, and a presentation of data relative to DEQ industrial stormwater curves is provided in Figures 4 through 15. A detailed screening presenting individual sample results is provided in Attachment A4.

### 4.1 Category 1

**SCMs are both City and State water quality programmatic measures.**

**Basins 17 and M-2** were evaluated under Category 1 DQOs because SCMs include both City and state water quality programmatic measures. Effectiveness for these basins is defined primarily as concentrations falling within the typical range for each contaminant on the DEQ industrial stormwater curves. In addition, results are screened against Portland Harbor Record of Decision CULs (EPA, 2017) and JSCS SLVs.

Analytical concentrations for Basins 17 and M-2 are within the typical range of data on the DEQ industrial stormwater curves for all contaminants analyzed.

Analytical concentrations for at least one sample from Basins 17 and M-2 are greater than the JSCS SLVs or Portland Harbor ROD surface water CULs for one or more analytes of the following chemical groups: metals, PAHs, phthalates, PCBs (Table A4-5 and Table A4-21, respectively).

### 4.2 Category 2

**SCMs include City and state programmatic stormwater measures and measures implemented at upland sites under the DEQ Cleanup Program, and SCMs have been fully implemented.**

**Basins 44 and 53A** were evaluated under Category 2 DQOs because SCMs include programmatic stormwater measures and DEQ cleanup sites that have achieved source control. Effectiveness for these basins is defined primarily by concentrations falling within the typical range for each contaminant on the DEQ industrial stormwater curves. In addition, results are screened against Portland Harbor ROD CULs and JSCS SLVs.

- **Basin 44** contaminants were measured in stormwater at concentrations within the typical range on the DEQ industrial stormwater curves for all contaminants except BEHP, for which two sample concentrations are slightly above typical values (Figure 5). Analytical concentrations for at least one sample from Basin 44 are greater than the JSCS SLVs or Portland Harbor ROD surface water CULs for one or more analytes of the following chemical groups: metals, PAHs, phthalates, PCBs (Table A4-11).

- **Basin 53A** contaminant concentrations were within the range of typical values on DEQ industrial stormwater curves, with the exception of total PAHs and chromium. The geomean of previous and current chromium samples from Basin 53A showed a 55% reduction from the previous sampling, and a 71% reduction from previous SCM implementation (Table 2). Total PAHs results varied widely, with the geomean concentration landing at approximately the knee of the curve and slightly higher than previously measured concentrations. Analytical concentrations for at least one sample from Basin 53A are greater than the JSCS SLVs or Portland Harbor ROD surface water CULs for one or more analytes of the following chemical groups: metals, PAHs, phthalates, PCBs (Table A4-19).

### 4.3 Category 3

SCMs include City and state programmatic stormwater measures and measures implemented at upland sites under the DEQ Cleanup Program; source control implementation is mostly, but not fully, complete.

**Basins 16, 19, 45, and 52D** were evaluated under Category 3 DQOs because SCMs are ongoing. Based on the SAP, SCM effectiveness is measured primarily by evaluating trends in the data set, and the contaminant concentrations relative to the DEQ industrial stormwater curves. In addition, results are screened against Portland Harbor ROD CULs and JSCS SLVs.

- **Basin 16** contaminants concentrations show a downward trend from previous sampling for all contaminants except arsenic, for which concentrations still land on the flat of the DEQ industrial stormwater curve. There is no historical data by which to compare Bis(2-ethylhexyl)phthalate (BEHP) data from Basin 16. The geomean of BEHP data collected in 2016-2017 is within the typical range of data on the DEQ industrial stormwater curve, although one sample, collected on September 17, 2016, is slightly elevated compared to typical values on the curve. Analytical concentrations for at least one sample from Basin 16 are greater than the JSCS SLVs or Portland Harbor ROD surface water CULs for one or more analytes of the following chemical groups: metals, PAHs, phthalates, PCBs (Table A4-1).
- **Basin 19** contaminant concentrations show a downward or stable trend for all analytes except total PAHs, which had a slight increase in geomean from the previous sampling. All analytes are within the typical range of concentrations on the DEQ industrial stormwater curves. Analytical concentrations for at least one sample from Basin 19 are greater than the JSCS SLVs or Portland Harbor ROD surface water CULs for one or more analytes of the following chemical groups: metals, PAHs, phthalates, PCBs (Table A4-7). Location-specific sampling in Basin 19 resulted in at least one concentration above the typical industrial stormwater values for copper, lead, and BEHP (Table A4-9).
- **Basin 45** contaminant concentrations show a downward or stable trend for all analytes except total PAHs. All analytes are within the typical range of concentrations on the DEQ industrial stormwater curves except total PAHs and BEHP. Analytical concentrations for at least one sample from Basin 45 are greater than the JSCS SLVs or Portland Harbor ROD surface water CULs for one or more analytes of the following chemical groups: metals, PAHs, phthalates, PCBs (Table A4-13).

- **Basin 52D** contaminant concentrations show a downward trend for all analytes, except arsenic, nickel, and zinc. Nickel and zinc concentrations are approximately the same as previous sampling. The following analytes had at least one sample concentration that falls outside of the typical range of concentrations on the DEQ industrial stormwater curves: arsenic, cadmium, chromium, lead, nickel, and total PAHs. Analytical concentrations for at least one sample from Basin 52D are greater than the JSCS SLVs or Portland Harbor ROD surface water CULs for one or more analytes of the following chemical groups: metals, PAHs, phthalates, PCBs (Table A4-15). Location-specific sampling in this basin resulted in concentrations above typical industrial values for most analytes for which DEQ has produced stormwater curves (Table A4-17).

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# 5. Discussion

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This section provides a discussion of the results presented in Section 4, both in terms of source control status and potential for in-water risk.

## 5.1 Source Control Effectiveness

### 5.1.1 Category 1

**SCMs are both City and state water quality programmatic measures.**

Data from Basins 17 and M-2 indicate that SCMs are effective, as analytical concentrations fall within the typical range of data on the DEQ industrial stormwater curves. In addition, exceedances of SLVs and CULs are generally of low orders of magnitude, and the exceedances are generally not for chemicals that are driving risk within the Portland Harbor. The exceptions are:

- **Exceedance of PCB CUL (Basin M-2 only).** PCBs were detected in only one of four samples collected from this basin. In addition, the PCB data in this basin are at the lower end of the typical range of concentrations on the DEQ industrial stormwater curves, indicating there are no significant sources of PCBs in Basin M-2.
- **Exceedance of carcinogenic PAH CUL (e.g., benzo(a)pyrene); Basins M-2 and 17).** Analytical data for total PAHs from both basins is well within the range of typical concentrations on the DEQ industrial stormwater curves, indicating there are no uncontrolled sources of PAHs in these basins.

In conclusion, data from Basins 17 and M-2, representing Category 1 basins, indicate SCMs are effective.

### 5.1.2 Category 2

**SCMs include City and state programmatic stormwater measures and measures implemented at upland sites under the DEQ Cleanup Program, and SCMs have been fully implemented.**

Effectiveness for these basins is defined primarily as concentrations falling within the typical range for each contaminant on the DEQ industrial stormwater curves. A summary of the overall assessment for each basin is provided below and in Table 2.

- **Basin 44** contaminants meet this criterion for all analytes except BEHP, which is only slightly elevated relative to the industrial stormwater curve. In addition, exceedances of SLVs and CULs are generally of low orders of magnitude, except for carcinogenic PAHs (e.g., benzo(a)pyrene) and PCBs. PCBs were detected in only two of four samples collected, and concentrations fall at the low end of the DEQ industrial stormwater curves, indicating there are no uncontrolled sources of PCBs in the basin. In regards to PAHs, a recent change in benzo(a)pyrene toxicity for human health results in a lower exceedance of CULs than portrayed in tables in Appendix A, and the PAH levels in this basin are within the typical range for industrial stormwater, also indicating no uncontrolled sources.

- **Basin 53A** contaminant concentrations meet the primary criterion for determining source control, with the exception of chromium and PAHs. However, chromium concentrations show a downward trend from previous sampling, indicating SCMs are working, and chromium concentrations do not exceed the CUL or the SLV. In regards to PAHs, one of four sample results exceeded the typical range for industrial stormwater, but the geometric mean is within the typical range, indicating there are not consistently elevated concentrations of PAHs discharging from this basin

Because of the recent change in toxicity values for benzo(a)pyrene, the human-health risk-based exceedances for Basin 53A data presented in this report would be decreased by almost one order of magnitude, which results in a low level significant exceedance given the context of the screening values and the conservative nature of the screening. Finally, PCB data this basin are at the far low end of the typical range of concentrations on the DEQ industrial stormwater curves, indicating there are no significant sources of PCBs in basin 53A.

In conclusion, data from Basins 44 and 53A, representing Category 2 basins, indicate SCMs are effective.

### 5.1.3 Category 3

**SCMs include City and state programmatic stormwater measures and measures implemented at upland sites under the DEQ Cleanup Program; source control implementation is mostly, but not fully, complete.**

Given that SCMs are ongoing in these basins, source control effectiveness is measured primarily by downward trends in data over time. A summary of the overall assessment for each basin is provided below and in Table 2.

- **Basin 16** contaminants are controlled, based on the primary line of evidence. While arsenic results show a slight increase from previous sampling, the concentrations are still well within the range of typical concentrations on DEQ stormwater curves. Analytical concentrations exceed SLVs or CULs for carcinogenic PAHs (e.g., benzo(a)pyrene) and PCBs. As described previously, the risk-based PAHs exceedances are not significant following the update in toxicity information for benzo(a)pyrene. While PCB concentrations exceed CULs based on human ingestion of fish, the PCB concentrations detected in Basin 16 have decreased over time, and are the low end of typical industrial stormwater discharges. The data from Basin 16 indicate SCMs are working.
- With the exception of PAHs, **Basin 19** analytical results (Table 2, Table A4-7) show a steady (arsenic) or downward (all other analytes) trend for the analytes for which DEQ developed industrial stormwater curves, indicating that the SCMs already in place are working. The two analytes for which concentrations are similar or slightly elevated relative to previous results are arsenic and PAHs, respectively, for which concentrations fall within the typical range on the DEQ industrial stormwater curves. Copper is the one analyte for which individual sample results fall above the typical range on the DEQ industrial stormwater curves. The SCM effectiveness monitoring results from the paired/upgradient sampling location in this basin (Calbag Metals – Front Avenue) indicate this site is a current source of these analytes (see Tables A4-7 through A4-10). It

is anticipated that ongoing implementation and refinement of SCMs at this site under the DEQ Cleanup Program will result in further reduction in concentrations of these contaminants to the stormwater conveyance system. Analytical results from this basin exceed CULs or SLVs by 2 orders of magnitude for PAHs and PCBs. PAH results fall within the typical range for industrial stormwater, and PCB results are at the far low end of the DEQ industrial stormwater curve.

- **Basin 45** data show a downward trend for most analytes evaluated. Zinc and PAHs are the only analytes for which concentrations have increased slightly from previous monitoring. Zinc results fall within the range of typical industrial concentrations. Individual sample results for Basin 45 were elevated relative to the DEQ industrial stormwater curves for total PAHs and BEHP. BEHP concentrations result in low level exceedances of SLVs and CULs, which are based on drinking water for humans. Analytical results from this basin exceed CULs or SLVs by 2 orders of magnitude for PAHs and PCBs, but PCB concentrations are at the far low end of the DEQ industrial stormwater curve. At the time of sampling, there was a cleanup site in this basin associated with PAHs (DEQ's Environmental Cleanup Site Inventory (ECSI; ECSI No.178). It is anticipated that ongoing implementation and refinement of SCMs and cleanup at ECSI No. 178 under DEQ's Cleanup Program will result in reduction in PAH concentrations in the stormwater conveyance system.
- **Basin 52D** sample results show a downward trend for all analytes except arsenic, nickel, and zinc, for which concentrations are similar from previous sampling. There were elevated concentrations for at least one sample relative to the DEQ industrial stormwater curves for several metals and total PAHs. Concentrations were particularly high for chromium. Site-specific monitoring was performed for this basin in addition to basin-scale monitoring. The site-specific monitoring, conducted adjacent to the Portland Container Site (ECSI No. 2375), indicated stormwater exceeded SLVs or CULs by at least 2 orders of magnitude for arsenic, lead, PAHs, and PCBs (Tables A4-15 through A4-18). Basin-scale monitoring exceeded SLVs or CULs by at least 2 orders of magnitude only for PAHs and PCBs. These findings indicate that adequate source controls were not yet in place at the upland source. However, given the reduction of concentrations at the other basins after SCMs were implemented, it is anticipated that implementation and refinement of SCMs and cleanup at this site under the DEQ Cleanup Program will result in reduction in concentrations of metals and PAHs in the stormwater conveyance system.

In conclusion, downward trends in three of the four Category 3 basins indicate SCMs are effective, but ongoing. Basins for which data indicate source control is not complete at the time of sampling have known, ongoing, site-specific sources. When SCMs are in place at these remaining properties, it is reasonable to assume they will be effective to prevent recontamination of Portland Harbor, given that this has been the case for the other basins evaluated.

## 5.2 Potential for In-water Risk

SCM effectiveness monitoring data were evaluated in the context of the potential for City outfall discharges to pose unacceptable in-water risk.

As stated in the JSCS guidance (DEQ 2005):

“An exceedance of an SLV does not necessarily indicate the upland source of contamination poses an unacceptable risk to human or ecological receptors, but does require the further consideration of source control efforts using a weight-of-evidence evaluation.”

Thus, if stormwater data are below in-water CULs, it is unlikely that discharges pose unacceptable in-water risk. If stormwater data are above CULs, it is an indication that other lines of evidence should be evaluated.

A possible line of evidence to consider is a full risk assessment including a comprehensive data evaluation, exposure assessment, toxicity assessment, risk evaluation, and uncertainty analysis (EPA 1989). However, this process is not a part of the JSCS, and would not be appropriate for the purpose of determining source control. Notably, the risk assessments performed for Portland Harbor evaluated in-water risks, which included exposure to contaminants that were actually present in the river, at the point of exposure. This would, by necessity, include any contaminants that may have been transported via stormwater. Alternatively, this report uses some of the principals of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) risk assessment process, primarily the most relevant aspects of the exposure assessment and toxicity assessment, to qualitatively evaluate several lines of evidence related specifically to the potential for unacceptable in-water risk from City outfall discharges. These include consideration of:

- Exposure medium, point of exposure
- Exposure duration
- Exposure frequency
- Exposure area, exposure point concentrations

### 5.2.1 Exposure Medium

One step of an exposure assessment is to identify relevant receptors and exposure media. Because one of DEQ's stated purposes of source control is to prevent unacceptable in-water risk, the in-water receptors identified for Portland Harbor are considered. The human and ecological in-water receptors and exposure scenarios upon which the Portland Harbor CULs are based generally do not exist in stormwater discharge, and do not have direct contact with stormwater in the City stormwater conveyance system (the Portland Harbor Human Health Risk Assessment evaluated direct contact of humans with stormwater and concluded no unacceptable risk from this exposure scenario [EPA, 2016]). They may, however, have contact with contaminants in stormwater after it reaches surface water. Therefore, in accordance with EPA risk assessment guidance (EPA, 1989, 1999), the appropriate medium and exposure point to determine whether City outfall discharges may pose unacceptable in-water risk is surface water.

### 5.2.2 Exposure Duration

Another step in an exposure assessment is to define the duration over which a receptor may be exposed to contaminants. In the Portland Harbor ROD, the majority of the surface water CULs are based on risk-based ARARs for the protection of drinking water. Given that these values were used in the screening of stormwater data in Appendix A, the exposure duration for these

values is considered as a line of evidence to evaluate potential in-water risks from stormwater. While it is unclear whether people drink untreated surface water from the Willamette River as a primary source of drinking water on a regular basis, the ROD CULs assume that a person is drinking 2 liters of untreated water per day straight from the Willamette River over a period of 30 years. If a person were to drink less river water per day, or drink river water daily over a period of less than 30 years, or treat the river water before drinking it (such as by boiling or filtering), then the in-water risks would be lower. While this example focuses on the exposure scenario that CULs are based on, the other risk-based concentrations to protect in-water receptors in Portland Harbor also are based on long-term or chronic exposures, including both human and ecological receptors. This is an important concept in understanding why CULs may be a useful screening tool for stormwater, but are not indicative of in-water risk when applied to data collected at a single point in time.

### 5.2.3 Exposure Frequency

As noted above, the surface water CULs assume daily exposure to contaminants through drinking untreated river water. However, stormwater does not discharge to surface water in Portland Harbor on a daily basis. When comparing stormwater data directly to surface water CULs, this discrepancy needs to be considered.

### 5.2.4 Exposure Area and Exposure Point Concentration

Next, exposure area and exposure point concentrations are considered. In the case of a person drinking surface water straight from the river daily for 30 years, it is likely that they would collect water from different locations over the years. This means that no one sample location is representative of their actual exposure. Rather, an estimate of an average concentration (e.g. upper confidence limit on the mean) over a larger area, such as several river miles, or perhaps the entire Site, would be more representative of the actual exposure concentrations. This concept is true for all in-water receptors. For example, a carp would be exposed to surface water over its approximately 3-mile home range, or a recreational boater would be exposed to surface water over their entire boating range. Some ecological receptors with small home ranges, such as crayfish, may stay in one localized area for most of their lives. In this case, the exposure area is small, and the other aspects of an exposure assessment should be considered, such as CERCLA's guidance to protect ecological receptors at the population-level. The population-scale exposure area of receptors such as crayfish is larger than the area that can be represented by a single sample location. Additionally, surface water concentrations vary throughout the year with seasonal flow patterns and other factors. Therefore, a surface water or stormwater sample collected at a single location and a single point in time is not a good representation of long-term or chronic exposures, which is what the CULs are based on.

When considering the appropriate exposure concentrations and comparisons of stormwater to CULs, it should be noted that the data collected for SCM effectiveness monitoring attempted to capture "first flush" conditions, which are assumed to be the time of discharge at which concentrations are highest, and not necessarily representative discharge concentrations throughout an event. Finally, because CERCLA cleanup is based on long-term or chronic exposures, exposure concentrations of contaminants in stormwater over this time scale provide a more accurate representation of actual exposures. Long-term exposure to contaminants in stormwater would occur in surface water, as discussed previously, after considerable mixing.

## 5.2.5 Applying CERCLA Exposure Assessment Concepts to Stormwater

Given the considerations discussed above, some general assumptions are made to evaluate potential for in-water risk from City outfall discharges.

For the purposes of this evaluation, PCBs are used as an example because of exceedances of CULs.

An average of the Total PCB geomeans from Category 1 and 2 basins is selected for demonstration purposes to represent long-term stormwater concentrations site-wide because these are the basins in which SCMs have been fully implemented. This value is 0.004 microgram per liter ( $\mu\text{g/L}$ ), which is at the far low end of the DEQ industrial stormwater curves for PCBs.

Based on work previously performed by the City (BES, 2006), Portland Harbor area runoff volume contributes between 0.06 and 0.08 percent of total Willamette River flow. This estimate includes all Portland Harbor area runoff; runoff contributions from City stormwater outfalls is only a portion of the total runoff. Thus a conservative long-term estimate of exposure concentrations for all Portland harbor runoff would be 0.08 percent of 0.004  $\mu\text{g/L}$ , which is 0.000003  $\mu\text{g/L}$ . This estimate roughly accounts for conservative considerations of exposure medium, exposure area, duration, and frequency of stormwater contributions to surface water for the purposes of demonstrating potential in-water risk; it does not represent a formal exposure evaluation, and does not include an evaluation the intake parameter values or methodology used to develop the CUL. The CUL for PCBs in surface water in Portland Harbor is 0.0000064  $\mu\text{g/L}$ , which is based on 30 years of exposure through drinking water. The conservative estimate of stormwater contribution to in-water exposure is lower than the CUL, indicating stormwater is not posing unacceptable in-water risk. The surface water CULs for Portland Harbor are the lowest value of site-specific risk-based protective concentrations and ARARs; with few exceptions, the ARAR-based values are lower than the site-specific values. This evaluation shows that stormwater concentrations are lower than ARAR-based CULs for Portland Harbor.

A similar analysis can be performed for loading of solids to the Willamette River from stormwater. The same memorandum describing the City of Portland's loading evaluation (BES, 2006) indicated that the average annual TSS loading for the Portland Harbor area was 0.23 percent of the total Willamette River flow. New limits on TSS in the industrial stormwater permits (DEQ, 2017) will decrease this percentage even more. This small loading percentage combined with post-conceptual-site-model concentrations show that stormwater is not posing unacceptable in-water risk.

## 6. Conclusions

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DEQ Stormwater guidance (DEQ, 2009) states:

“Stormwater is a unique contaminant pathway for the Cleanup Program to address because releases of certain types of contaminants are expected to continue, at some level, due to the nature of industrial operations and other human activities.”

While low levels of contaminants may persist in stormwater, the City’s current and previous work related to source control indicates that stormwater discharging from City outfalls will not contribute to recontamination of the Portland Harbor in-water sediment remedy, and will not pose unacceptable in-water risk, after remaining SCMs are fully implemented.

The source control strategy for the City outfalls has been a collaborative effort with DEQ for more than 10 years. It has included implementation of several City and DEQ-led programs, and is focused on controlling sources at the source. Data show that source control is effective, but a few individual sites still need to complete their source control work. City source control programs that reduce the potential for contaminants to be conveyed via City outfalls will continue into the future. These programs, paired with other regulatory programs such as the industrial stormwater permits (1200z) that recently have been updated to further reduce TSS loading from stormwater, will ensure that sources continue to be controlled.

With the submittal of this report, City responsibilities under the Outfalls Project IGA and additional objectives identified in coordination with DEQ have all been met, and City is requesting that DEQ issue a Notice of Completion for the IGA and a Source Control Decision for the City outfalls.

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Tables

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**Table 1. Summary of Basins Selected for Source Control Measure (SCM) Effectiveness Monitoring in Relation to Oregon Department of Environmental Quality (DEQ) Selection Elements**

Outfall Basin	DEQ Selection Elements <sup>(1)</sup>					
	SCM Type(s)	Existing Basin-Scale Data			Does Outfall Discharge to an Area with High Recontamination Potential?	General Basin Characteristics <sup>(4)</sup>
		Basin-Scale Monitoring Data Previously Collected?	3 or more contaminants exceeding JSCS SLVs and Knees of DEQ Guidance Curves? <sup>(2)</sup>	SCM Effectiveness Demonstration Previously Complete? <sup>(3)</sup>		
<b>Category 1 (Controlled; water quality programs only)</b>						
17	• Programmatic/Water Quality	No	NA	NA	Yes – Guilds Lake Industrial Area (RM9W)	1,486-acre drainage area, most of which is Forest Park; approximately 80 acres is industrial area with a small section of Highway 30. One active Cleanup Program site, and no current NPDES permittees.
M-2	• Programmatic/Water Quality	Yes	No	Yes	Yes – Swan Island Lagoon	135-acre drainage area, entirely light industrial use. Two Cleanup Program sites, and several NPDES permittees.
<b>Category 2 (Controlled; water quality and Cleanup programs)</b>						
44	• Programmatic/Water Quality • City Portland Harbor-specific • Cleanup Program	Yes	Yes	Yes	Yes – RM 11E	16-acre drainage basin currently in light industrial use. Three Cleanup Program sites, and no current NPDES permittees.
53A	• Programmatic/Water Quality • Cleanup Program	Yes	No	Yes (but post-SCM dataset limited to one sample)	No	73-acre drainage basin, with predominantly heavy industrial use. Three Cleanup Program sites and three current NPDES permittees.
<b>Category 3 (Mostly controlled; water quality and Cleanup programs)</b>						
16	• Programmatic/Water Quality • City Portland Harbor-specific • Cleanup Program	Yes	Yes	No (previous data did not include entire basin)	Yes – Guilds Lake Industrial Area (RM9W)	71-acre basin with a mix of heavy/light industrial and commercial uses. Five Cleanup Program sites and four current NPDES permittees.
19	• Programmatic/Water Quality • Cleanup Program	Yes	Yes	Yes	Yes – Guilds Lake Industrial Area (RM9W)	487-acre basin of almost 70% Forest Park and 30% heavy industrial uses. Numerous Cleanup Program sites and NPDES permittees.
45	• Programmatic/Water Quality • City Portland Harbor-specific • Cleanup Program	Yes	Yes	No	Yes – RM 11E	10-acre basin of mixed land use, including heavy industrial and commercial. Two Cleanup Program sites and one current NPDES permittee.
52D	• Programmatic/Water Quality • Cleanup Program	Yes	Yes	No	Yes – International Slip (RM3.5E)	24-acre basin, entirely composed of heavy industrial land use. Two Cleanup Program sites and two NPDES permittees.

**Notes:**

- (1) Generalized description of considerations identified in DEQ’s December 28, 2015, comment letter (DEQ, 2015). In addition to the considerations listed, DEQ recommended that the basins monitored include a representative basin from Outcomes 2 through 6 identified in the City’s *SCM Effectiveness Demonstration* (BES, 2015). The selected basins represent all of these except for Outcome 2 (outfall does not discharge to an identified Area of Potential Concern [AOPC]); Outcome 2 basins are adequately represented by existing data and/or drain small areas that have been almost entirely redeveloped and include stormwater treatment (BES, 2016c).
- (2) JSCS SLVs = screening level values from the Portland Harbor Joint Source Control Strategy (DEQ/EPA, 2005). DEQ Portland Harbor industrial stormwater contaminant curves are presented in DEQ’s stormwater evaluation guidance (DEQ, 2009). Specific contaminants in each basin for which existing data exceed the SLVs and the typical industrial values on the DEQ curves are identified in the *Selection of Outfall Basins for Source Control Measure Effectiveness Monitoring* technical memorandum (BES, 2016c).
- (3) Whether the existing data are sufficient to demonstrate SCM effectiveness depends on whether the data was collected after implementation of the SCMs.
- (4) Detailed descriptions of the outfall basins are provided in the Closure Report provided as Appendix B to the *Municipal Stormwater Source Control Report for Portland Harbor* (BES, 2013).

**Table 2. Summary of SCM Effectiveness Assessment Results**

Outfall Basin	Contaminant	2015-2017 Monitoring Results <sup>(1)</sup>		Basin Geomean from Previous Monitoring <sup>(3)</sup>	Percent Reduction, Geomean
		Basin Geomean	Individual Data Points > Typical <sup>(2)</sup>		
<b>Category 1 - SCMs are City and State water quality programmatic measures</b>					
Basin 17	Arsenic	1.41	1	--	--
	Cadmium	0.121	0	--	--
	Chromium	2.81	0	--	--
	Copper	10.4	0	--	--
	Lead	5.12	0	--	--
	Mercury	0.0112	0	--	--
	Nickel	2.32	0	--	--
	Silver	0.100 U	0	--	--
	Zinc	59.1	0	--	--
	BEHP	1.2	0	--	--
	Total PAHs	0.40	0	--	--
	Total PCBs	0.00396	0	--	--

*Overall assessment for Basin 17:* The monitoring results indicate the collective effectiveness of the SCMs being implemented in this basin.

**Table 2. Summary of SCM Effectiveness Assessment Results**

Outfall Basin	Contaminant	2015-2017 Monitoring Results <sup>(1)</sup>		Basin Geomean from Previous Monitoring <sup>(3)</sup>	Percent Reduction, Geomean
		Basin Geomean	Individual Data Points > Typical <sup>(2)</sup>		
Basin M-2	Arsenic	0.654	0	1.89	-65%
	Cadmium	0.104	0	0.319	-67%
	Chromium	1.46	0	2.17	-33%
	Copper	6.70	0	13.9	-52%
	Lead	2.17	0	4.25	-49%
	Mercury	0.00460	0	0.009	-49%
	Nickel	1.18	0	2.53	-53%
	Silver	0.100 U	0	0.16	--
	Zinc	62.8	0	129	-51%
	BEHP	1.4	0	0.88	<i>increase</i>
	Total PAHs	0.29	0	0.18	<i>increase</i>
	Total PCBs	0.00295	0	0.00510	-42%

*Overall assessment for Basin M-2* : The monitoring results indicate the collective effectiveness of the SCMs being implemented in this basin.

**Table 2. Summary of SCM Effectiveness Assessment Results**

Outfall Basin	Contaminant	2015-2017 Monitoring Results <sup>(1)</sup>		Basin Geomean from Previous Monitoring <sup>(3)</sup>	Percent Reduction, Geomean
		Basin Geomean	Individual Data Points > Typical <sup>(2)</sup>		
<b>Category 2 - SCMs include City and State programmatic stormwater measures and measures implemented at upland sites under the DEQ Cleanup Program, and SCMs have been fully implemented</b>					
Basin 44	Arsenic	0.658	0	1.85	-64%
	Cadmium	0.217	0	0.57	-62%
	Chromium	2.64	0	6.27	-58%
	Copper	13.6	0	22	-38%
	Lead	6.72	0	17.9	-62%
	Mercury	0.00985	0	0.021	-53%
	Nickel	1.99	0	4.8	-59%
	Silver	0.100 U	0	0.108 U	--
	Zinc	79.5	0	173	-54%
	BEHP	3.4	2	1.67	<i>increase</i>
	Total PAHs	0.90	0	0.733	<i>increase</i>
	Total PCBs	0.00699	0	0.249 (pre-SCM) / 0.0604 (post-SCM)	-97%

*Overall assessment for Basin 44* : With the exception of BEHP, the monitoring results indicate the collective effectiveness of the SCMs being implemented in this basin. BEHP concentrations are generally above the "typical" range of the DEQ stormwater guidance curve, but even the highest BEHP concentration (4.1 µg/L) is only moderately above this range. Relative to the previous datasets, concentrations for most contaminants have decreased, further indicating the overall effectiveness of the SCMs in this basin.

**Table 2. Summary of SCM Effectiveness Assessment Results**

Outfall Basin	Contaminant	2015-2017 Monitoring Results <sup>(1)</sup>		Basin Geomean from Previous Monitoring <sup>(3)</sup>	Percent Reduction, Geomean
		Basin Geomean	Individual Data Points > Typical <sup>(2)</sup>		
Basin 53A	Arsenic	1.08	0	4.46 (pre-SCM) / 0.69 (post-SCM)	-76%
	Cadmium	0.243	0	0.359 (pre-SCM) / 0.14 (post-SCM)	-32%
	Chromium	18.9	1	42.0 (pre-SCM) / 12 (post-SCM)	-55%
	Copper	13.2	0	23.1 (pre-SCM) / 7.97 (post-SCM)	-43%
	Lead	11.4	0	16.2 (pre-SCM) / 4.24 (post-SCM)	-30%
	Mercury	0.00919	0	0.033 (pre-SCM) / 0.0069 (post-SCM)	-72%
	Nickel	3.45	0	5.82 (pre-SCM) / 2.13 (post-SCM)	-41%
	Silver	0.118	0	0.128 (pre-SCM) / 0.1 U (post-SCM)	-8%
	Zinc	306	0	459 (pre-SCM) / 337 (post-SCM)	-33%
	BEHP	1.4	0	1.04 (pre-SCM) / NA (post-SCM)	<i>no change</i>
	Total PAHs	1.2	2	0.65 (pre-SCM) / NA (post-SCM)	<i>increase</i>
	Total PCBs	0.00240	0	0.0373 (pre-SCM) / 0.000278 (post-SCM)	-94%

*Overall assessment for Basin 53A* : With the exception of chromium, the monitoring results indicate the collective effectiveness of the SCMs being implemented in this basin.

**Table 2. Summary of SCM Effectiveness Assessment Results**

Outfall Basin	Contaminant	2015-2017 Monitoring Results <sup>(1)</sup>		Basin Geomean from Previous Monitoring <sup>(3)</sup>	Percent Reduction, Geomean
		Basin Geomean	Individual Data Points > Typical <sup>(2)</sup>		
<b>Category 3 - SCMs include City and State programmatic stormwater measures and measures implemented at upland sites under the DEQ Cleanup Program; source control implementation is mostly but not fully complete</b>					
Basin 16	Arsenic	1.41	0	Note <sup>(5)</sup> 0.60	increase
	Cadmium	0.313	0	0.65	-52%
	Chromium	3.67	0	6.1	-40%
	Copper	22.3	0	50.4	-56%
	Lead	10.6	0	26.9	-61%
	Mercury	0.0136	0	0.046	-70%
	Nickel	3.29	0	5.27	-38%
	Silver	0.100 U	0	0.068	--
	Zinc	105	0	183	-43%
	BEHP	3.2	1	NA	--
	Total PAHs	0.73	1	0.75	-3%
Total PCBs	0.00888	0	0.134	-93%	

*Overall assessment for Basin 16:* The monitoring results indicate the collective effectiveness of the SCMs being implemented in this basin, with the exception that additional upland SCMs are needed to control an identified ongoing source of BEHP, which is the only contaminant evaluated for which the basin geomean is elevated (slightly) based on comparison to the DEQ stormwater guidance curve. It is anticipated that ongoing implementation and refinement of SCMs at this site (Calbag Metals - Nicolai) under the DEQ Cleanup Program will reduce concentrations of BEHP and other contaminants (including cadmium and PAHs) being discharged to the Basin 16 conveyance system.

**Table 2. Summary of SCM Effectiveness Assessment Results**

Outfall Basin	Contaminant	2015-2017 Monitoring Results <sup>(1)</sup>		Basin Geomean from Previous Monitoring <sup>(3)</sup>	Percent Reduction, Geomean
		Basin Geomean	Individual Data Points > Typical <sup>(2)</sup>		
Basin 19	Arsenic	1.39	0	1.27	stable
	Cadmium	0.163	0	0.32	-49%
	Chromium	3.04	0	5.56	-45%
	Copper	14.9	1	18.3	-19%
	Lead	13.2	0	18.8	-30%
	Mercury	0.0250	0	0.034	-26%
	Nickel	2.31	0	4.58	-50%
	Silver	0.100 U	0	0.087	--
	Zinc	155	0	204	-24%
	BEHP	2.2	0	6.9	-67%
	Total PAHs	0.61	0	0.49	increase
	Total PCBs	0.00837	0	0.0280	-70%

*Overall assessment for Basin 19* : The monitoring results indicate the collective effectiveness of the SCMs being implemented in this basin. Geomean values are not elevated compared to the DEQ stormwater guidance curves. In addition, for all but two of the curve contaminants, the geomeans also are lower than the geomeans for the previous data, indicating a decreasing trend. The SCM effectiveness monitoring results from the paired/upgradient sampling location in this basin (Calbag Metals - Front) indicate this site is a current source of two of the three contaminants (copper and BEHP) for which individual data points were elevated compared to the curves. It is anticipated that ongoing implementation and refinement of SCMs at this site under the DEQ Cleanup Program will result in further reduction in concentrations of these contaminants conveyance system.

**Table 2. Summary of SCM Effectiveness Assessment Results**

Outfall Basin	Contaminant	2015-2017 Monitoring Results <sup>(1)</sup>		Basin Geomean from Previous Monitoring <sup>(3)</sup>	Percent Reduction, Geomean
		Basin Geomean	Individual Data Points > Typical <sup>(2)</sup>		
Basin 45	Arsenic	1.00	0	1.42	-29%
	Cadmium	0.237	0	0.577	-59%
	Chromium	8.06	0	15.2	-47%
	Copper	14.6	0	29.4	-50%
	Lead	9.51	0	23.2	-59%
	Mercury	0.0118	0	0.021	-44%
	Nickel	6.32	0	11.8	-46%
	Silver	0.100 U	0	0.122	--
	Zinc	336	0	327	<i>increase</i>
	BEHP	2.7	1	3.27	-17%
	Total PAHs	2.0	2	1.02	<i>increase</i>
Total PCBs	0.00392	0	0.0227	-83%	

*Overall assessment for Basin 45* : With the exception of total PAHs, the monitoring results indicate the collective effectiveness of the SCMs being implemented in this basin. The geomean for total PAHs is only slightly above the "typical" range of the curve, and only one sample collected during the monitoring had a total PAHs concentration that was above the "typical" range.

**Table 2. Summary of SCM Effectiveness Assessment Results**

Outfall Basin	Contaminant	2015-2017 Monitoring Results <sup>(1)</sup>		Basin Geomean from Previous Monitoring <sup>(3)</sup>	Percent Reduction, Geomean
		Basin Geomean	Individual Data Points > Typical <sup>(2)</sup>		
Basin 52D	Arsenic	1.64	1	1.38	increase
	Cadmium	0.466	2	0.691	-33%
	Chromium	38.2	2	80.9	-53%
	Copper	29	0	35.3	-18%
	Lead	21.6	2	25.2	-14%
	Mercury	0.0211	0	0.05 U	--
	Nickel	7.23	1	6.93	increase
	Silver	0.102	0	0.39 U	--
	Zinc	274	0	225	increase
	BEHP	1.9	0	5	-62%
	Total PAHs	1.0	2	1.13	-12%
	Total PCBs	0.0527	0	0.0620	-15%

*Overall assessment for Basin 52D* : SCM effectiveness monitoring at the basin scale was paired with monitoring at the upgradient point of discharge of the stormwater treatment swale for the Portland Container site. During two of the three stormwater sampling events in Basin 52D, the Portland Container swale was discharging, and the analytical results from this discharge point indicated that concentrations of almost all of the contaminants listed above were elevated compared to the DEQ charts of contaminant concentration data from stormwater samples collected at Portland Harbor-area industrial sites (DEQ stormwater guidance curves). Several of these contaminants also were elevated in the two basin-scale samples collected when the Portland Container swale was discharging - but notably were not elevated in the basin-scale sample collected when the Portland Container swale was not discharging. These findings indicated that adequate source controls were not yet in place at this major upland source, and SCM effectiveness monitoring in Basin 52D was therefore discontinued after three sampling events.

**Notes:**

-- = no previous data, or non-detects prevent calculation of percent change

BEHP = bis(2-ethylhexyl)phthalate

DEQ = Oregon Department of Environmental Quality

Geomean = geometric mean.

NA = not analyzed

PAH = polycyclic aromatic hydrocarbons

PCB = polychlorinated biphenyls

SCM = source control measure

U = concentrations for all samples are below the laboratory method reporting limit indicated.

µg/L = micrograms per liter

<sup>(1)</sup> Data are presented in Tables A-1 through A-10 in Appendix A (Data Report).

<sup>(2)</sup> "Typical" range is based on comparison to DEQ charts of contaminant concentration data from stormwater samples collected at Portland Harbor-area industrial sites. Source: *DEQ Guidance for Evaluating the Stormwater Pathway at Upland Sites – Appendix E: Tool for Evaluating Stormwater Data* prepared by DEQ, dated January 2009 (updated December 2015).

<sup>(3)</sup> Geomean values for previously collected data, and identification of the source data sets by basin, are included in Appendix A of the *Source Control Measures Effectiveness Demonstration*, prepared by the City of Portland Bureau of Environmental Services, dated September 2015.

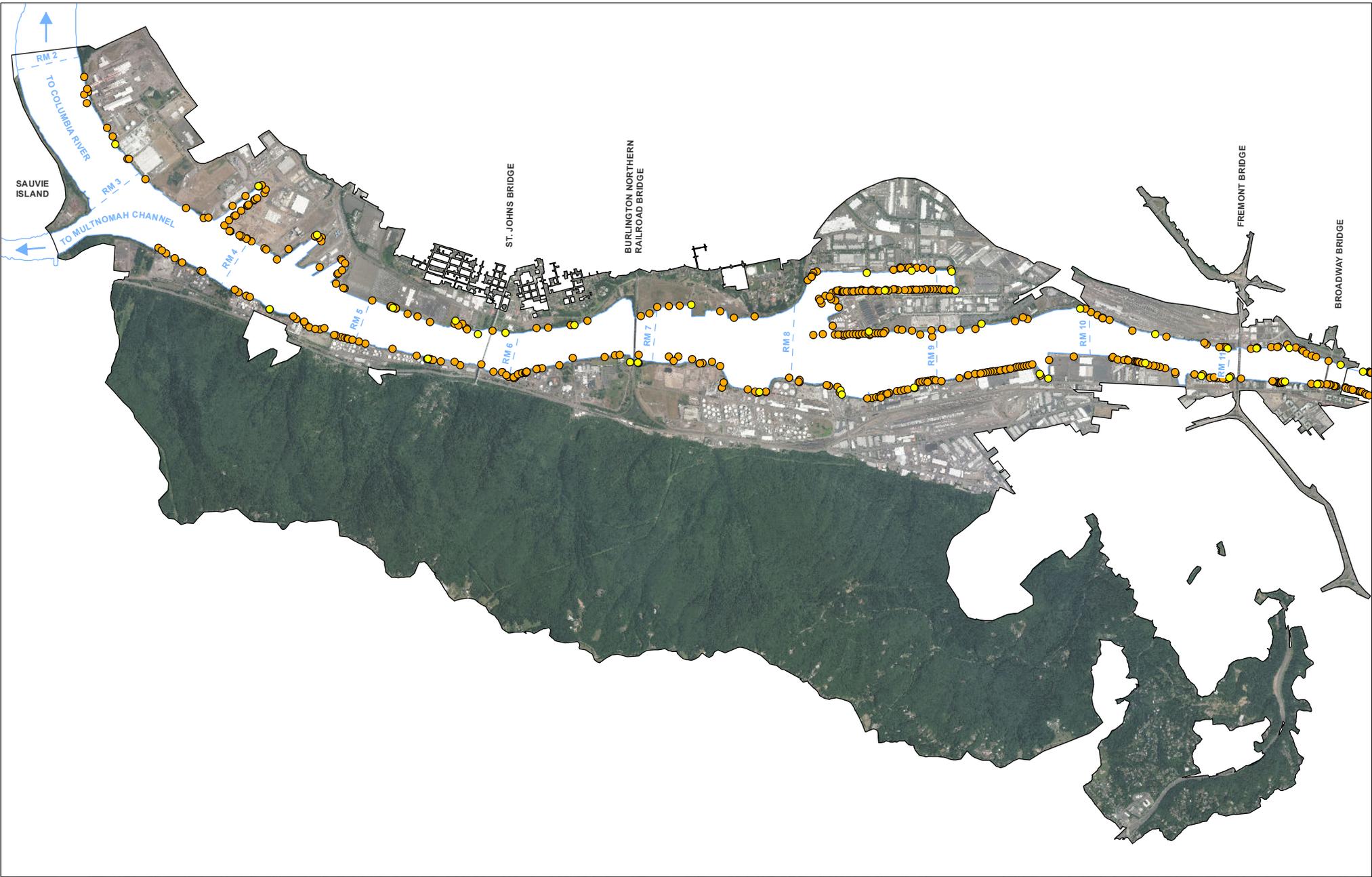
<sup>(4)</sup> Criteria for the SCM effectiveness assessment are established in the data quality objectives (DQOs) of the revised Sampling and Analysis Plan, prepared by the City of Portland, dated February 8, 2016.

<sup>(5)</sup> The previous sampling in the Basin 16 trunk line was conducted at a location that represented only about 75% of the basin, and therefore the previous data are not directly comparable to the 2015-2017 monitoring results, which are from a location that represents most of the basin.

**Figures**

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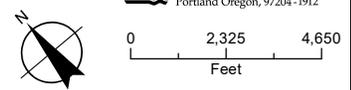
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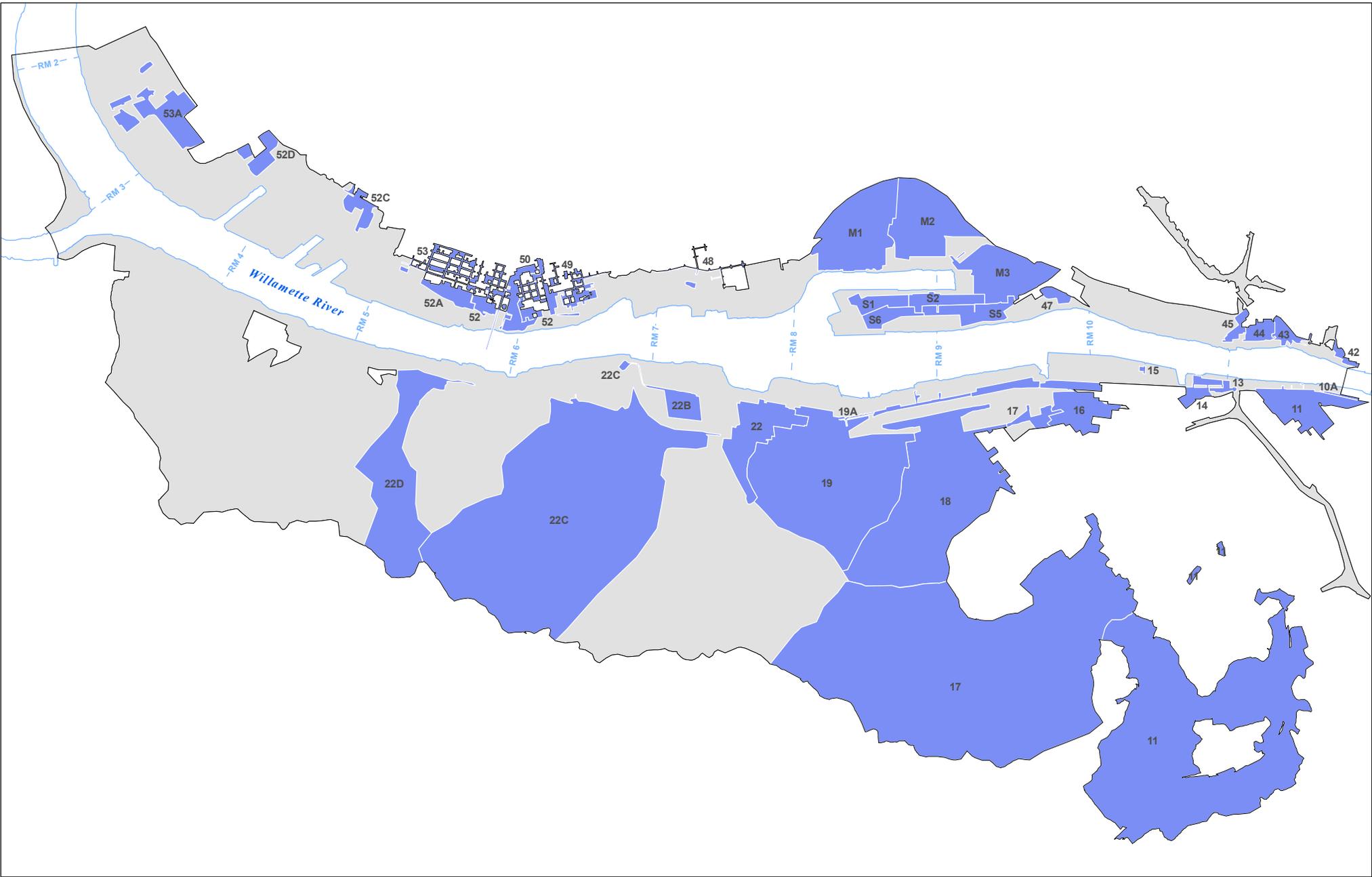


- LEGEND**
- City Outfall
  - Non-City Outfall
  - River Mile (RM)
  - Portland Harbor Hydroboundary

**FIGURE 1**  
**Portland Harbor Overview**

ENVIRONMENTAL SERVICES  
 CITY OF PORTLAND  
 1120 SW Fifth Avenue, Room 1000  
 Portland Oregon, 97204-1912





**LEGEND**

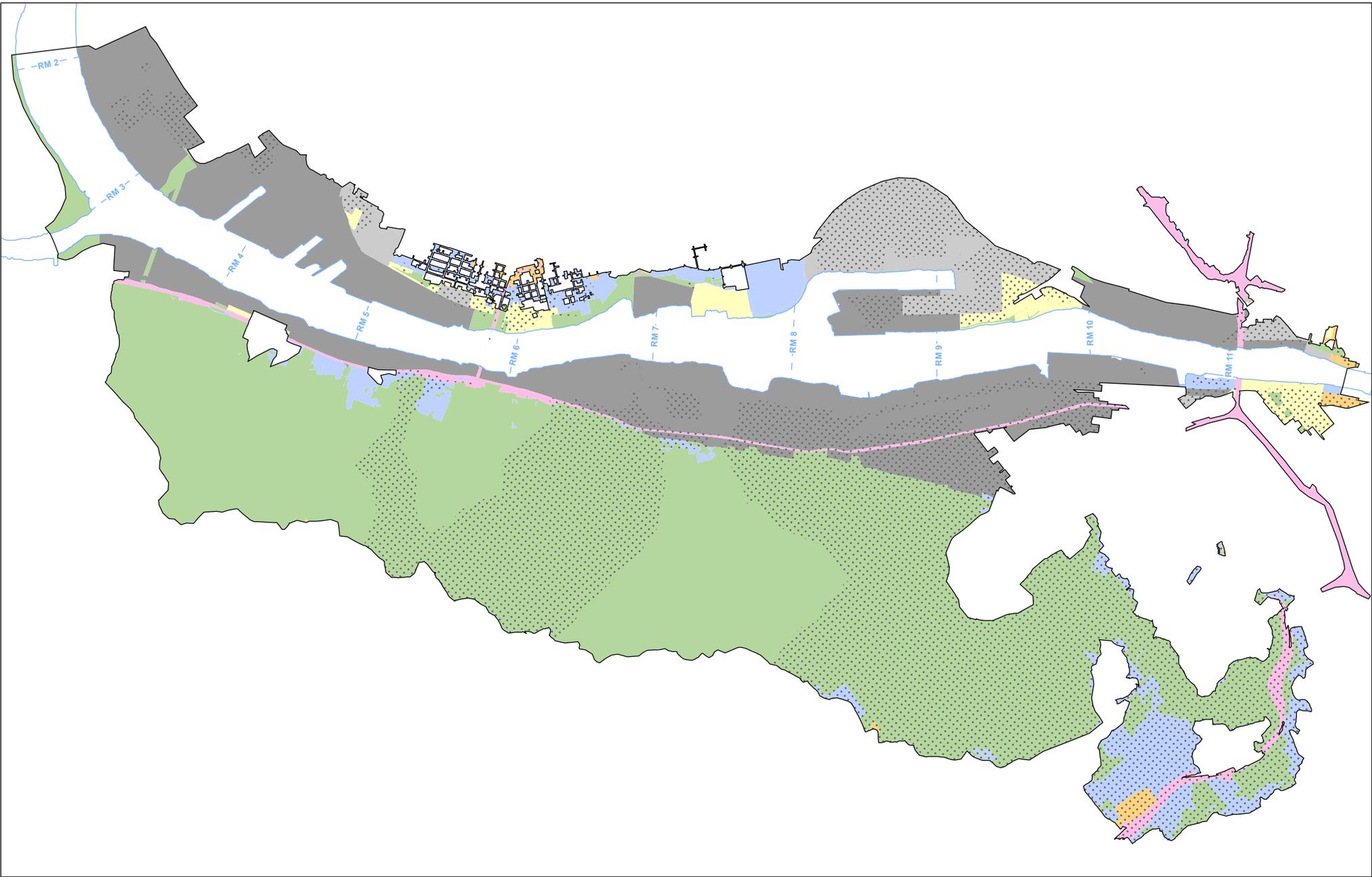
- City Outfall Basin
- Non-City Outfall Drainage Area
- All Other Features**
- River Mile (RM)
- Portland Harbor Hydroboundary

Date: June 8, 2017  
 Data Sources: BES

**FIGURE 2**  
**Current City Outfall Basins**

ENVIRONMENTAL SERVICES  
 CITY OF PORTLAND  
 1120 SW Fifth Avenue, Room 1000  
 Portland Oregon, 97204-1912

0 2,325 4,650  
 Feet



**LEGEND**

- City Outfall Basin
- River Mile (RM)
- Portland Harbor Hydroboundary

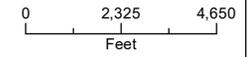
**Land Use/Zoning**

- |                    |                      |
|--------------------|----------------------|
| Heavy Industrial   | Residential          |
| Light Industrial   | Parks and Open Space |
| General Employment | Major Transportation |
| Commercial         |                      |

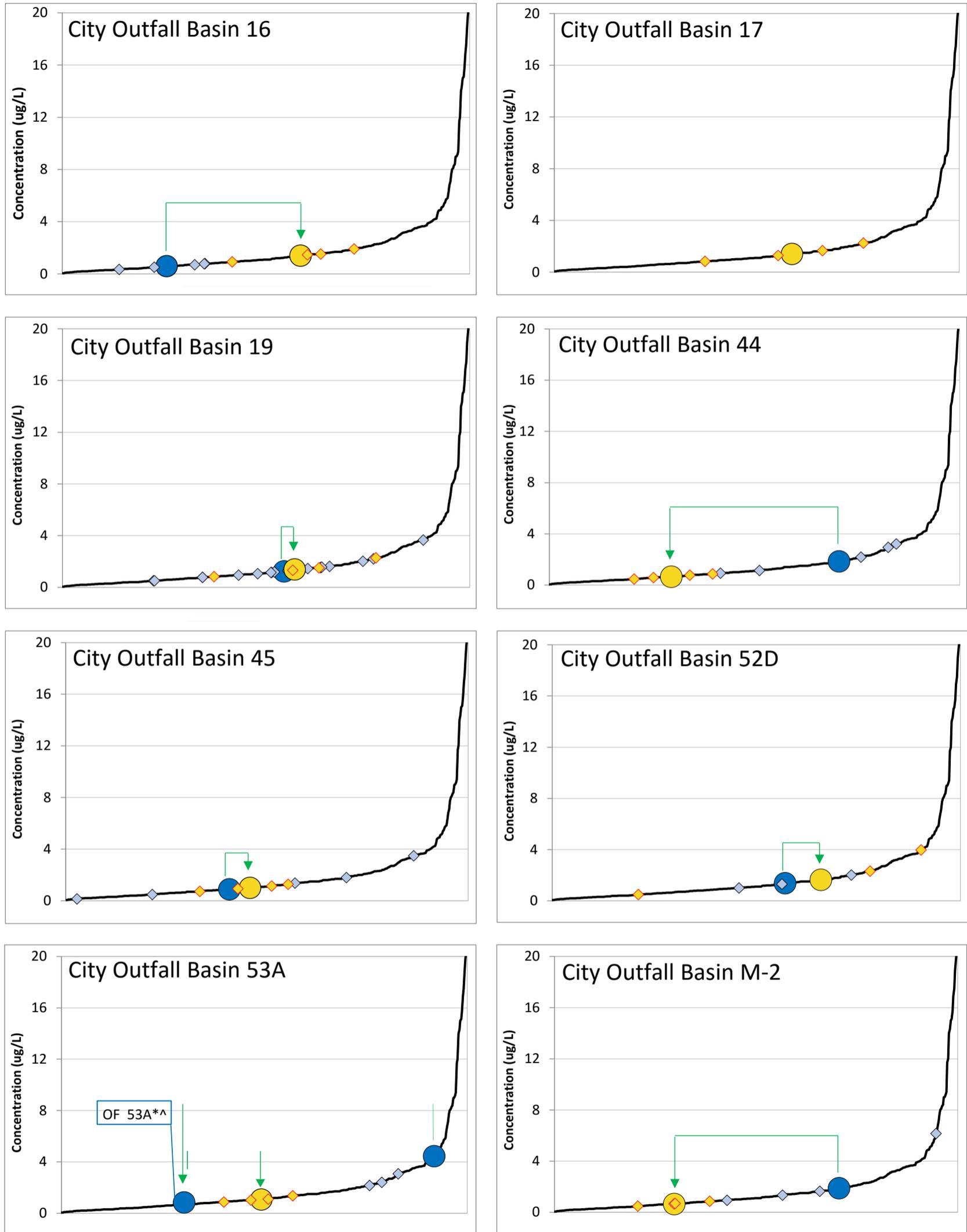
**FIGURE 3**

**Portland Harbor Land Use**

ENVIRONMENTAL SERVICES  
 CITY OF PORTLAND  
 1120 SW Fifth Avenue, Room 1000  
 Portland Oregon, 97204-1912



**Figure 4. City Outfalls Data Relative to DEQ Data Curve for Arsenic in Stormwater at Portland Harbor Heavy Industrial Sites<sup>(1)</sup>**



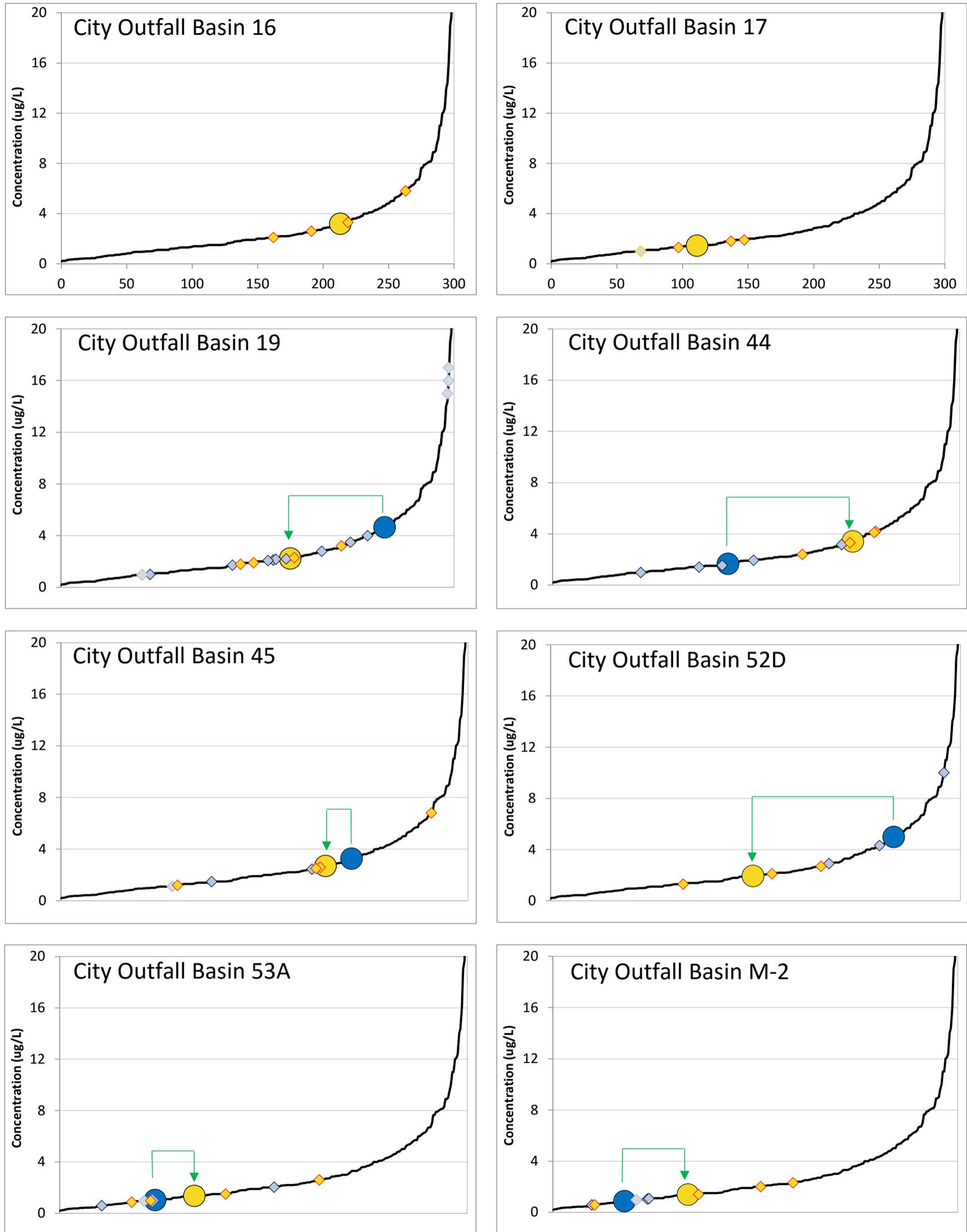
**Legend:** 2015 - 2017 SCM Effectiveness Data: ● Geomean    ◆ Detected individual event concentrations    ◆ Non-detected individual event concentrations  
 Earlier Data (2006 - 2014): ● Geomean    ◆ Detected individual event concentrations    ◆ Non-detected individual event concentrations  
 ↘ Change in geomean from historic samples to current monitoring event    — DEQ Stormwater Data at Portland Harbor Heavy Industrial Sites

(1) Curve Source: Oregon Department of Environmental Quality (DEQ), "Tool for Evaluating Stormwater Data" – Appendix E to Guidance for Evaluating the Stormwater Pathway at Upland Sites. January 2009 (updated December 2015).

\* = post-SCM data

^ = value represents single event

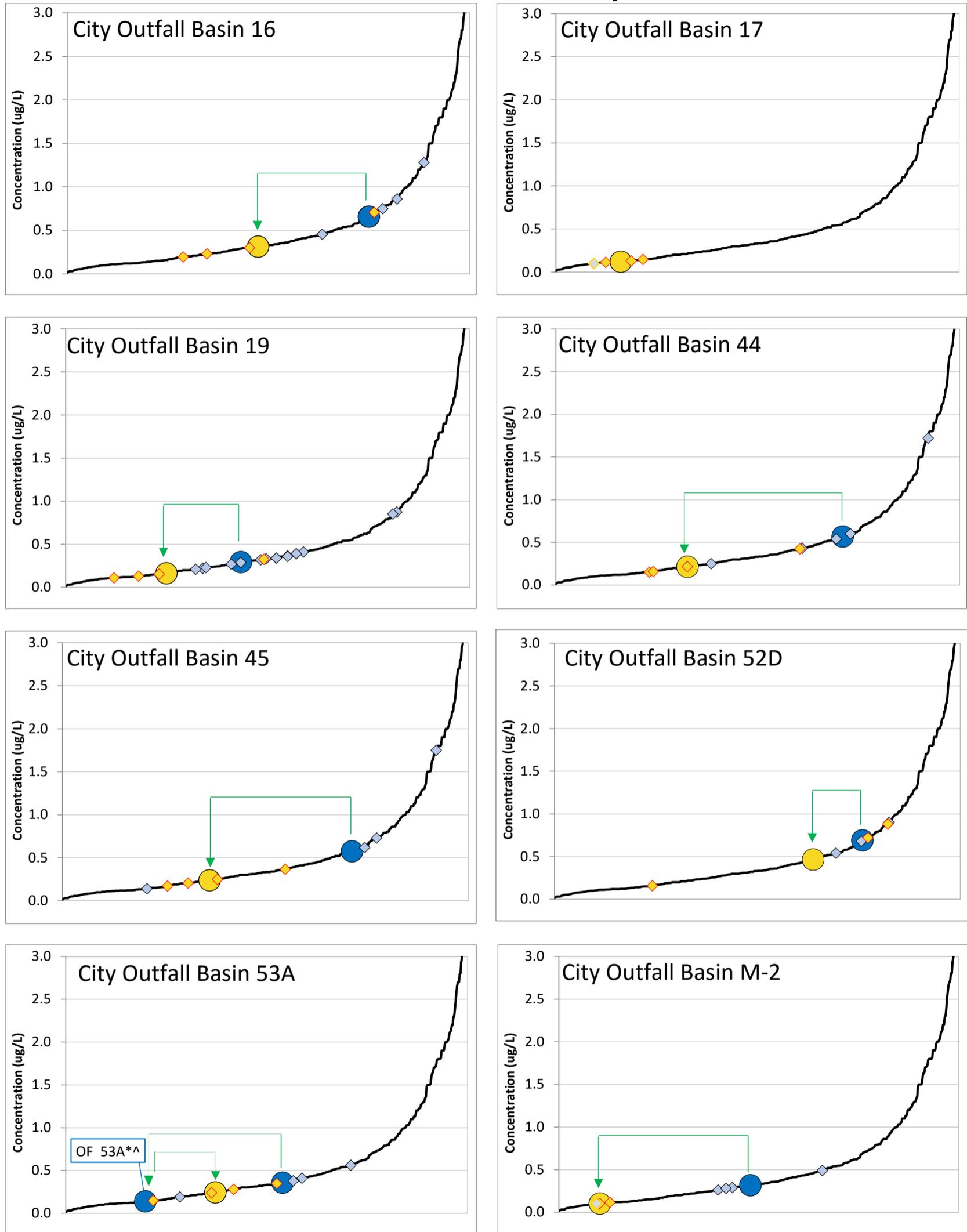
**Figure 5. City Outfalls Data Relative to DEQ Data Curve for BEHP in Stormwater at Portland Harbor Heavy Industrial Sites<sup>(1)</sup>**



**Legend:** 2015 - 2017 SCM Effectiveness Data: ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations  
 Earlier Data (2006 - 2014): ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations  
↘ Change in geomean from historic samples to current monitoring event — DEQ Stormwater Data at Portland Harbor Heavy Industrial Sites

(1) Curve Source: Oregon Department of Environmental Quality (DEQ), "Tool for Evaluating Stormwater Data" – Appendix E to Guidance for Evaluating the Stormwater Pathway at Upland Sites. January 2009 (updated December 2015).

**Figure 6. City Outfalls Data Relative to DEQ Data Curve for Cadmium in Stormwater at Portland Harbor Heavy Industrial Sites<sup>(1)</sup>**

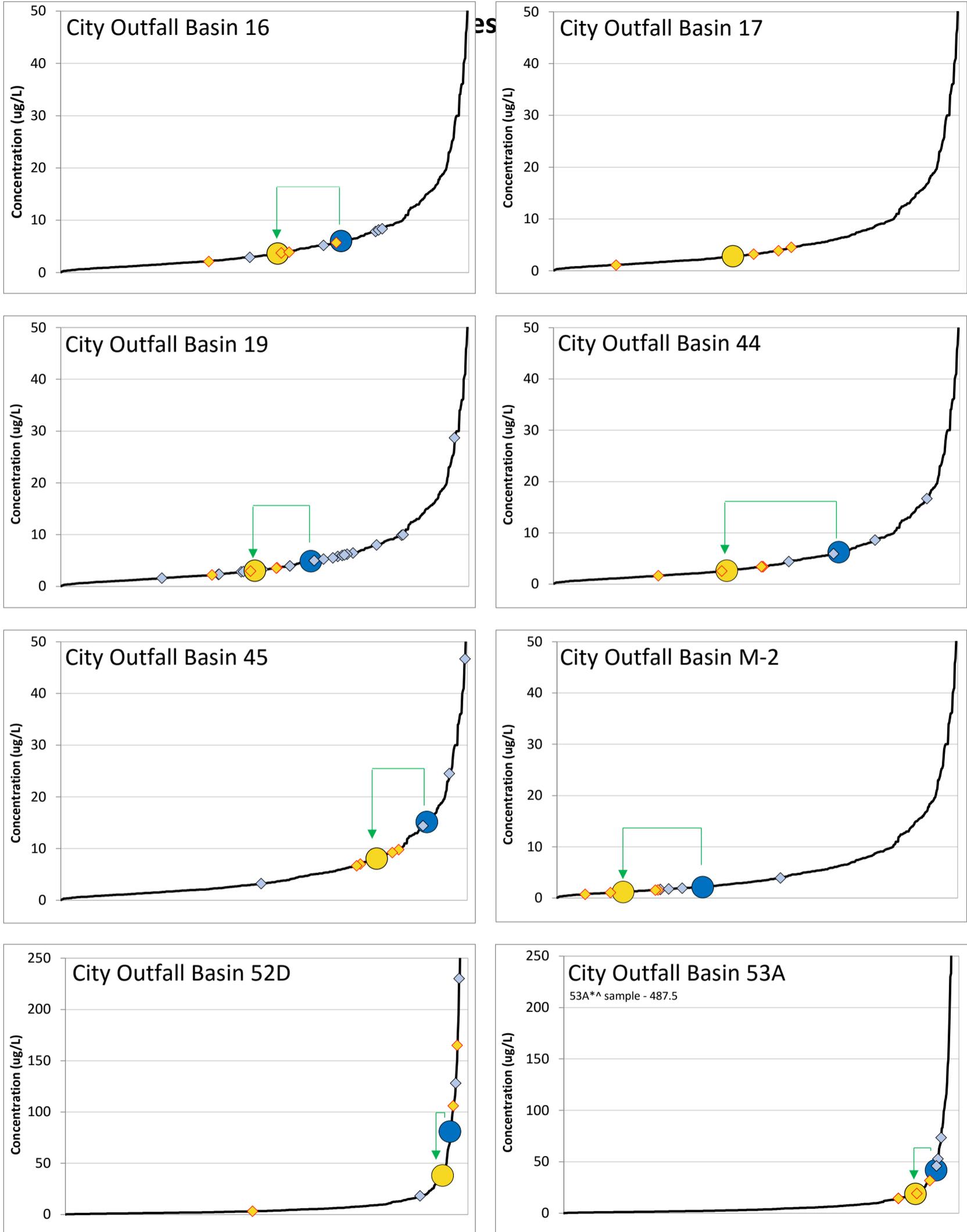


**Legend:** 2015 - 2017 SCM Effectiveness Data: ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations  
 Earlier Data (2005 - 2014): ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations  
↘ Change in geomean from historic samples to current monitoring event — DEQ Stormwater Data at Portland Harbor Heavy Industrial Sites

(1) *Curve Source:* Oregon Department of Environmental Quality (DEQ), "Tool for Evaluating Stormwater Data" – Appendix E to Guidance for Evaluating the Stormwater Pathway at Upland Sites. January 2009 (updated December 2015).

\* = post-SCM data  
 ^ = value represents single event

**Figure 7. City Outfalls Data Relative to DEQ Data Curve for Chromium in Stormwater at Portland Harbor Heavy Industrial**



**Legend:** 2015 - 2017 SCM Effectiveness Data: ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations  
 Earlier Data (2005 - 2014): ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations

↘ Change in geomean from historic samples to current monitoring event

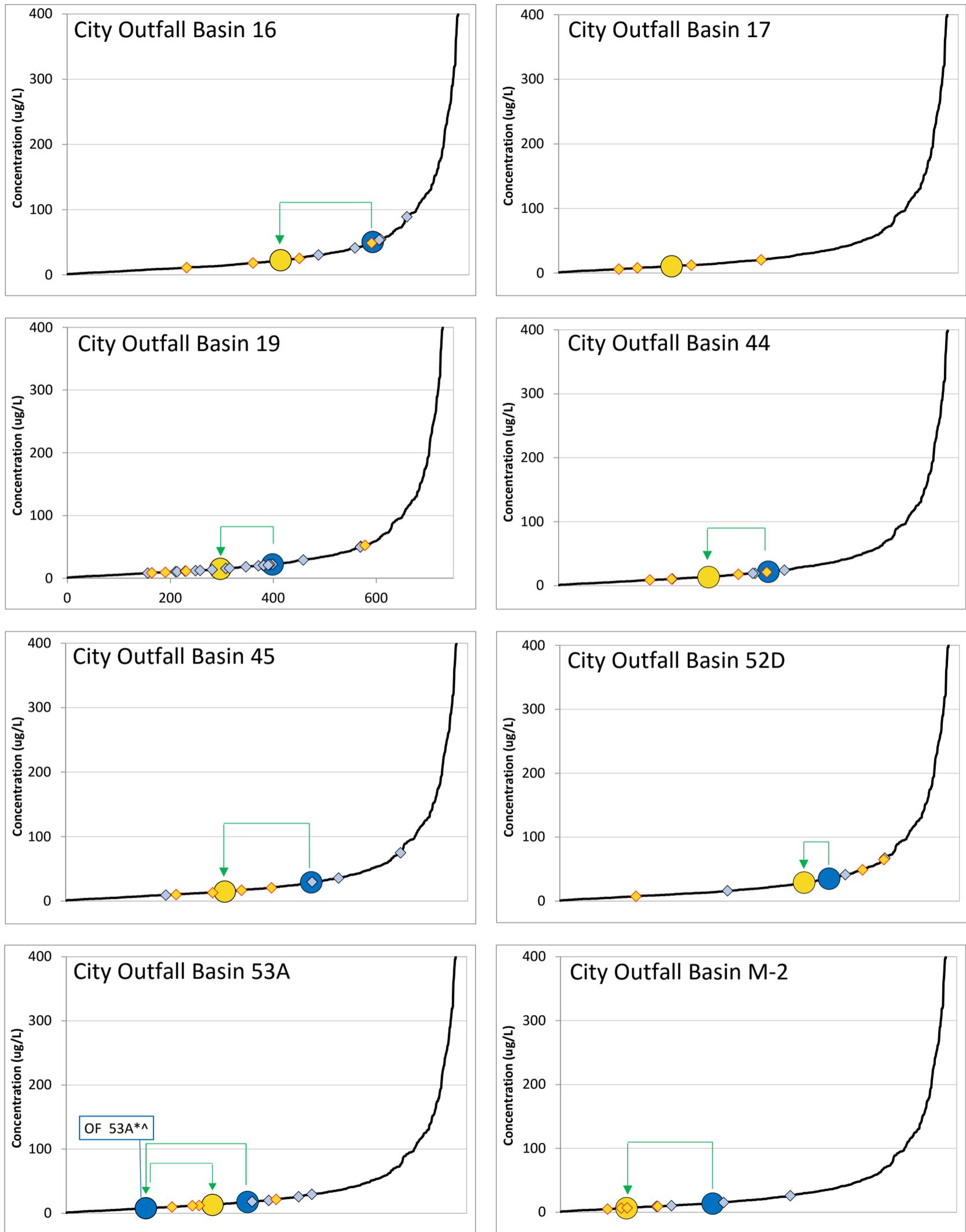
DEQ Stormwater Data at Portland Harbor Heavy Industrial Sites

(1) Curve Source: Oregon Department of Environmental Quality (DEQ), "Tool for Evaluating Stormwater Data" – Appendix E to Guidance for Evaluating the Stormwater Pathway at Upland Sites. January 2009 (updated December 2015).

\* = post-SCM data

^ = value represents single event

**Figure 8. City Outfalls Data Relative to DEQ Data Curve for Copper in Stormwater at Portland Harbor Heavy Industrial Sites<sup>(1)</sup>**



**Legend:** 2015 - 2017 SCM Effectiveness Data: ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations  
 Earlier Data (2006 - 2014): ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations

↔ Change in geomean from historic samples to current monitoring event

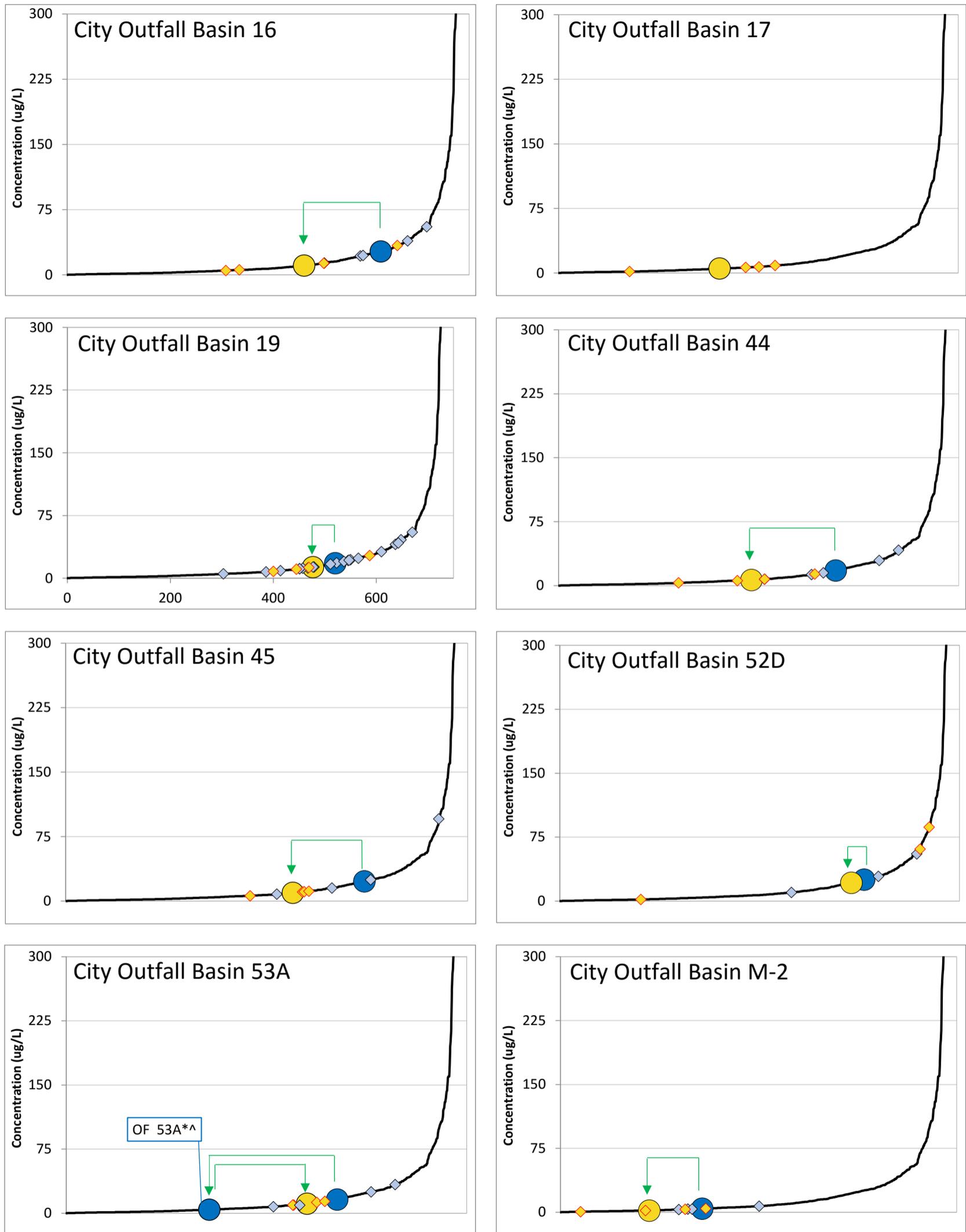
DEQ Stormwater Data at Portland Harbor Heavy Industrial Sites

(1) *Curve Source:* Oregon Department of Environmental Quality (DEQ), "Tool for Evaluating Stormwater Data" – Appendix E to Guidance for Evaluating the Stormwater Pathway at Upland Sites. January 2009 (updated December 2015).

\* = post-SCM data

^ = value represents single event

**Figure 9. City Outfalls Data Relative to DEQ Data Curve for Lead in Stormwater at Portland Harbor Heavy Industrial Sites<sup>(1)</sup>**



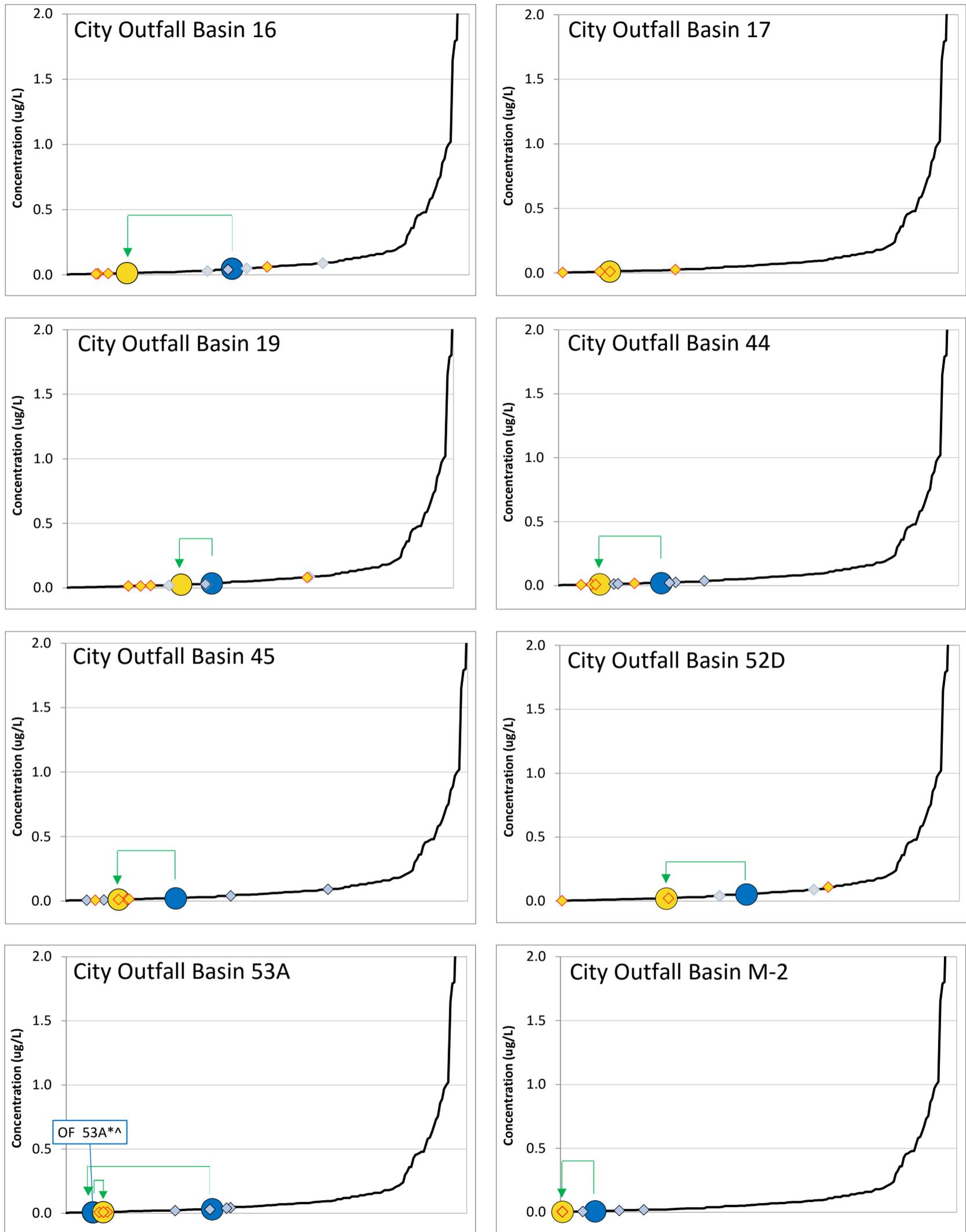
**Legend:** 2015 - 2017 SCM Effectiveness Data: ● Geomean ◆ Detected individual event concentrations  Non-detected individual event concentrations  
 Earlier Data (2006 - 2014): ● Geomean ◆ Detected individual event concentrations  Non-detected individual event concentrations  
↘ Change in geomean from historic samples to current monitoring event — DEQ Stormwater Data at Portland Harbor Heavy Industrial Sites

(1) Curve Source: Oregon Department of Environmental Quality (DEQ), "Tool for Evaluating Stormwater Data" – Appendix E to Guidance for Evaluating the Stormwater Pathway at Upland Sites. January 2009 (updated December 2015).

\* = post-SCM data

^ = value represents single event

**Figure 10. City Outfalls Data Relative to DEQ Data Curve for Mercury in Stormwater at Portland Harbor Heavy Industrial Sites<sup>(1)</sup>**



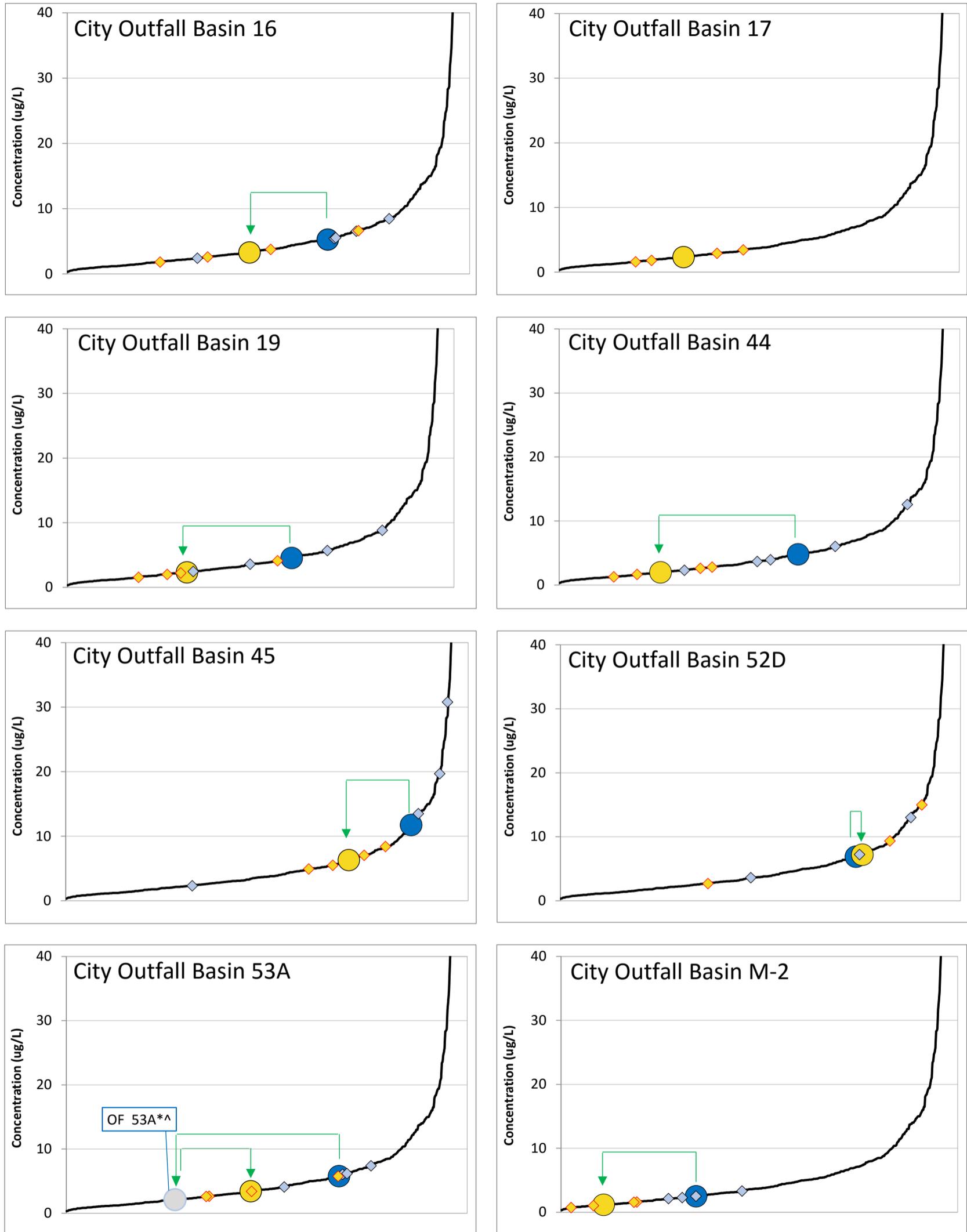
**Legend:** 2015 - 2017 SCM Effectiveness Data: ● Geomean ◆ Detected individual event concentrations ◇ Non-detected individual event concentrations  
 Earlier Data (2006 - 2014): ● Geomean ◆ Detected individual event concentrations ◇ Non-detected individual event concentrations  
↘ Change in geomean from historic samples to current monitoring event — DEQ Stormwater Data at Portland Harbor Heavy Industrial Sites

(1) *Curve Source:* Oregon Department of Environmental Quality (DEQ), "Tool for Evaluating Stormwater Data" – Appendix E to Guidance for Evaluating the Stormwater Pathway at Upland Sites. January 2009 (updated December 2015).

\* = post-SCM data

^ = value represents single event

**Figure 11. City Outfalls Data Relative to DEQ Data Curve for Nickel in Stormwater at Portland Harbor Heavy Industrial Sites<sup>(1)</sup>**



**Legend:** 2015 - 2017 SCM Effectiveness Data: ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations  
 Earlier Data (2006 - 2014): ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations

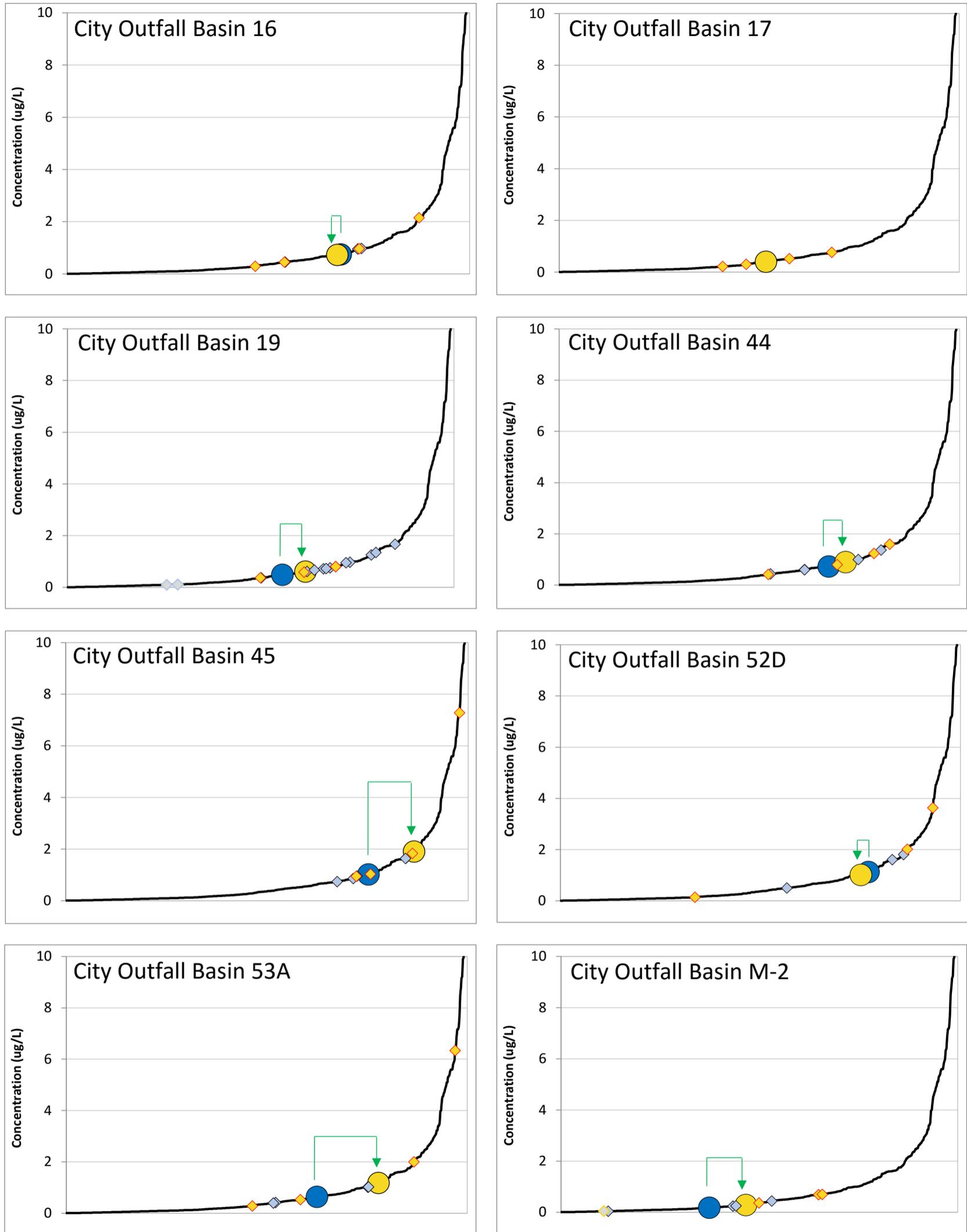
↘ Change in geomean from historic samples to current monitoring event — DEQ Stormwater Data at Portland Harbor Heavy Industrial Sites

(1) Curve Source: Oregon Department of Environmental Quality (DEQ), "Tool for Evaluating Stormwater Data" – Appendix E to Guidance for Evaluating the Stormwater Pathway at Upland Sites. January 2009 (updated December 2015).

\* = post-SCM data

^ = value represents single event

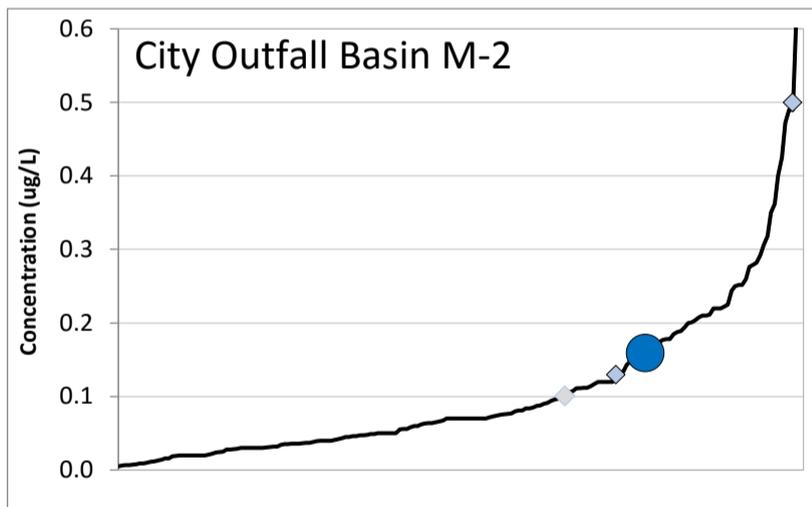
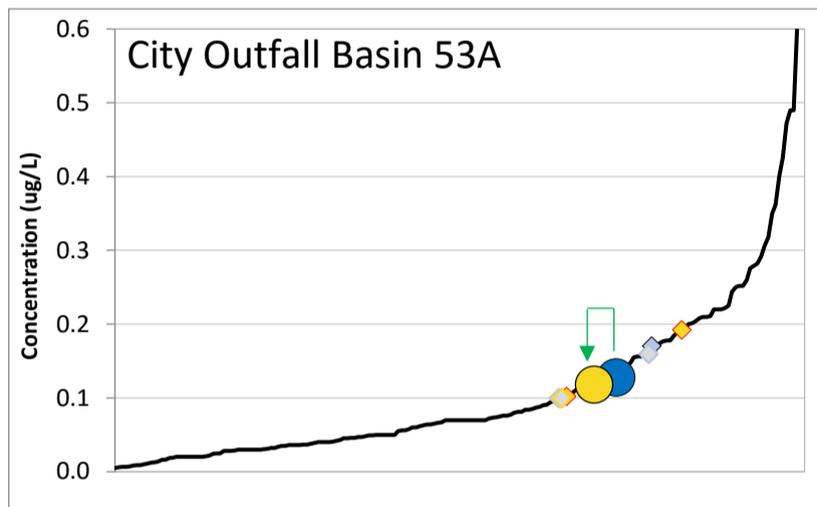
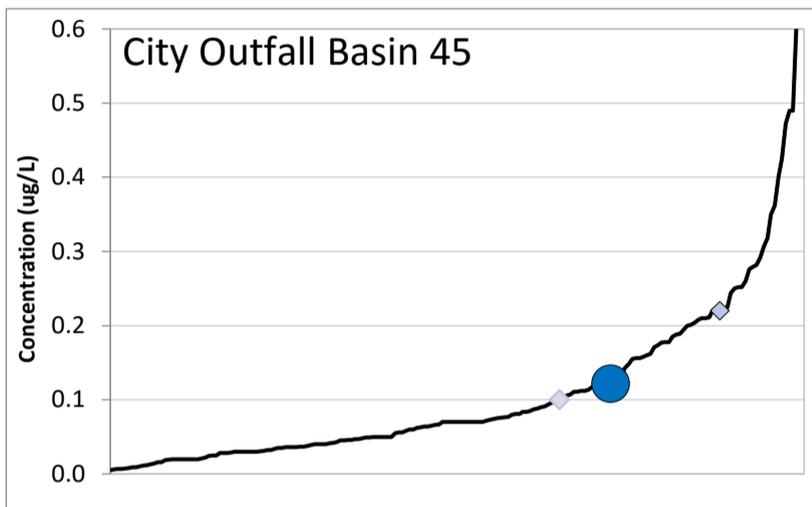
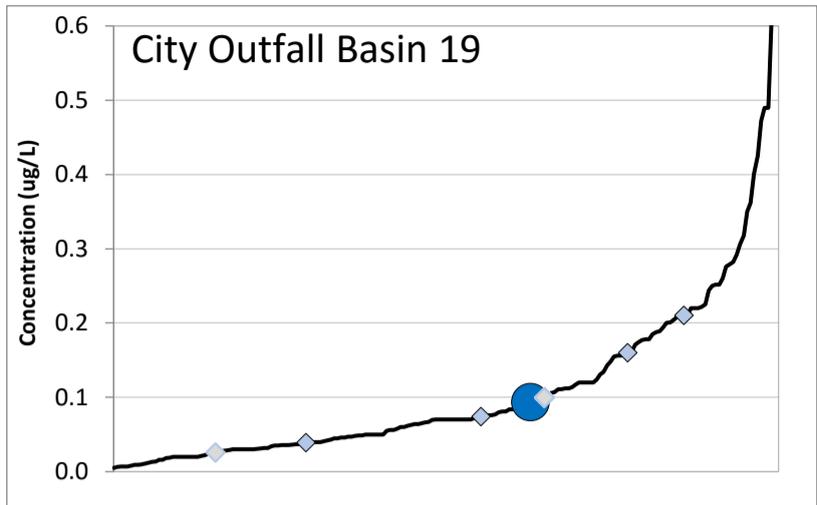
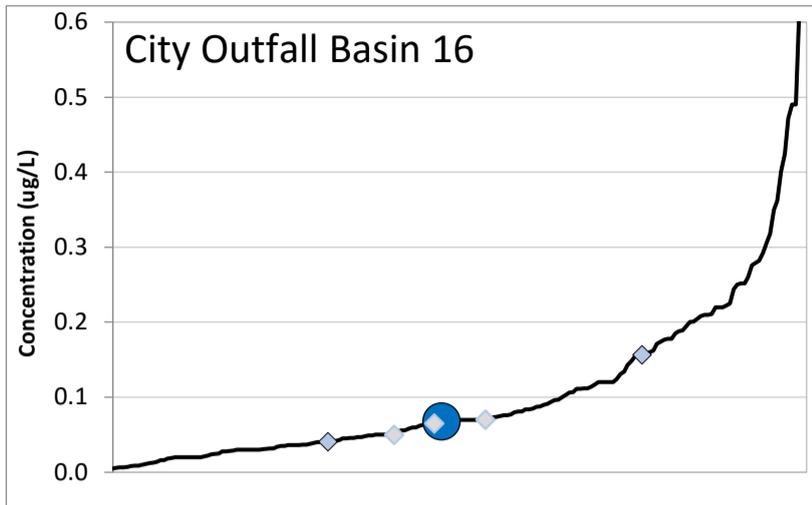
**Figure 12. City Outfalls Data Relative to DEQ Data Curve for Total PAH in Stormwater at Portland Harbor Heavy Industrial Sites<sup>(1)</sup>**



**Legend:** 2015 - 2017 SCM Effectiveness Data: ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations  
 Earlier Data (2006 - 2014): ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations  
↘ Change in geomean from historic samples to current monitoring event — DEQ Stormwater Data at Portland Harbor Heavy Industrial Sites

(1) Curve Source: Oregon Department of Environmental Quality (DEQ), "Tool for Evaluating Stormwater Data" – Appendix E to Guidance for Evaluating the Stormwater Pathway at Upland Sites. January 2009 (updated December 2015).

**Figure 13. City Outfalls Data Relative to DEQ Data Curve for Silver in Stormwater at Portland Harbor Heavy Industrial Sites<sup>(1)</sup>**



Multiple basins had non-detected concentrations of <0.1:

Earlier Data: OF 44, OF 52D, OF 53A\*^

2015 - 2017 Data: OF 16, OF 17, OF 19, OF 44, OF 45, OF 52D, OF M-2

**Legend:** 2015 - 2017 SCM Effectiveness Data: ● Geomean    ◆ Detected individual event concentrations    ◆ Non-detected individual event concentrations  
 Earlier Data (2006 - 2014): ● Geomean    ◆ Detected individual event concentrations    ◆ Non-detected individual event concentrations

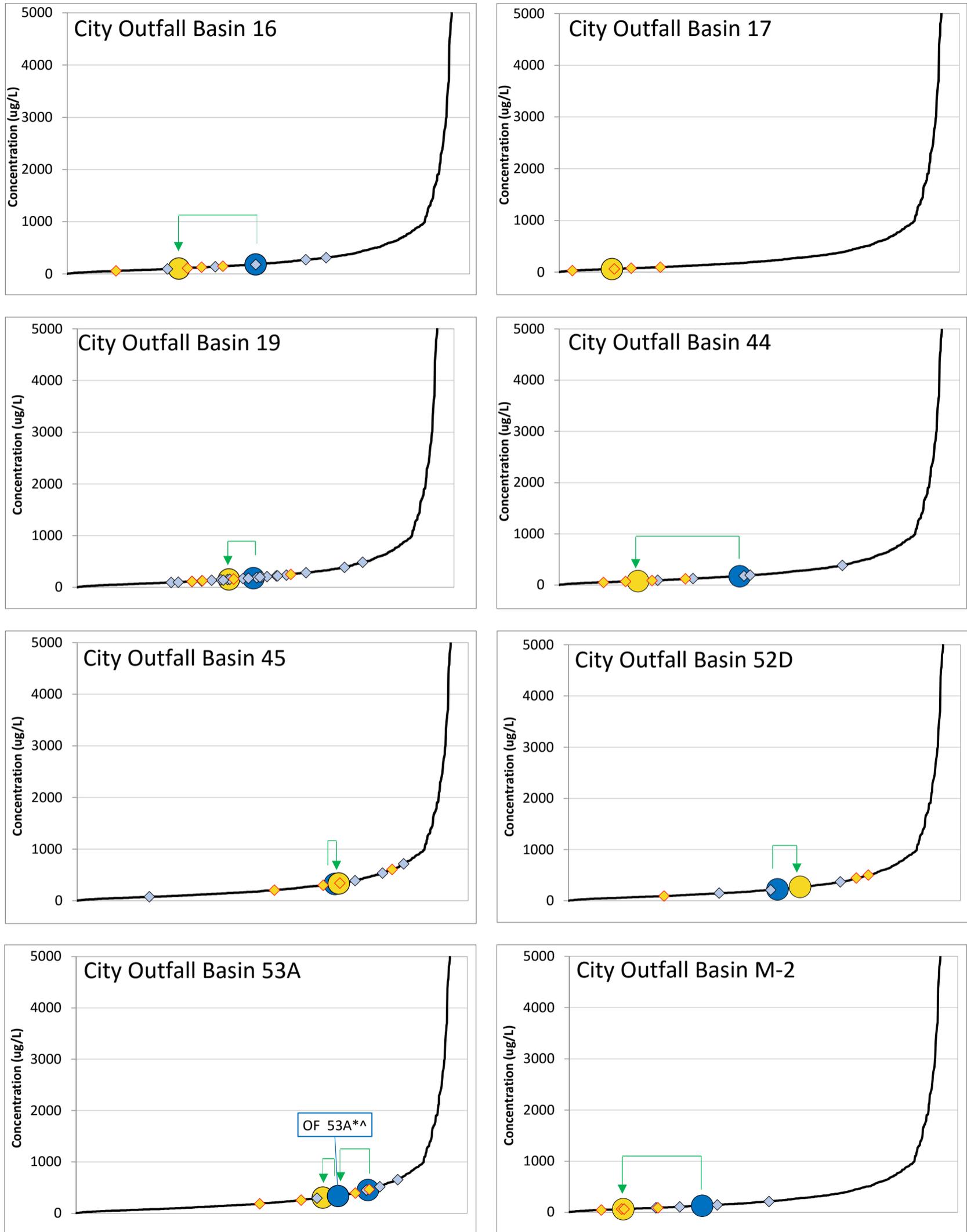
↓ Change in geomean from historic samples to current monitoring event    DEQ Stormwater Data at Portland Harbor Heavy Industrial Sites

(1) Curve Source: Oregon Department of Environmental Quality (DEQ), "Tool for Evaluating Stormwater Data" – Appendix E to Guidance for Evaluating the Stormwater Pathway at Upland Sites. January 2009 (updated December 2015).

\* = post-SCM data

^ = value represents single event

**Figure 14. City Outfalls Data Relative to DEQ Data Curve for Zinc in Stormwater at Portland Harbor Heavy Industrial Sites<sup>(1)</sup>**



**Legend:** 2015 - 2017 SCM Effectiveness Data: ● Geomean    ◆ Detected individual event concentrations    ◆ Non-detected individual event concentrations  
 Earlier Data (2006 - 2014): ● Geomean    ◆ Detected individual event concentrations    ◆ Non-detected individual event concentrations

↘ Change in geomean from historic samples to current monitoring event

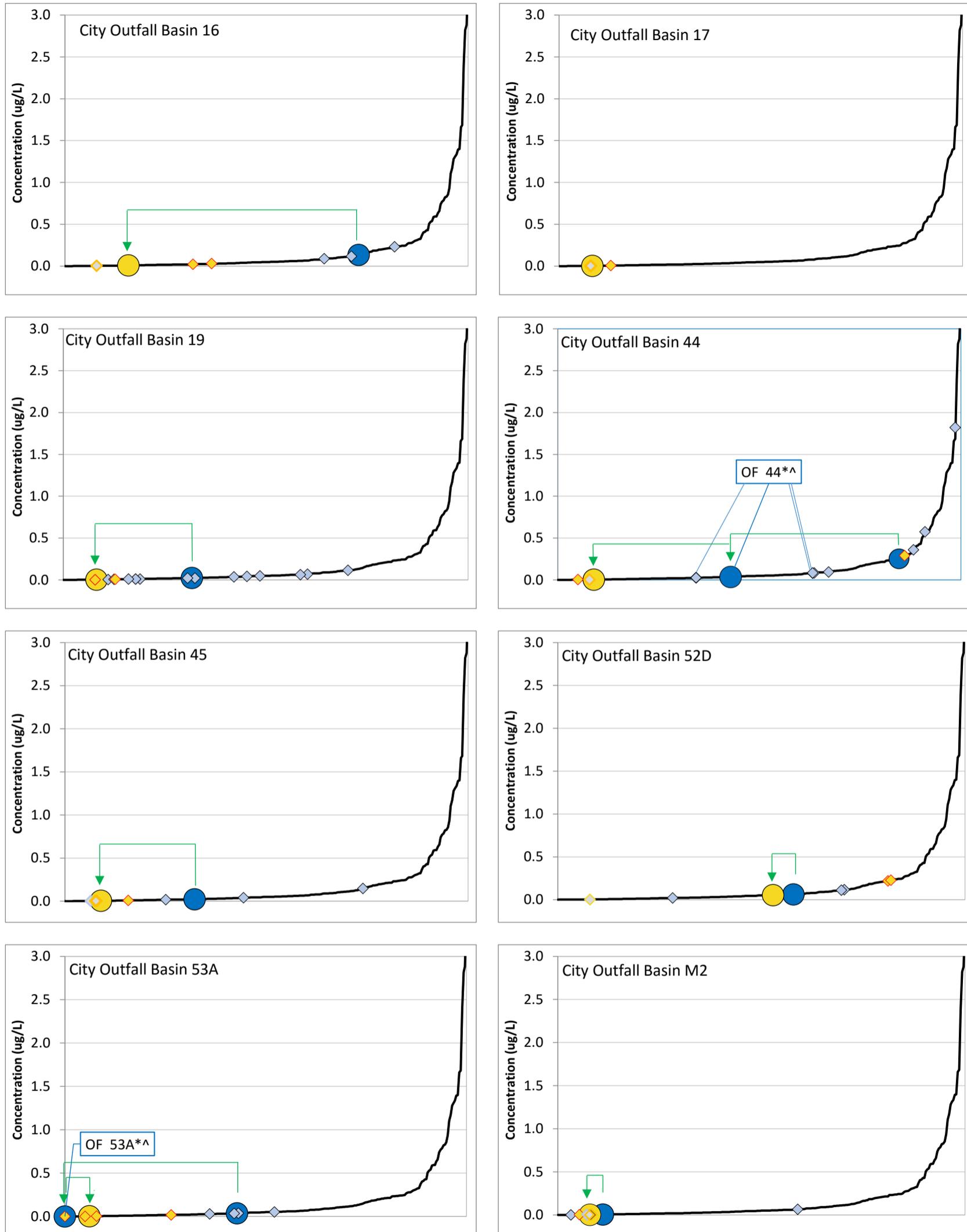
— DEQ Stormwater Data at Portland Harbor Heavy Industrial Sites

(1) *Curve Source:* Oregon Department of Environmental Quality (DEQ), "Tool for Evaluating Stormwater Data" – Appendix E to Guidance for Evaluating the Stormwater Pathway at Upland Sites. January 2009 (updated December 2015).

\* = post-SCM data

^ = value represents single event result

Figure 15. City Outfalls Data Relative to DEQ Data Curve for Polychlorinated Biphenyls in Stormwater at Portland Harbor Heavy Industrial Sites



**Legend:** 2015 - 2017 SCM Effectiveness Data: ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations  
 Earlier Data (2006 - 2014): ● Geomean ◆ Detected individual event concentrations ◆ Non-detected individual event concentrations  
→ Change in geomean from historic samples to current monitoring event — DEQ Stormwater Data at Portland Harbor Heavy Industrial Sites

(1) *Curve Source:* Oregon Department of Environmental Quality (DEQ), "Tool for Evaluating Stormwater Data" – Appendix E to Guidance for Evaluating the Stormwater Pathway at Upland Sites. January 2009 (updated December 2015).  
 \* = post-SCM data  
 ^ = value represents single event result

# **Appendix A**

## **Data Report – Source Control Measure Effectiveness Monitoring**

**City of Portland Outfalls Project  
ECSI No. 2425**

**June 2018**

**Prepared by  
City of Portland  
Bureau of Environmental Services**

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- Figure A-2: Outfall Basin 16 - 2016 Stormwater Sampling Locations
- Figure A-3: Outfall Basin 17 - 2015-2016 Stormwater Sampling Locations
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- Figure A-5: Outfall Basin 44 - 2016-2017 Stormwater Sampling Location
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- Figure A-8: Outfall Basin 52D - 2016 Stormwater Sampling Locations
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## **Attachments**

- Attachment A1: Field Documentation
- Attachment A2: Storm Event Precipitation Graphs (Stormwater Grab Sampling)
- Attachment A3: Hydrographs for Flow-Weighted Composite Samples (Outfall 19)
- Attachment A4: Summary of Stormwater Analytical Data
- Attachment A5: Laboratory Reports and Data Review Memoranda

## Abbreviations and Acronyms

BES	City of Portland, Bureau of Environmental Services
City	City of Portland
COC	chain of custody
DEQ	Oregon Department of Environmental Quality
DRM	data review memorandum
ECSI	DEQ's Environmental Cleanup Site Inventory
EPA	U.S. Environmental Protection Agency
ERF	Extended Range Forecasting Company, Inc.
HYDRA	Hydrological Data Retrieval and Alarm
IGA	intergovernmental agreement
JSCS	Portland Harbor Joint Source Control Strategy
LIMS	BES Laboratory Information Management System
MS4	Municipal Separated Storm Sewer System
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PST	Pacific Standard Time
QAPP	quality assurance project plan
QC	quality control
RM	river mile
SAP	sampling and analysis plan
SCM	source control measure
SOP	standard operating procedure
SVOC	semivolatile organic compound
TSS	total suspended solids
WPCL	BES Water Pollution Control Laboratory

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# A1 Introduction

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This report summarizes the results of the City of Portland (City) Bureau of Environmental Services' (BES) stormwater sampling activities conducted during the 2015-2016 and 2016-2017 wet seasons at eight City outfalls within the Portland Harbor Study Area (Figure A-1). The purpose of the stormwater sampling was to support the City's conclusion that future stormwater discharges from City outfalls are unlikely to pose significant recontamination risk after all identified sources have been controlled, and to support an evaluation of in-water risks affiliated with stormwater discharges. These investigation results are submitted pursuant to the City's intergovernmental agreement (IGA) with the Oregon Department of Environmental Quality (DEQ) to collaborate on the evaluation and control of potential upland sources of discharges to the City stormwater conveyance system that might adversely affect sediment and surface water quality in the Portland Harbor. The data collection activities described in this report were conducted in accordance with the *City of Portland Outfalls Project Revised Sampling and Analysis Plan (SAP; BES, 2016a)* submitted to and approved by DEQ in February 2016 (DEQ, 2016).

This report describes stormwater sampling locations and conditions, summarizes field and laboratory procedures, and presents analytical testing results. It is Appendix A of the *Source Control Measure Effectiveness Monitoring and Assessment Report (BES, 2018)*, which evaluates the stormwater data, in conjunction with previously collected data and other basin information, to evaluate the collective effectiveness of a wide array of source controls implemented by multiple parties within the drainage basins for City outfalls in Portland Harbor.

## A1.1 Purpose

The purpose of the City's monitoring efforts was to collect stormwater data from selected City outfall basins in Portland Harbor to allow evaluation of source control measure (SCM) effectiveness in those basins. The eight outfall basins monitored were chosen to meet selection criteria identified by DEQ (DEQ, 2015; BES, 2016b), as described in Section A2.

The sampling approach was in general accordance with the *Portland Harbor Joint Source Control Strategy (JSCS; DEQ/EPA, 2005, as amended 2007)* so that, where possible, the data can be compared to existing representative data sets to evaluate and compare concentration trends.

## A1.2 Report Organization

The remainder of this report is organized into the following major sections:

- Section A2: Monitoring Locations
- Section A3: Sampling Procedures
- Section A4: Storm Events Sampled
- Section A5: Laboratory Analyses and Data Management
- Section A6: Sample Results
- Section A7: References

Supporting information is provided in the following attachments:

- Attachment A1: Field Documentation
- Attachment A2: Storm Event Precipitation Graphs (Stormwater Grab Sampling)
- Attachment A3: Hydrographs for Flow-Weighted Composite Samples (Outfall 19)
- Attachment A4: Summary of Stormwater Analytical Data
- Attachment A5: Laboratory Reports and Data Review Memoranda

## A2 Monitoring Locations

The City collected stormwater samples from eight City outfall basins in the Portland Harbor Study Area during the 2015-2016 and 2016-2017 wet seasons. Primary factors considered in selecting the outfall basins to be sampled included:

- Source control status in the basin allows a meaningful evaluation of SCM effectiveness. This consideration means that sources in the basin must be controlled, or mostly controlled, by SCMs that have been implemented. Basins selected for monitoring under this objective include:
  - Basins controlled by City and state water quality programs alone.
  - Basins controlled (or mostly controlled) by City and state water quality programs in combination with SCMs implemented under DEQ's Cleanup Program.
- The basin selection elements identified by DEQ (DEQ, 2015) are represented. In addition to elements that fall under the "source control status" factor described in the preceding bullet, these selection elements include:
  - Basins for which existing outfall data exceeds the JSCS screening level values and the "typical" values of DEQ's stormwater guidance curves (DEQ, 2009) for three or more curve contaminants (without demonstrated subsequent reduction).
  - Basins that discharge to the inriver areas with a higher risk for recontamination, as identified by DEQ and the U.S. Environmental Protection Agency (EPA; i.e., River Mile 11 East [RM 11E], Swan Island Lagoon, International Slip [RM 3.5E], Guilds Lake Industrial Area [RM 9], and Doane Lake Industrial Area [RM 6W-7W]).
  - Basins representing a variety of differences in characteristics, including basin size, industrial intensity, Forest Park drainage contribution, and number of permitted industries, to confirm program-level assumptions of land use coinciding with levels of contamination.

Based on these factors, the following outfall basins were selected for stormwater sampling and analysis: Basins 16, 17, 19, 44, 45, M-2, 52D, and 53A. Characteristics of these basins are summarized in Table A-1. The basin outfall locations are shown in Figure A-1. In each of these basins, the monitoring location was the most downgradient accessible point that receives discharge from the whole basin. In three of the basins (Basins 16, 19, and 52D), additional monitoring locations also were included to collect stormwater samples from specific sites discharging to these basins, concurrently with the basin-scale sampling locations. The basin boundaries and sampling points are shown in Figures A-2 through A-9 and the sampling locations are described in Table A-1.

### A2.1 Grab Sample Locations

Basin-scale stormwater grab samples were collected from each of the basins listed above, with the exception of Basin 19, from which composite stormwater samples were collected (see Section A2.2). The seven basin-scale stormwater grab samples generally were collected from a manhole,

not directly at an outfall (except at Outfall 17 for some samples), because the outfall pipe openings typically are submerged in the river or are otherwise difficult to access. The sampling location within each basin was chosen to represent as much of the drainage basin as possible, without compromising sample integrity resulting from anticipated river backup in the lower elevation systems. The SAP identified an alternate sampling location for Basin 17 that could be used in the event that the primary location (the outfall itself) was not suitable for obtaining a representative sample. The Basin 17 alternate sampling location was used during the last of four events, when the outfall was inundated by a higher river level.

Stormwater grab samples also were collected at the three supplemental sampling locations representing site-specific discharges in Basins 16, 19, and 52D, for a total of 10 grab sampling locations.

## A2.2 Flow-Weighted Composite Sample Location

Flow-weighted composite samples, obtained using an automatic system, are collected progressively over the entire storm hydrograph and thus yield data representing mean contaminant concentrations in runoff over the course of the storm event being sampled. For Basin 19, much of the previous stormwater data was collected via flow-weighted composite samples that represented the majority of the hydrographs for each storm event. Because this basin is slated for future monitoring by the BES Municipal Separated Storm Sewer System (MS4) program, stormwater samples from Basin 19 were collected again using flow-weighted composite samples for consistency with the existing data set.

## A3 Sampling Procedures

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The sampling was conducted in accordance with the SAP, which was developed to provide project-specific information to supplement the City's *Amended Programmatic Quality Assurance Project Plan* (QAPP; BES, 2007a) and *Amended Programmatic Sampling and Analysis Plan* (Programmatic SAP; BES, 2007b) for collection of water and solids samples for the City of Portland Outfalls Project. This section describes how key elements of these guidance documents were implemented.

### A3.1 Sampling Staff

BES personnel conducted the stormwater sampling. At a minimum, the sampling staff included a Storm Event Coordinator and Event Sampling Teams. The Storm Event Coordinator was responsible for tracking weather patterns, selecting the storm events for sampling, and directing sampling activities. Event Sampling Teams were two-person teams and included at least one experienced staff member from the City's Field Operations staff. Individual staff members were used, on occasion, if no traffic control was required.

In some cases, more than one Event Sampling Team was used during a single stormwater sampling event to decrease the length of field time and the number of individual storms needed to collect representative samples from all basin sampling locations designated in the SAP.

### A3.2 Storm Event Tracking

The SAP identified the following target storm event criteria (consistent with JSCS) for stormwater sampling:

- Antecedent dry period of at least 24 hours (as defined by <0.1 inch of rainfall during the previous 24 hours)
- Minimum predicted rainfall volume of >0.2 inch for the storm event
- Expected duration of the storm event of at least 3 hours

These criteria were developed for implementation using upland sites. In this case, the criteria were used as general guidelines to determine if forecasted storms should be targeted for sampling. Based on the City's experience with stormwater monitoring in this region, smaller storms or those of shorter duration are unlikely to generate runoff at the outfall that would be representative of entire stormwater basins that have large areas or significant pervious components. To the extent practicable, project personnel adhered to sampling only forecasted storms meeting the target storm criteria to help ensure that stormwater runoff would be adequate for sample collection, representative of stormwater runoff, and consistent between sampling events.

The Storm Event Coordinator worked directly with the City's contract weather forecasting service, Extended Range Forecasting Company, Inc. (ERF), to obtain forecasts and to decide whether to initiate a stormwater sampling event. The Storm Event Coordinator had the option to use best professional judgment to determine potential storm events for which the targeted

antecedent dry period might be shortened in an effort to collect a full data set. The minimum antecedent dry period was established at 6 hours, based on the stormwater monitoring program for the City's underground injection control system permit.<sup>1</sup>

### A3.3 Field Sampling Approach and Procedures

Stormwater sampling procedures were conducted in accordance with the applicable standard operating procedures (SOPs) included in the Programmatic SAP. The SOPs were established by the City's Field Operations section to standardize the data collection methodologies for a wide range of monitoring activities and thereby maintain comparability and representativeness of the data produced.

Given the varying complexity and size of the City outfall conveyance systems, the timing of grab sample collection relative to the start of the storm event was targeted to ensure that the grab samples represented contributions from the entire basin (including upper reaches of the system) and represented stormwater rather than flow from any non-stormwater sources (i.e., "dry-weather flow"). In general, the timing of the grab sampling events was targeted to occur during what would be considered the rising limb of a flow hydrograph at each sample location. However, because flow monitoring was not conducted at the grab sample locations, determination of the optimum sampling window in each basin was based on the best professional judgment of the Storm Event Coordinator. The Storm Event Coordinator established the order in which basins were sampled on the basis of characteristics such as basin size, the percent of impervious surfaces in a basin, forecasted storm size, and first-flush periods. In all cases, grab sampling was targeted to occur within the first 12 hours of observable storm runoff at the sampling site.

Grab stormwater samples were collected from the designated monitoring locations during four storm events for each basin except Basin 52D (see discussion of this exception in Section A3.4). Two of the four events at each grab sample location were intended to target first-flush conditions (broadly defined for the purposes of basin-scale monitoring as being within the first 30 to 60 minutes of observed runoff, depending on basin size and conditions). For flow-weighted composite sampling in Basin 19, four storm events were sampled. A description of each storm event sampled and an evaluation of the overall sample representativeness are provided in Section A4.

The general procedures followed in the stormwater sampling program are summarized below, with reference to the applicable SOPs (refer to the Programmatic SAP for full descriptions of the SOPs). No significant deviations from the SOPs occurred during the 2015-2017 stormwater sampling activities. Minor deviations in implementation of the SOPs are discussed in Section A3.4.

#### A3.3.1 General Procedures (Grab and Composite Sampling)

##### Determination of Stormwater Flow

As specified in the SAP, in the event there was any question whether water observed at the sampling location represented stormwater flow or standing water (e.g., for basins in which the

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<sup>1</sup> DEQ Water Pollution Control Facilities/Underground Injection Control permit number 102830, issued to the City of Portland on June 1, 2005.

outfall pipe opening was submerged), field crews made visual observations at the time of sampling, such as noting the flow direction of a floatable object, to confirm the presence of stormwater flow. In all cases, it was determined that stormwater flow was sampled.

### Field Parameter Measurements

Data collected in the field during each sampling event included measurement of pH, conductivity, and temperature for all primary stormwater samples (i.e., excluding field duplicate samples and field decontamination blanks). The procedures followed during collection of these measurements are specified in the following SOPs: *SOP 1.01a, Field pH Measurement of Water Samples*; *SOP 1.03a, Field Conductivity Measurement of Water Samples*; and *SOP 1.05a, Field Temperature Measurement of Water Samples*. The general procedures for collecting these measurements include (1) equipment calibration, to ensure accurate readings; (2) collecting and recording the measurement on the field sample documentation; (3) conducting a post-measurement check of the equipment after returning from the field to confirm the accuracy of the field readings; and (4) properly maintaining the equipment.

### Quality Control Procedures

Sampling quality control (QC) procedures included decontamination of all sampling equipment before sampling, collection of QC samples in the field, and completion of a chain-of-custody (COC) form for each set of samples. The basic elements of these procedures are summarized in the following paragraphs.

#### *Sampling Equipment Decontamination*

The equipment decontamination procedures followed during the stormwater sampling program are detailed in *SOP 7.01a, Decontamination of Sampling Equipment*. The appropriate decontamination sequence was selected for each set of samples based on the chemical analyses to be performed. The decontamination procedures included the use of specified wash and rinse solutions, followed by drying and packaging steps. The field crew decontaminated all sampling equipment in the staging area of the BES Water Pollution Control Laboratory (WPCL) before leaving for the sampling sites.

#### *Collection of Field Decontamination Blanks and Duplicate Samples*

The SAP specified preparation of one field decontamination blank for each sampling round<sup>2</sup> and collection of one field duplicate sample for approximately every 10 stormwater samples. All field decontamination blanks and duplicate stormwater samples were collected according to the procedures specified in *SOP 7.01c, Field Quality Control Sample Collection*. The field decontamination blanks were composed of deionized water that had been transferred to the sample containers using decontaminated sampling equipment. Each field duplicate sample was collected alongside the primary sample, using the same sampling protocol. The QC samples were delivered to the laboratory with the associated stormwater samples. Results for the QC samples are included in the data summary tables presented in Attachment A4.

#### *Sample COC*

Handling of the samples was conducted as specified in *SOP 7.01d, Sample Chain-of-Custody*. This SOP specifies the detailed procedures to be followed regarding sample labeling, documentation,

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<sup>2</sup> A round of sampling is defined for this purpose as one set of samples from each basin-scale monitoring location. Four rounds of sampling were conducted for this project, so four field blanks were collected during the course of this project.

packaging and preservation, transport, delivery/relinquishment, and laboratory security. These procedures include completion of a COC form for each batch of samples. Information recorded on the COC form includes the project name and file number, type of sample (e.g., grab, composite), matrix, sample location, sample identification number, field parameter measurements (pH, temperature, conductivity), requested analytes, comments or special instructions for the receiving laboratory, and any additional comments concerning sample quality.

### A3.3.2 Collection of Grab Samples

With the exception of Basin 17, all grab samples were collected using *SOP 2.02b, Grab Sample Collection with Stainless Steel Beaker*. This procedure is designed for use where direct access is not possible, such as when accessing storm sewer pipes through manholes. At each sampling location, the field sampling team attached a decontaminated beaker to a rope, slowly lowered the beaker to the water surface, then submerged and retrieved it, keeping the beaker off of the bottom of the storm sewer pipe or the bed of the surface water, if possible, to prevent adding deposited sediment to the sample.

In Basin 17, samples were collected directly from the 90-inch-diameter outfall during the first three of four sampling events at this outfall, when the outfall was not submerged by the river. The collected stormwater then was transferred to pre-prepared, analyte-specific sample bottles/containers; the sample bottles were filled to one-quarter full, rinsed (except when pre-cleaned or pre-preserved sample bottles were being used), then filled fully and capped. The filled containers were placed in a cooler with ice for storage and transport to the laboratory.

### A3.3.3 Collection of Flow-Weighted Composite Samples

The flow-weighted composite samples from Basin 19 were collected in accordance with *SOP 2.01b, Flow-Paced Composite Sampling of Stormwater*. The samples were collected during four storm events (March 9–10, September 17, October 13–14, and November 5–6, 2016). Automatic flow monitoring and sampling equipment were installed at the monitoring location before sample collection, and remained in place for the duration of the sampling project. New sample collection bottles were placed in the equipment before each targeted storm event and replaced as needed during the event as bottles filled. The equipment was programmed to collect a uniform aliquot of stormwater following the discharge of a calculated “trigger volume” of stormwater flow, such that sample aliquot collection frequency increased with flow rate. Each aliquot was distributed to one of eight glass sample bottles within the automated sampler; samplers were programmed to distribute three aliquots to each sample bottle.

Trigger volumes for aliquot collection were determined by evaluating the total basin area, impervious area, and predicted storm size and duration. The objective of these calculations was to generate sufficient sample volume for all requested laboratory analyses and generate a composite stormwater sample representing both the rising and falling limbs of the storm hydrograph. Following completion of the sampling event, field crews reviewed flow, sampler, and rain gage data to determine the extent of the storm event represented by the set of sample bottles, including any triggers missed.

To achieve the event-averaged stormwater sample targeted in the sampling objectives for this basin, the final composite sample was created in the laboratory from representative portions of

the individual sample bottles.<sup>3</sup> Creation of the final composite sample for each event is detailed on the Composite Bottle Data Sheet (included with field documentation in Attachment A1). Each sample was created by decanting a specified volume from the individual sample bottles into a churn splitter and agitating the contents as subsamples were decanted into individual bottles for analysis. The SOP provides that some bottles, typically from the beginning or end of the sampling event, may be omitted from the final composite if they are not considered representative of the targeted conditions (e.g., if they may represent surface water baseflow before stormwater runoff). Any aliquots omitted from the final composite sample were noted on the Composite Bottle Data Sheets.

### A3.4 Deviations from the SAP

The SCM effectiveness monitoring was conducted in general accordance with the SAP and applicable SOPs, with the exception of the deviations listed below. These deviations do not affect the quality or interpretation of the resulting data; therefore, the monitoring is judged to have met the SAP objectives.

- Only three samples were collected from the Basin 52D basin-scale monitoring location. The SAP specified that a total of four samples were to be collected from each basin-scale sampling location. As discussed in further detail in the main text of this report, observations and analytical results from the paired site-specific sampling location in Basin 52D indicated that additional SCMs are warranted at this site to control contaminant discharges to the City stormwater conveyance system. Therefore, with DEQ's concurrence (DEQ, 2017b), monitoring in Basin 52D was discontinued after three sampling events.
- The SAP targeted two first-flush sampling events at each basin-scale monitoring location, but this objective was met only at Basin 17. Despite attempts to capture first-flush events during the course of the 2016–2017 sampling period, the following challenges made it difficult in many cases to capture first-flush flow in the targeted initial 30 to 60 minutes of runoff:
  - The broad geographic distribution of monitoring locations prevented more than one or two first flush samples from being collected during each event before the first-flush time has elapsed.
  - In some cases, sampling crews were mobilized in an attempt to target first-flush conditions, but rainfall failed to materialize as forecasted (e.g., on December 22, 2016, when the predicted rainfall failed to materialize until the overnight period later that night).
  - The Basin M-2 monitoring location is in a high traffic area requiring extensive traffic control to be set up (a process taking 30 to 45 minutes) before a sample could be collected.
  - The Basin 53A monitoring location is on private property surrounded by a security fence and, therefore, is accessible only during standard business hours.

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<sup>3</sup> If sample bottles included three aliquots (triggers) per equipment record (sample and flow minimum), then equal portions were taken from all bottles. If one or more bottles had three aliquots but a reduced sample volume, then the subsampled volume from each bottle did not exceed this maximum volume. If one or more bottles had less than three aliquots, then subsampled volumes on these bottles were adjusted to be one-third or one-half of the volumes subsampled from bottles with three aliquots.

Additionally, a somewhat lengthy security check-in procedure is required upon arrival.

- The unusually cold weather from December 2016 through February 2017 impeded the collection of the outstanding stormwater samples. The few extended dry periods during these months had been characterized by high pressure and sub-freezing temperatures and had concluded with snow or freezing rain events, which—besides creating hazardous conditions and technical feasibility challenges—are atypical of winter storms in Portland and, therefore, were deemed not suitable for the SCM effectiveness monitoring.

With DEQ's concurrence (DEQ, 2017a), in light of the above issues, the sampling program was completed with fewer than the targeted number of first-flush samples. Review of the stormwater data from the basins with first-flush and non-first-flush samples does not indicate a consistent low bias in concentrations associated with the non-first-flush events; therefore, the resulting data set is considered to meet the SAP objectives.

- The 24-hour antecedent dry period criterion was not met for the October 31, 2015; March 9-10, 2016; November 15, 2016; and February 8, 2017, storm events. However, in all cases, the antecedent dry period was greater than the minimum 6-hour antecedent dry period specified in the SAP.
- The minimum forecasted rainfall amounts for the September 25, 2015; September 17, 2016; and November 22, 2016, storm events were less than 0.2 inch. However, the maximum forecasted rainfall for these events was more than 0.2 inch, and in all cases the amount of rainfall recorded was more than 0.2 inch.
- Eleven flow-paced sample aliquots were missed during the September 17-18, 2016, Basin 19 composite sample collection because the automated sampler malfunctioned during the latter half of the storm event. As a result, the sample does not represent the entire storm hydrograph as specified in the SAP. However, the resulting sample represents whole-basin flow from the first approximately 7 hours of the storm, so it is considered to meet the SAP objectives. See Section A4.2.2 for additional detail.
- Five flow-paced aliquots were missed during the October 13-14, 2016, Basin 19 composite sampling events because of equipment malfunction. However, aliquots were collected during most of the flow duration, and the resulting sample is considered to meet the SAP objectives. See Section A4.2.2 for additional detail.
- SOP 7.01c provides that the field decontamination blank is to be collected upon arrival at the first sampling location, before actual sampling. Two of the field decontamination blanks (collected on March 9, 2016, and February 8, 2017) were not collected at the first sampling location; however, in all cases the field decontamination blanks were collected from decontaminated sampling equipment before it was used for stormwater sampling.

## A3.5 Sample Collection Documentation

Field data were recorded on project-specific paperwork during each sampling event, in accordance with the procedures described in the Programmatic SAP. Each Event Sampling Team completed the following forms during the course of each sampling event, as applicable: for all

sampling, a Daily Field Report and COC form were completed; for collection of flow-weighted composite samples, Trigger Volume Work Sheets and Composite Bottle Data Sheets also were completed. Copies of the completed field documents are provided in Attachment A1.

## A4 Storm Events Sampled

This section describes the storm events during which stormwater samples were collected from the City outfall basins in accordance with the SAP. Three of the four grab samples from Basin 17 were collected during the fall of 2015, to take advantage of the extremely low river levels that allowed the samples to be collected directly from the outfall.<sup>4</sup> The remaining grab samples for the project were collected during a total of eight storm events during March 2016 through February 2017. During four of the 2016 storm events, flow-weighted composite stormwater samples were collected from Basin 19. The 2015–2017 storm events sampled are described below.

### A4.1 Storm Event Data

As described in Section A3.2, storm events were targeted for sampling by the Storm Event Coordinator based on ERF forecasts of storms that would meet the target storm event criteria. After a sampling event was completed, the characteristics of the storm event sampled were evaluated using data from the City’s Hydrological Data Retrieval and Alarm (HYDRA) system rain gage network ([http://or.water.usgs.gov/non-usgs/bes/raingage\\_info/](http://or.water.usgs.gov/non-usgs/bes/raingage_info/)). Precipitation data from the following four rain gages near the Portland Harbor Study Area were used to characterize the storm events for each sampling location, using the most representative gage available for each location (rain gage locations are shown in Figure A-1):

<u>HYDRA (rain gage) Station</u>	<u>Address</u>	<u>Outfall Basin</u>
Station #82: Shipyard	8900 N Sever Road	52D, 53A
Station #117: Albina	2920 N Larrabee Avenue	44, 45
Station #121: Yeon	3395 NW Yeon Street	16, 17, 19
Station #204: Swan Island	4299 N Port Center Way	M-2

In addition to using the gage records from the above stations to characterize precipitation at each sample location, rainfall for the Portland Harbor Study Area was characterized for the entire 2015–2017 monitoring program time period by averaging the gage data for the four rain gages. The purpose of averaging the rainfall data from all four gages was to characterize the average precipitation falling directly on impervious surfaces within the developed/industrial portion of the lower Willamette River during the period of this project. Figure A-10 depicts the monthly rainfall for the September 2015 to February 2017 sampling period, averaged from the four gages, compared to the long-term average monthly rainfall between 1981 and 2010 for the same months.

The specific stormwater sampling events for each outfall basin are listed in Table A-2. Graphs depicting precipitation, based on hourly individual rain gage data, and sample collection times for each basin and site-specific location where grab sampling was conducted are presented in Attachment A2. The graphs are presented to show the relationship between the timing, magnitude, and duration of precipitation events, and the grab sample collection times. The

<sup>4</sup> Typically, Outfall 17 is submerged and river water backs up into an extensive length of the outfall pipe, complicating basin-scale sampling in this outfall basin. Because of the unusually low river levels during the fall of 2015 that exposed the outfall, sampling was initiated from Outfall 17 early in anticipation of DEQ approval of the SCM effectiveness monitoring SAP (BES, 2016a). All sampling procedures at Outfall 17 were fully in accordance with the SAP.

graphs do not depict a relationship between precipitation and flow volume because flow data were not collected at grab sampling locations. For each basin, Attachment A2 also includes a summary of the characteristics of each sampling event and designates those events that are judged as meeting first-flush criteria.

Hydrographs associated with the four flow-weighted composite samples from Basin 19, showing precipitation, flow data, and timing of individual sample aliquots collected, are presented in Attachment A3.

Determination of which events represent first-flush conditions for the entire basin was largely based on timing of sampling (defined for the purposes of the SAP to be generally within the first 30 to 60 minutes of full-basin discharge at the monitoring location), but also took into account factors such as basin size, characteristics, and saturation conditions before the sampled storm event. For example, in larger basins the window for first-flush conditions could extend beyond the initial 60 minutes of observed flow. Sampling crews used best professional judgement to evaluate when precipitation in a basin was sufficient to (1) generate the initial flow at a sampling location in response to precipitation, and (2) represent flow from the entire basin.

## A4.2 Descriptions of Storm Events

The descriptions of grab- and composite-sampling events provided below are based on sampling crew field notes, and precipitation representative of each outfall presented in Attachment A2. As described in Section A3.2, the target JSCS criteria for stormwater sampling generally were met.<sup>5</sup> For the sampling events described below, the beginning and ending of an event is defined as the period of reasonably continuous precipitation for a specific storm. In accordance with standard practice, all rain gage data are recorded in Pacific Standard Time (PST). Therefore, all sample times presented in this report are given in PST.

For each sampling event, samples were defined as meeting first flush conditions, based on an overall impression of the data for each individual sampling location presented in Attachment A2 and consideration of the following factors:

- Timing of sample collection during the storm event (i.e., targeted first portion or rising limb of a flow hydrograph at each location)
- Field observations
- Size of the drainage basin (including consideration of impervious surfaces)

The general time frames included in the storm event descriptions below are based on the ranges recorded among the applicable rain gages for that event; specific time frames (e.g., for antecedent dry periods) are shown in the figures in Attachment A2.

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<sup>5</sup> Sampling events were scheduled on the basis of forecasted storm size and durations (usually described as a range) that were predicted to meet the sampling criteria described in Section A3.2. Hourly precipitation data for an individual representative City rain gain were plotted to depict each storm event by outfall in Attachment A2. Actual storm size and duration varied from forecasted amounts as described in the text.

## A4.2.1 Grab-Sampling Events

### September 25, 2015

No significant rainfall was recorded for 7 days preceding this event. The preceding day's forecast for rainfall on September 25 was a minimum of 0.12 to more than 0.21 inch. On September 25, rainfall began between 7:00 and 8:00 a.m., peaked between 8:00 and 9:00 a.m., and ended between 10:00 and 11:00 a.m. Approximately 0.25 inch of rain fell during this storm. One stormwater sample (parent and duplicate) was collected from Outfall 17 at 9:14 a.m. This sample is considered to reflect first-flush conditions based on the basin characteristics, field observations, timing of sample collection relative to the start of rainfall, and the unsaturated state of the drainage area before this storm.

### October 10, 2015

No significant rainfall was recorded for 2 days preceding this event. The minimum forecasted rainfall for this event was 0.42 inch. On October 10, rainfall began between 11:00 a.m. and noon, and ceased between 4:00 and 6:00 p.m. before a final pulse between 6:00 and 7:00 p.m. The storm ended between 7:00 and 8:00 p.m. with a cumulative rainfall total of approximately 0.40 inch. One stormwater sample was collected from Outfall 17 at 1:18 p.m. This sample is considered to reflect first-flush conditions based on the basin characteristics, field observations, timing of the sample collection relative to the start of rainfall, and the unsaturated state of the drainage area before this storm.

### October 31, 2015

A total of approximately 0.4 inch of precipitation occurred in the 24 hours preceding this event; therefore, the antecedent dry period criterion for this event was not met. However, less than 0.1 inch of rainfall was recorded at the Yeon rain gage during the 9 hours preceding this event, and no rainfall was recorded during the 5 hours immediately preceding this event. A large storm was predicted for October 31, with a minimum forecasted rainfall of 1.29 inches. On October 31, rainfall began between 11:00 a.m. and noon, and ceased between 7:00 and 8:00 p.m. Approximately 1.76 inches of rainfall fell during this event. One stormwater sample was collected from Outfall 17 at 1:48 p.m. and is judged to represent the first flush of discharge from this event.

### March 9-10, 2016

A total of approximately 0.15 inch of precipitation occurred in the 24 hours preceding this event, but less than 0.1 inch occurred during the 14 to 17 hours preceding this event and only a trace or no rainfall was recorded at any of the four rain gages during the 8 to 10 hours immediately preceding this event. The minimum forecasted rainfall for March 9 was 0.37 inch. On March 9, rainfall began between 6:00 and 7:00 a.m., and generally increased up to a peak intensity (close to 0.2 inch per hour) between approximately 3:00 and 4:00 p.m., ceased briefly between approximately 8:00 and 9:00 p.m., then resumed before ending between approximately midnight and 3:00 a.m. on March 10. A total of approximately 0.8 to 1.0 inch of rainfall was recorded for this event. Stormwater grab samples were collected from all 10 grab sampling locations between 10:10 a.m. and 3:40 p.m. on March 9. These samples likely do not represent first-flush conditions based on the timing of sample collection relative to the start of rainfall.

#### May 19, 2016

No rainfall was recorded during the 3 days preceding this event. The forecasted rainfall for this event was a minimum of 0.12 inch to a maximum of more than 0.38 inch. On May 19, rainfall began between 11:00 a.m. and noon, and intensified between noon and 1:00 p.m. The two samples collected during this event (from Basins 44 and 45) were collected at 1:02 and 1:16 p.m., respectively. Rainfall stopped briefly between 2:00 and 3:00 p.m., intensified again between 4:00 and 5:00 p.m., and ended between 7:00 and 8:00 p.m. Total rainfall recorded at the Albina gage during this event was 0.42 inch. The two samples collected during this event are considered to reflect first-flush conditions, based on the basin characteristics, field observations, and timing of sample collection relative to the start of rainfall.

#### September 17, 2016

No rainfall was recorded during the 9 days preceding this event. The forecasted rainfall for September 17 was a minimum of 0.14 inch to a maximum of more than 0.25 inch. On September 17, rainfall began between 6:00 and 7:00 a.m., became locally intermitted after about noon, depending on location, and ceased between 2:00 and 9:00 p.m. for a cumulative total of approximately 0.39 to 0.62 inch. Stormwater grab samples were collected from four basins (Basins 16, 19, 52D, and M-2) between 11:07 a.m. and 1:21 p.m. These samples likely do not represent first-flush conditions given the timing of sample collection.

#### October 13, 2016

No rainfall, or a trace amount, depending on gage station, was recorded during the 3 days preceding this event. The minimum forecasted rainfall for this event was 0.88 inch. On October 13, sustained rainfall began at all gage locations between 12:00 a.m. and 1:00 a.m., became heavy by 2:00 a.m., and continued with intermittent heavy pulses until ceasing between 11:00 p.m. and midnight. A cumulative total of approximately 1.95 to 2.05 inches of rainfall was recorded for this event. Stormwater samples were collected from nine grab sample locations in seven basins (Basins 16, 19, 44, 45, 52D, 53A, and M-2) between 8:04 a.m. and 12:40 p.m. These samples likely do not represent first-flush conditions given the timing of sample collection.

#### November 5, 2016

Less than 0.1 inch of precipitation occurred in the 24 hours preceding this event. The minimum forecasted rainfall for this event was 0.57 inch. On November 5, rainfall began between 5:00 and 6:00 a.m. and remained relatively light until around 9:00 a.m. One stormwater grab sample was collected (from the Basin 19 site-specific location) at 10:35 a.m. as the rainfall was becoming heavier. Rainfall continued, with the most intense period occurring at approximately 5:00 p.m., until ceasing between approximately 11:00 p.m. and midnight, for a cumulative total of approximately 1.22 inches. Based on the sample timing and the localized drainage area for this sample location, the sample collected during this event likely does not represent first-flush conditions.

#### November 15, 2016

Approximately 0.81 inch of rainfall was recorded during the 24 hours preceding this event, but only a trace amount fell during the 15 hours immediately preceding this event. The minimum forecasted rainfall for this event was 0.23 inch. A short pulse of heavy rainfall totaling 0.12 inch occurred between 2:00 and 3:00 p.m., and the one sample collected from this event (from Basin

53A) was collected at 2:59 p.m. This sample is considered to reflect first-flush conditions based on the timing of sample collection.

#### November 22-23, 2016

No rainfall was recorded during the 38 hours preceding this event. The forecasted rainfall for this event was 0.14 inch to more than 0.21 inch. On November 22, rainfall began between 1:00 and 2:00 p.m. and quickly intensified, with a heavy pulse occurring between 3:00 and 4:00 p.m. The two stormwater samples collected during this event (both from Basin 16) were collected at 3:47 and 3:13 p.m. on November 22. Except for one brief interruption, rainfall continued for almost 24 hours and ceased between 12:00 p.m. and 1:00 p.m. on November 23, for a cumulative total of approximately 1.54 inches. The samples collected during this event are considered to reflect first-flush conditions based on the timing of sample collection.

#### February 8-9, 2017

Less than 0.1 inch of rain fell in the 14 hours to more than 24 hours preceding this event, depending on gage location. The minimum forecasted rainfall for this event was 0.48 inch. After several hours of no rainfall at all gage locations, steady rainfall began between 12:00 a.m. and 2:00 a.m. on February 8 and continued with varying intensity and local brief pauses until ceasing between 2:00 and 3:00 p.m. on February 9. The cumulative total of rainfall for this event was approximately 1.98 to 2.37 inches, depending on gage location. Stormwater samples were collected from four outfall basins (Basins 44, 45, 53A, and M-2) between 8:18 and 10:49 a.m. on February 8. These samples are not considered to reflect first-flush conditions based on the timing of sample collection.

### **A4.2.2 Flow-Weighted Composite Sampling Events – Basin 19**

The Basin 19 composite samples were collected during the March 9-10, September 17, October 13, and November 5, 2016, storm events described above. Additional information specific to collection of the composite Basin 19 stormwater samples for each of these events is provided below.

#### March 9-10, 2016

The Basin 19 composite stormwater sample for this event was collected in 25 aliquots at flow-paced intervals between 8:03 a.m. on March 9 and 3:03 a.m. on March 10. The event hydrograph in Attachment A3 presents the timing of the individual aliquots relative to flow and precipitation at the sample location.

#### September 17, 2016

The composite sample was collected in 14 aliquots at flow-paced intervals between 6:42 a.m. and 1:37 p.m. The automated sampler was set up to continue collecting flow-paced aliquots through the remainder of the storm (which ended between 7:00 and 8:00 p.m.), but the equipment tubing malfunctioned and did not collect aliquots during the latter half of the storm event (see the event hydrograph in Attachment A3). As a result, the sample does not represent the entire storm hydrograph as specified in the SAP. However, it consists of flow-weighted aliquots from the first approximately 7 hours of the storm and represents whole basin flow, so it is considered to meet the SAP objectives.

### October 13-14, 2016

The composite sample was collected in a total of 11 flow-paced aliquots, representing most but not all of the storm event, as discussed below. Collection of the first aliquot was triggered by the initiation of runoff at approximately 2:25 a.m. on October 13. Flow-paced sample collection continued through 5:00 a.m., but because of equipment malfunction, no further aliquots were collected until 11:35 a.m., representing an approximately 6-hour gap in coverage of the storm hydrograph. Aliquot collection resumed at 11:35 a.m. and continued through 11:25 p.m. on October 13, except for one missed aliquot at 5:15 p.m. Rainfall for this event ended between approximately 11:00 p.m. and midnight on October 13, and a final trigger occurred at approximately 1:55 a.m. on October 14, but because of equipment malfunction, this final aliquot was missed. As shown on the hydrograph for this event in Attachment A3, a total of five flow triggers were missed, including the one at the end of the event. However, the resulting composite sample represents 16 hours of storm discharge, including the first 5 hours of discharge (i.e., first flush) and the two periods of highest flow. It is considered to meet the SAP objectives.

### November 5-6, 2016

The composite sample was collected in 31 aliquots at flow-paced intervals between 7:41 a.m. on November 5 and 10:15 a.m. on November 6, representing the entire runoff event with no missed flow triggers. The event hydrograph in Attachment A3 presents the timing of the individual aliquots relative to flow and precipitation at the sample location.

## **A4.3 Storm Event Representativeness**

General conditions during the 2015-2017 stormwater sampling efforts were assessed to determine whether the SCM effectiveness monitoring samples collected are considered representative of expected Portland-area rainfall and of first-flush and/or overall stormwater runoff conditions within a particular outfall basin.

### **A4.3.1 Grab Samples**

The 2015-2017 stormwater samples are considered representative of a typical wet season (between September and May) in the Portland area, based on a comparison of the average monthly rainfall data for Portland Harbor<sup>6</sup> with regional long-term rainfall data<sup>7</sup>. This comparison is presented in Figure A-10, which shows (1) rainfall during the 2015-2017 sampling period that generally matches the historical precipitation pattern except for an earlier-than-normal onset of the wet season in October 2016, and (2) high monthly precipitation totals in December 2015 and February 2017, both of which received record amounts of rainfall. Note that sampling was not conducted during the extremely wet period in December 2015, and the sample collected in February 2017 was collected near the beginning of the month.

The storms sampled in the 2015-2017 SCM effectiveness monitoring period generally met the target storm criteria, with the minor exceptions identified in Section A3.4. Based on storm size and duration, and the timing of sample collection, the stormwater samples collected during these

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<sup>6</sup> Average monthly rainfall for the Portland Harbor area between September 2015 and February 2017 were calculated using precipitation data from the City's Albina, Shipyard, Swan Island, and Yeon rain gages.

<sup>7</sup> Regional average long-term rainfall calculated using 1981-2010 data for the Portland International Airport (NOAA, 2016).

storm events are considered representative of discharge from all portions of the basins being sampled.

At least one sample representative of first-flush conditions was collected in five of the seven basins where grab sampling was conducted at the basin-scale monitoring location (Basins 16, 17, 44, 45, and 53A). The samples obtained from Basins 52D or M-2 are not likely to be representative of first-flush conditions. However, review of the stormwater data from the basins with first-flush and non-first-flush samples does not indicate a consistent low bias in concentrations associated with the non-first-flush events; therefore, results from Basins 52D and M-2 are considered representative of the overall range of stormwater discharge conditions at these outfalls, despite the lack of samples collected during first flush.

### **A4.3.2 Composite Samples**

Review of the flow, sampler, and rain gage data associated with the flow-weighted composite samples (Basin 19) indicates the March 9-10 and November 5-6, 2016, sampling events successfully captured flow representing all portions of the storm hydrograph, with no significant gaps in aliquot collection during any storm event. Several aliquots were missed during the September 17 and October 13-14, 2016, sampling events because of equipment malfunction, as discussed in Section A4.2.2; however, based on the significant portions of both of these events that were successfully captured (including the first several hours of runoff in both cases), the resulting samples are considered to be sufficiently representative of Basin 19 discharge during these runoff events to meet the SAP objectives.

### **A4.3.3 Summary**

Based on the above discussion, the City stormwater samples are considered representative of typical wet-season conditions in the Portland area. The collective results of the sampling are representative of both first-flush and general basin runoff conditions.

## A5 Laboratory Analyses and Data Management

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### A5.1 Chemical Analyses

Table A-3 lists the chemical analyses and analytical methods for the 2015-2017 stormwater samples. All samples were submitted for laboratory analysis of polychlorinated biphenyl (PCB) congeners, total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc), polycyclic aromatic hydrocarbons (PAHs) and phthalates, and total suspended solids (TSS). The samples collected from Basin 17 and Basin 44 also were analyzed for organochlorine pesticides. In addition, the Basin 17 samples also were analyzed for PCB Aroclors, and the first three Basin 17 samples also were analyzed for a full scan of semivolatile organic compounds (SVOCs). The chemical analytical results are summarized by sample location in tables provided in Attachment A4.

### A5.2 Data Management

Field and laboratory data obtained during the 2015-2017 stormwater sampling events were managed in accordance with the QAPP. BES maintains records of the field data in both hard copy and electronic (.pdf file) formats. Analytical laboratory data from the WPCL and contract laboratories (with the exception of the PCB congener results), along with associated field parameter measurements as recorded on the COC forms, were manually entered into the BES Laboratory Information Management System (LIMS), which functions as the BES database for data storage, sample tracking, and reporting. A hard copy of the entered data was printed and checked for data entry errors. After all sample results had undergone technical and data entry review, the WPCL QA specialist electronically marked each sample in LIMS to indicate that all analyses for the sample were complete and had been checked for errors. Data were not released for use until the internal data review process was complete. Copies of the final laboratory analytical reports are provided in Attachment A5.

### A5.3 Data Review and Usability

In accordance with the QAPP, the City reviewed all field and analytical data associated with the stormwater samples to verify that the resulting data were of acceptable quality for the intended use. Based on a review of the data and supporting documentation, as described in this section, the quality of the stormwater field and analytical data is adequate for the purposes of meeting the SAP objectives.

#### A5.3.1 Field Data

No significant issues associated with sample collection procedures were encountered, and field data were collected in general accordance with the SOPs and other guidance documentation (with the minor exceptions noted in Section A3.4). Based on equipment calibration and post-measurement review, all field data were determined to be valid and of acceptable quality. Field data documentation for sampling also met the SAP objectives to the extent practicable and was determined to be acceptable.

### **A5.3.2 Laboratory Data**

A WPCL chemist checked analytical data sheets and results of laboratory QC samples to ensure that the QC statistics were within control limits and that appropriate corrective actions were taken if control limits were exceeded. The WPCL chemist also flagged or provided comments on results that did not strictly meet QC criteria. The WPCL applied specific data qualifiers, defined in the laboratory reports, to qualify results where appropriate. The contracting laboratories used customized flags to communicate detailed QC issues.

For each sampling event, the final laboratory reports were reviewed and QC issues identified by the WPCL or the contracted laboratories are summarized in a Data Review Memorandum (DRM) for the sampling event. The DRMs are included with the associated laboratory reports in Attachment A5. The DRMs summarize laboratory QC exceptions and discuss the basis for any resulting data qualifiers.

## A6 Results

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The field and chemical analytical results for the 2015-2017 stormwater samples are summarized according to sampling location in the data tables presented as Attachment A4 to this report. The full laboratory reports and accompanying DRMs are presented in Attachment A5. The data tables presented in Attachment A4 include notations where appropriate to indicate potential data quality concerns or use limitations, as discussed in the DRMs.

The data tables include values for total PCB congeners, total PCB Aroclors, and total PAHs. For a given sample, these totals were calculated by summing the concentrations of individual compounds that were detected within the analyte group. Where chemical analyses resulted in undetected values for all compounds within the analyte group, then the total value is considered non-detected ("ND"). If any of the individual values used in the sum are estimated ("J" qualified), then the total value is considered to be estimated.

In summary, the 2015-2017 stormwater sampling data were collected in general accordance with the SAP during storm events that have been confirmed to be representative of typical precipitation events for the area. The quality of the resulting data (as qualified by the reporting laboratories and as described in the DRMs) has been determined to be acceptable for the intended purposes. Based on these factors, these data meet the SAP objectives.

## A7 References

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Tables

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**Table A-1**  
**Outfall Basin Characteristics and Descriptions of Stormwater Sampling Locations**  
**2015-2017 Stormwater Monitoring**

Outfall Basin	Size (acres)	Impervious Surface Area	Land Use(s) <sup>(1)</sup>	Sampling Locations		
				Location ID	Feature	Description
16	71	79%	HI, T	16_SW1	MH AAX408	Samples collected from outgoing 48-inch pipe. Represents the majority of the Basin 16 drainage area.
				16_SW2	MH ANH937	Samples collected from incoming 12-inch line from MH. Represents only stormwater discharges to Outfall 16 from the Calbag Metals-Nicolai site (ECSI #5059).
17	1,486	9%	OS, HI, R, T, C	17_16SW	Outfall	Samples collected directly from the 90-inch diameter outfall. Represents all of the Basin 17 drainage area.
				17_17SW	MH AAT596 <sup>(2)</sup>	Samples collected from outgoing 90-inch pipe. This alternative sampling location also represents all of the Basin 17 drainage area.
19	486	22%	OS, HI, T	19_SW3	MH AAP918	Samples collected from outgoing 42-inch pipe. Represents all of the Basin 19 drainage area.
				19_SW2	Stormwater sampling MH at 4927 NW Front	Samples collected from MH. Represents stormwater discharges to Outfall 19 from the Calbag Metals-Front site (ECSI #2454).
44	16	75%	LI, HI, T	44_SW20	MH ABC352	Samples collected from outgoing 12-inch pipe. Represents all of the Basin 44 drainage area.
45	10	88%	HI, T, LI	45_SW1	MH ABC319	Samples collected from the 27-inch line discharging from this manhole. Represents all of the Basin 45 drainage area.
52D	24	90%	HI	52D_SW5	MH APT249	Samples collected at the manhole. Represents all of the Basin 52D drainage area.
				52D_SW6	MH APT252	Samples collected from incoming line from 9449 N. Burgard Way. Represents only stormwater discharges to Outfall 52D from the Portland Container Repair site (ECSI #2375).
53A	73	59%	HI	53A_SW1	MH AAA170	Samples collected at the manhole. Represents all of the Basin 53A drainage area.
M-2	135	79%	LI, OS	M2-SW1	MH AAM169	Samples collected from 60-inch line discharging from this manhole. Represents all of the Basin M-2 drainage area.

Notes:

**Table A-1**  
**Outfall Basin Characteristics and Descriptions of Stormwater Sampling Locations**  
**2015-2017 Stormwater Monitoring**

Outfall Basin	Size (acres)	Impervious Surface Area	Land Use(s) <sup>(1)</sup>	Sampling Locations		
				Location ID	Feature	Description

ECSI = Environmental Cleanup Site Information database for the Oregon Department of Environmental Quality's Cleanup Program

MH = manhole

<sup>(1)</sup> Multiple land uses are listed in order of predominance. Land use definitions (based on zoning classifications):

HI = Heavy Industrial

LI = Light Industrial

T = Major Transportation

OS = Parks and Open Space

C = Commercial

<sup>(2)</sup> Alternative location designated for use in case the outfall was submerged.

**Table A-2**  
**Storm Events and Outfall Basins Sampled**  
**2015-2017 Stormwater Monitoring**

Outfall Basin	Sampling Location		Sample Type	Sampling Event			
	Location ID	Feature		Event 1	Event 2	Event 3	Event 4
16	16_SW1	MH AAX408	Grab	3/9/2016	9/17/2016	10/13/2016	11/22/2016
	16_SW2	MH ANH937 (Calbag-Nicolai connection)	Grab	3/9/2016	9/17/2016	10/13/2016	11/22/2016
17	17_16SW	Outfall	Grab	9/25/2015	10/10/2015	10/31/2015	--
	17_17SW	MH AAT596 (Alternative Location)	Grab	--	--	--	3/9/2016
19	19_SW3	MH AAP918	Composite	3/9/2016	9/17/2016	10/13/2016	11/5/2016
	19_SW2	Stormwater Sampling MH at 4927 NW Front (Calbag-Front connection)	Grab	3/9/2016	9/17/2016	10/13/2016	11/5/2016
44	44_SW20	MH ABC352	Grab	3/9/2016	5/19/2016	10/13/2016	2/8/2017
45	45_SW1	MH ABC319	Grab	3/9/2016	5/19/2016	10/13/2016	2/8/2017
52D	52D_SW5	MH APT249	Grab	3/9/2016	9/17/2016	10/13/2016	--
	52D_SW6	MH APT252 (Portland Container connection)	Grab	3/9/2016	--	10/13/2016	--
53A	53A_SW1	MH AAA170	Grab	3/9/2016	10/13/2016	11/15/2016	2/8/2017
M-2	M2-SW1	MH AAM169	Grab	3/9/2016	9/17/2016	10/13/2016	2/8/2017

## Notes:

-- = not sampled

MH = manhole

**Table A-3**  
**Chemical Analytical Schedule**  
**2015-2017 Stormwater Monitoring**

Outfall Basin	Location ID	Sample Information			Field Measurements			Laboratory Analysis and Method <sup>(2)</sup>								
		Sample ID	Type <sup>(1)</sup>	Collection Date	Conductivity	pH	Temperature	TSS (SM 2540D)	Total Metals (EPA 200.8)	Mercury (WPCLSOP-M-10.01)	PAHs and Phthalates (EPA 8270M-SIM)	SVOCs (full scan) (EPA 8270C)	PCB Congeners (EPA 1668A)	PCB Aroclors (EPA 8082)	Organochlorine Pesticides (EPA 8081)	
16	16_SW1	W16C092-07	N	3/9/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16I149-04	N	9/17/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16J112-07	N	10/13/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16K206-01	N	11/22/2016	X	X	X	X	X	X	X	--	X	--	--	
	16_SW2	W16C092-08	N	3/9/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16I149-03	N	9/17/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16J112-08	N	10/13/2016	X	X	X	X	X	X	X	--	X	--	--	
17	17_16SW	W15I174-01	N	9/25/2015	X	X	X	X	X	X	X	X	X	X	X	
		W15I174-02	DUP	9/25/2015	NA	NA	NA	X	X	X	X	X	X	X	X	
		W15J074-01	N	10/10/2015	X	X	X	X	X	X	X	X	X	X	X	
		W15J213-01	N	10/31/2015	X	X	X	X	X	X	X	X	X	X	X	
	17_17SW	W16C092-09	N	3/9/2016	X	X	X	X	X	X	X	--	X	X	X	
	19	19_SW3	W16C101-01	N	3/9/2016	NA	NA	NA	X	X	X	X	--	X	--	--
			W16C101-02	DUP	3/9/2015	NA	NA	NA	X	X	X	X	--	X	--	--
W16I160-01			N	9/17/2016	NA	NA	NA	X	X	X	X	--	X	--	--	
W16J118-01			N	10/13/2016	NA	NA	NA	X	X	X	X	--	X	--	--	
19_SW2		W16K060-01	N	11/5/2016	NA	NA	NA	X	X	X	X	--	X	--	--	
		W16C092-10	N	3/9/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16I149-05	N	9/17/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16J112-09	N	10/13/2016	X	X	X	X	X	X	X	--	X	--	--	
44	44_SW20	W16J112-11	DUP	10/13/2016	NA	NA	NA	X	X	X	X	--	X	--	--	
		W16K053-01	N	11/5/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16C092-02	N	3/9/2016	X	X	X	X	X	X	X	--	X	--	X	
		W16E158-03	N	5/19/2016	X	X	X	X	X	X	X	--	X	--	X	
45	45_SW1	W16J112-01	N	10/13/2016	X	X	X	X	X	X	X	--	X	--	X	
		W17B063-01	N	2/8/2017	X	X	X	X	X	X	X	--	X	--	X	
		W17B063-04	DUP	2/8/2017	NA	NA	NA	X	X	X	X	--	X	--	--	
		W16C092-03	N	3/9/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16E158-01	N	5/19/2016	X	X	X	X	X	X	X	--	X	--	--	
52D	52D_SW5	W16E158-04	DUP	5/19/2016	NA	NA	NA	X	X	X	X	--	X	--	--	
		W16J112-02	N	10/13/2016	X	X	X	X	X	X	X	--	X	--	--	
		W17B063-02	N	2/8/2017	X	X	X	X	X	X	X	--	X	--	--	
	52D_SW6	W16C092-04	N	3/9/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16I149-01	N	9/17/2016	X	X	X	X	X	X	X	--	X	--	--	
53A	53A_SW1	W16J112-05	N	10/13/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16C092-05	N	3/9/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16J112-04	N	10/13/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16C092-06	N	3/9/2016	X	X	X	X	X	X	X	--	X	--	--	
		W16C092-12	DUP	3/9/2015	NA	NA	NA	X	X	X	X	--	X	--	--	
53A_SW1	W16J112-06	N	10/13/2016	X	X	X	X	X	X	X	--	X	--	--		
	W16K144-01	N	11/15/2016	X	X	X	X	X	X	X	--	X	--	--		
	W17B060-01	N	2/8/2017	X	X	X	X	X	X	X	--	X	--	--		
		W16C092-01	N	3/9/2016	X	X	X	X	X	X	--	X	--	--		

**Table A-3**  
**Chemical Analytical Schedule**  
**2015-2017 Stormwater Monitoring**

Outfall Basin	Location ID	Sample Information			Field Measurements			Laboratory Analysis and Method <sup>(2)</sup>							
		Sample ID	Type <sup>(1)</sup>	Collection Date	Conductivity	pH	Temperature	TSS (SM 2540D)	Total Metals (EPA 200.8)	Mercury (WPCLSOP-M-10.01)	PAHs and Phthalates (EPA 8270M-SIM)	SVOCs (full scan) (EPA 8270C)	PCB Congeners (EPA 1668A)	PCB Aroclors (EPA 8082)	Organochlorine Pesticides (EPA 8081)
								X	X	X	X	X	X	X	X
M-2	M2-SW1	W16I149-01	N	9/17/2016	X	X	X	X	X	X	X	--	X	--	--
		W16J112-03	N	10/13/2016	X	X	X	X	X	X	X	--	X	--	--
		W17B063-03	N	2/8/2017	X	X	X	X	X	X	X	--	X	--	--
NA	NA	W16C070-01	FDB	3/9/2016	NA	NA	NA	X	X	X	X	--	X	--	--
		W16E158-02	FDB	5/19/2016	NA	NA	NA	X	X	X	X	--	X	--	--
		W16J112-10	FDB	10/13/2016	NA	NA	NA	X	X	X	X	--	X	--	--
		W17B060-02	FDB	2/8/2017	NA	NA	NA	X	X	X	X	--	X	--	--

Notes:

-- = not analyzed

NA = not applicable

<sup>(1)</sup> Sample types:

N = normal

DUP = field duplicate

FDB = field decontamination blank. Note that each field decontamination blank is listed only at the collection site but represents the field blank for the entire sampling event.

<sup>(2)</sup> Analyses:

TSS = total suspended solids. Analysis performed by City of Portland, Bureau of Environmental Services' Water Pollution Control Laboratory (WPCL).

Total Metals analysis includes arsenic, cadmium, chromium, copper, lead, nickel, silver, and zinc. Analysis performed by WPCL.

Total Mercury analysis performed by WPCL.

PAHs = polycyclic aromatic hydrocarbons. PAH and phthalate analysis performed by WPCL.

PCB = polychlorinated biphenyls. PCB congener analysis performed by Pace Analytical Services. PCB Aroclor analysis performed by WPCL.

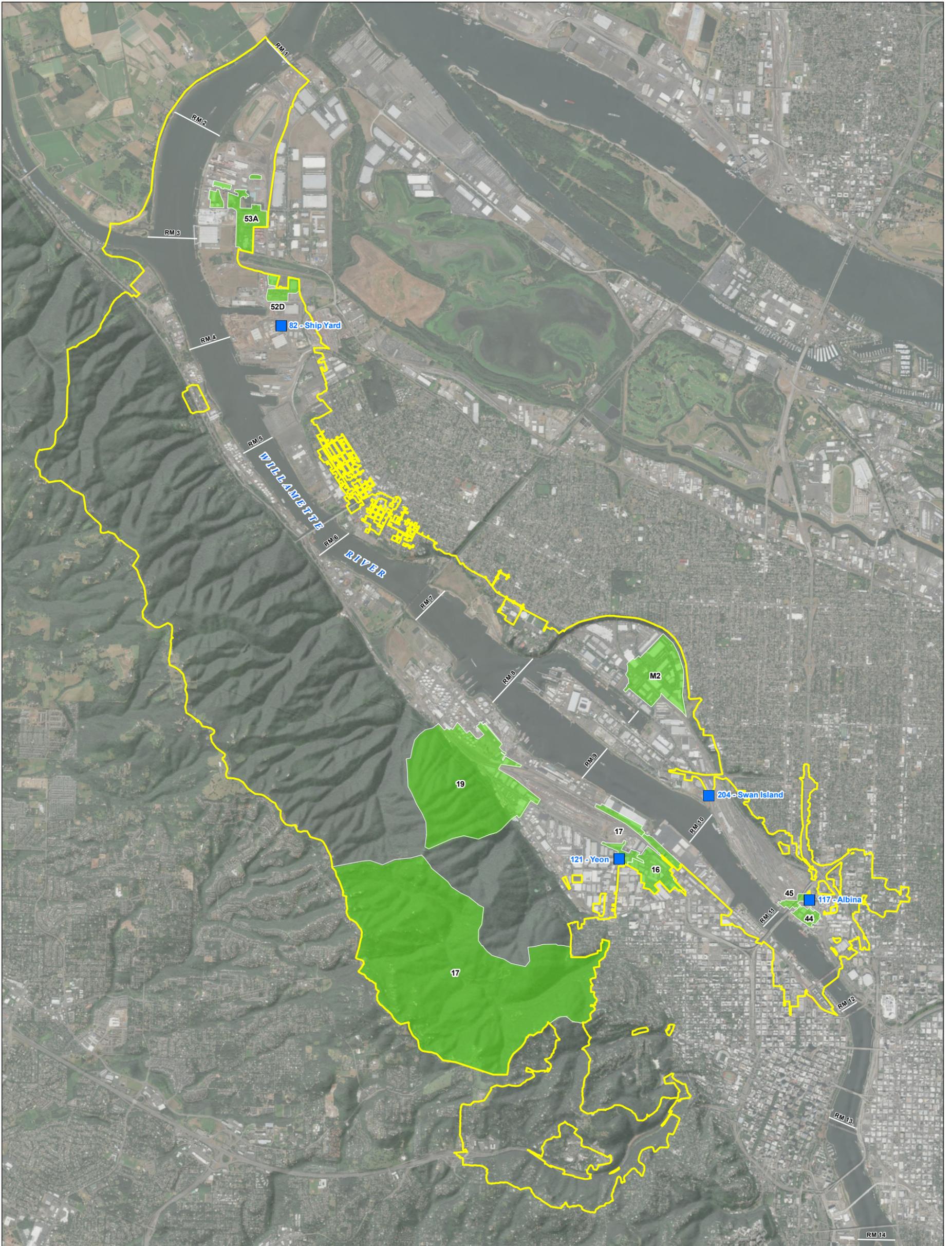
Pesticides analysis performed by ALS Environmental.

SVOC = semivolatile organic compound. SVOC analysis performed by WPCL.

**Figures**

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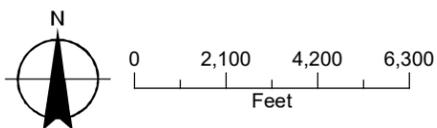


**LEGEND**

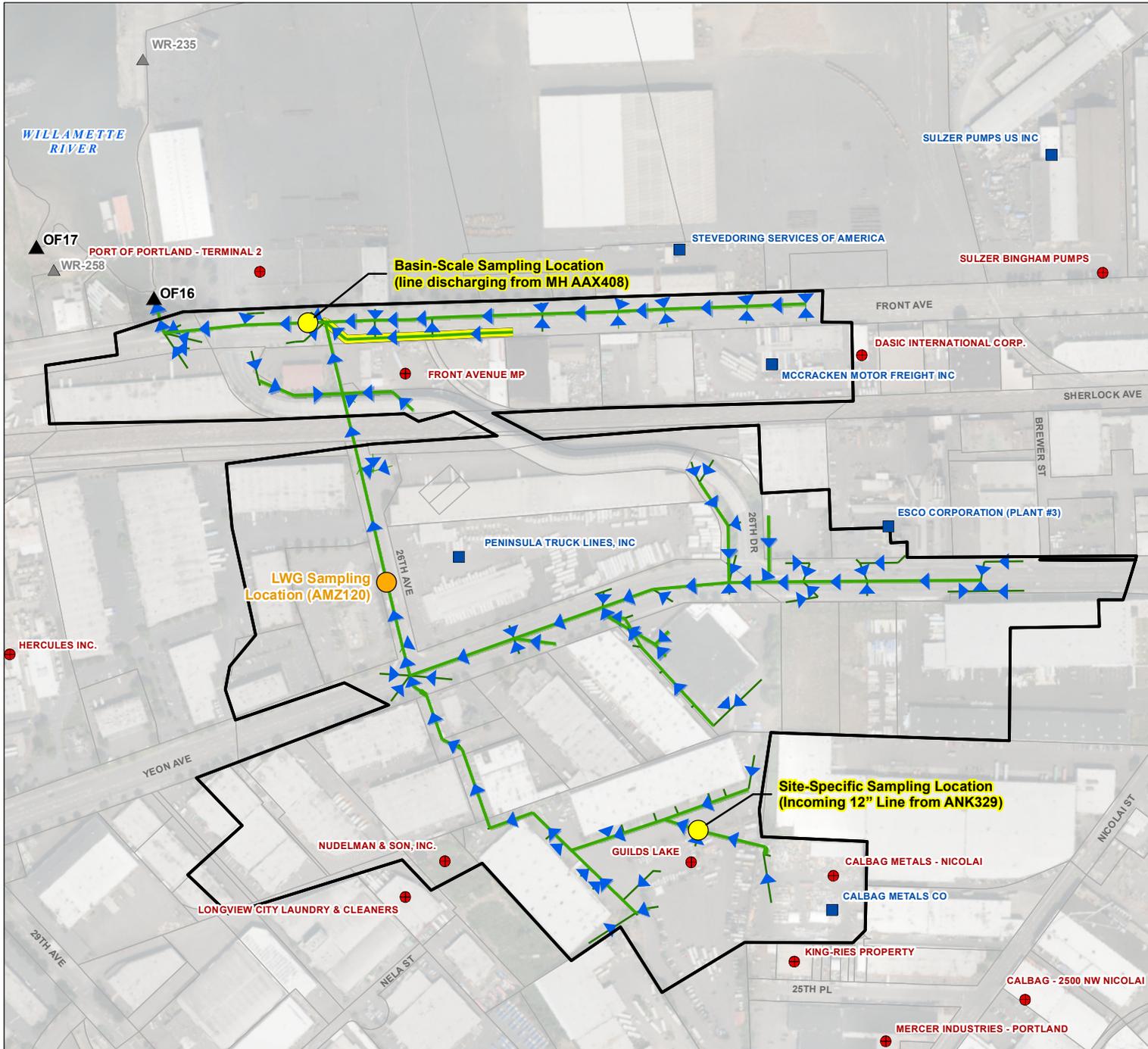
- City Rain Gage Station
- City Outfall Basin Included in 2015/2016 Stormwater Monitoring
- Portland Harbor Hydroboundary

**FIGURE A-1**  
**2015-2017 Stormwater Sampling Locations**

Date: June 2018  
 Data Sources: BES, METRO, Air Photo taken 2013 USDA

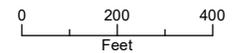
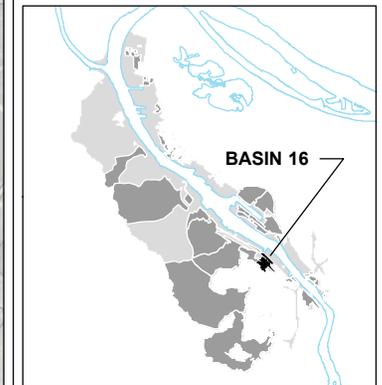


**FIGURE A-2**  
**Outfall Basin 16**  
**2016 Stormwater**  
**Sampling Locations**



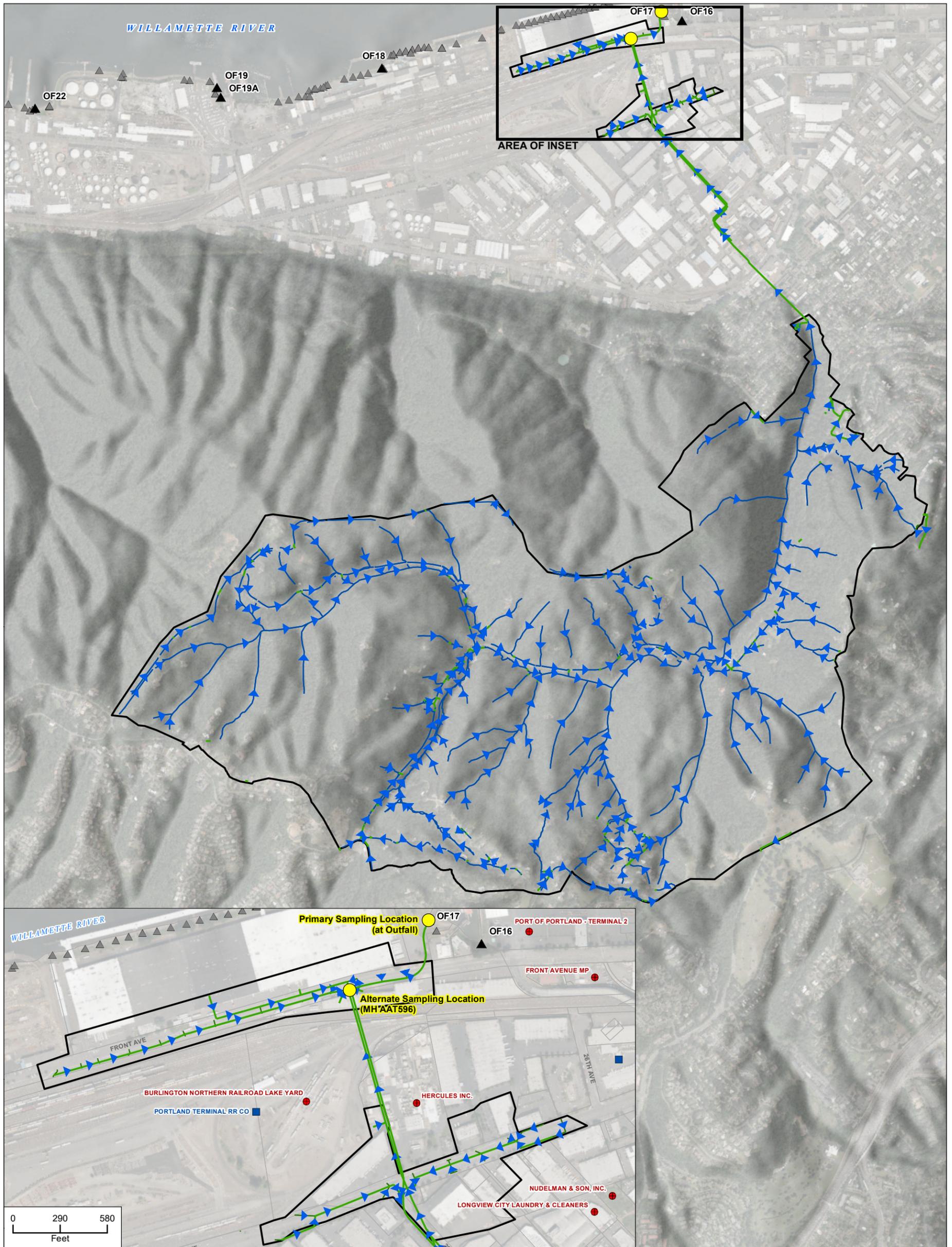
**LEGEND**

- Sampling Location
- Previous LWG Sampling Location
- Basin 16
- DEQ ECSI Site
- NPDES Stormwater Permit
- City Outfall
- Non-City Outfall
- Storm Line
- 8-inch Line Cleaned by City, October 2006
- Tax Lot



Date: June 2018  
 Data Sources: BES, METRO, Air Photo taken Summer 2014





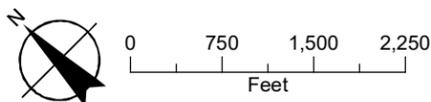
**LEGEND**

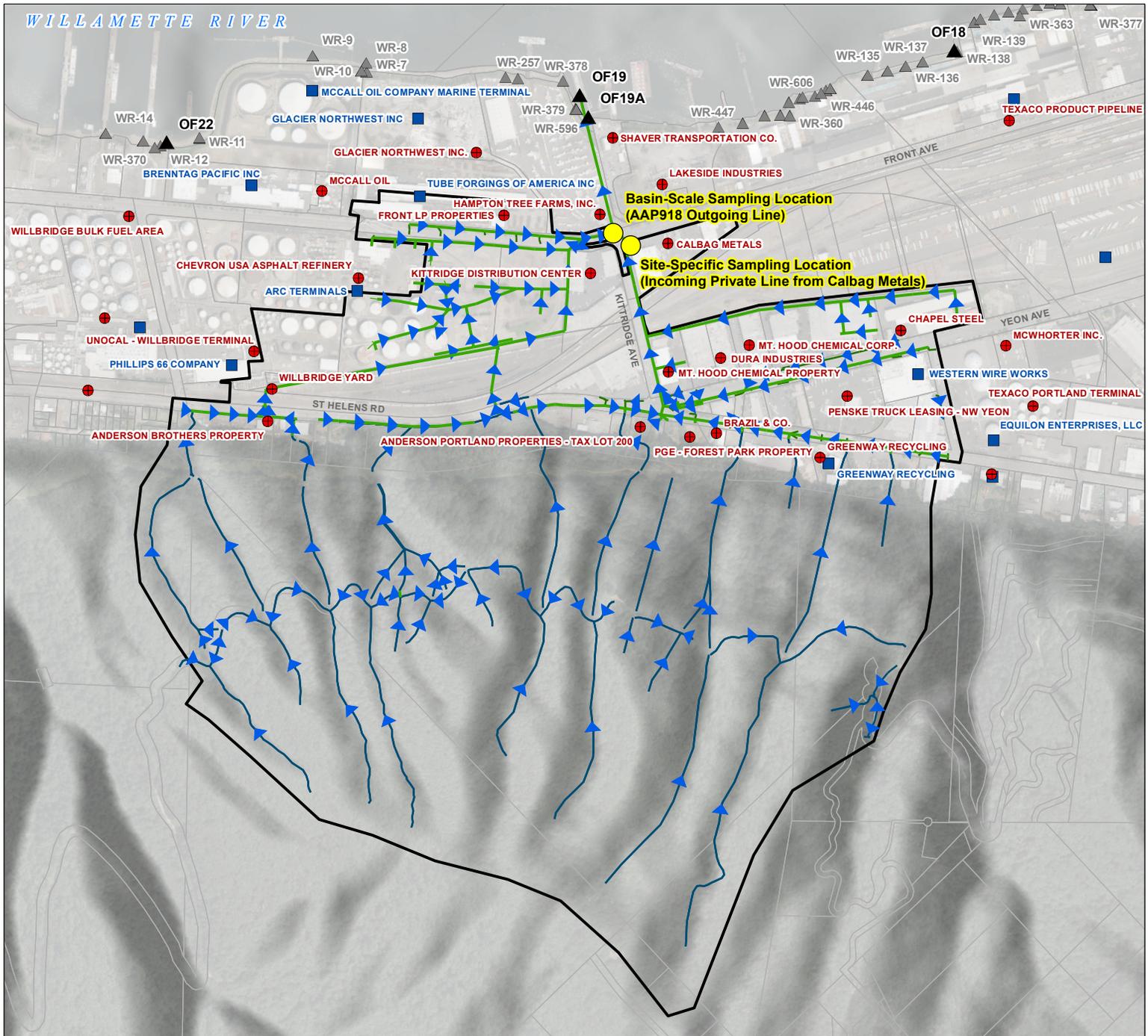
- Sample Location
- Basin 17
- DEQ ECSI Site
- NPDES Stormwater Permit
- ▲ City Outfall
- ▲ Non-City Outfall
- ▶ Storm Line
- ▶ Surface Water
- Tax Lot

**FIGURE A-3**  
**Outfall Basin 17**

2015-2016 Stormwater Sampling Locations

Date: June 2018  
Data Sources: BES, METRO, Air Photo taken Summer 2014 COP

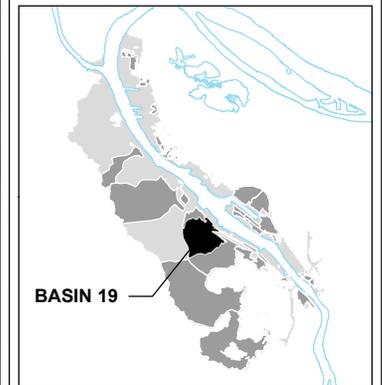




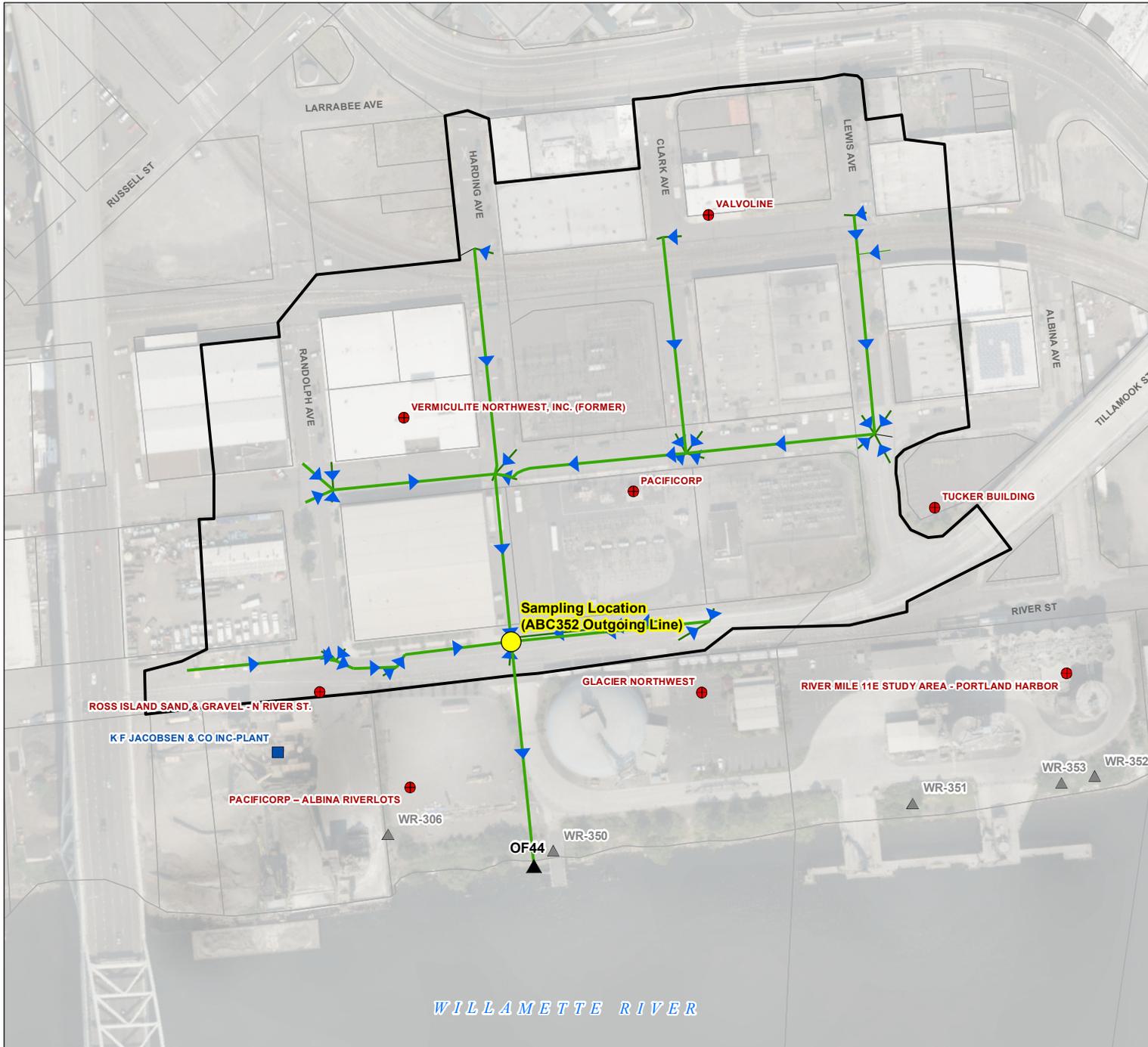
**FIGURE A-4**  
**Outfall Basin 19**  
**2016 Stormwater**  
**Sampling Locations**

**LEGEND**

- Sampling Location
- Basin 19
- DEQ ECSI Site
- NPDES Stormwater Permit
- City Outfall
- Non-City Outfall
- Storm Main
- Surface Water
- Tax Lot

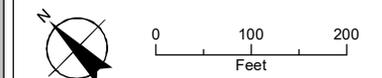
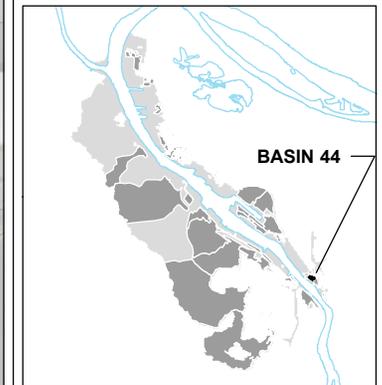


**FIGURE A-5**  
**Outfall Basin 44**  
 2016-2017 Stormwater  
 Sampling Locations

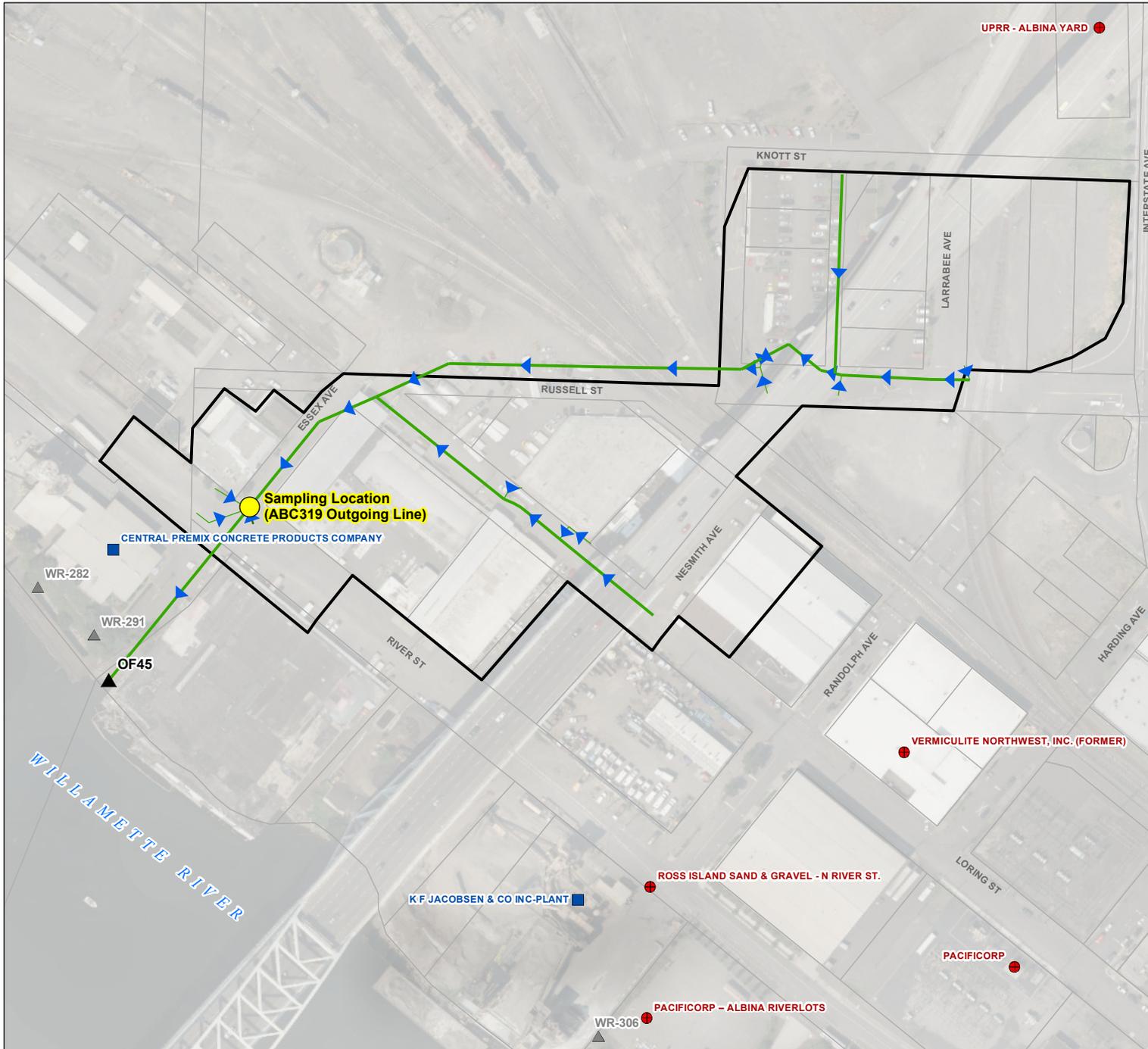


**LEGEND**

- Sampling Location
- Basin 44
- DEQ ECSI Site
- NPDES Stormwater Permit
- City Outfall
- Non-City Outfall
- Storm Line
- Tax Lot

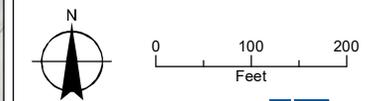
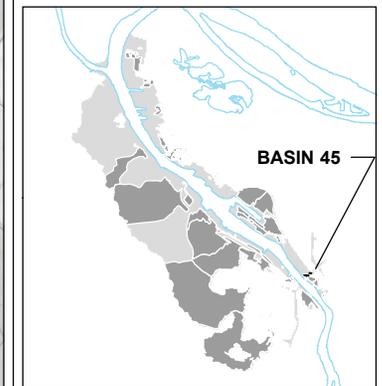


**FIGURE A-6**  
**Outfall Basin 45**  
 2016-2017 Stormwater  
 Sampling Locations



**LEGEND**

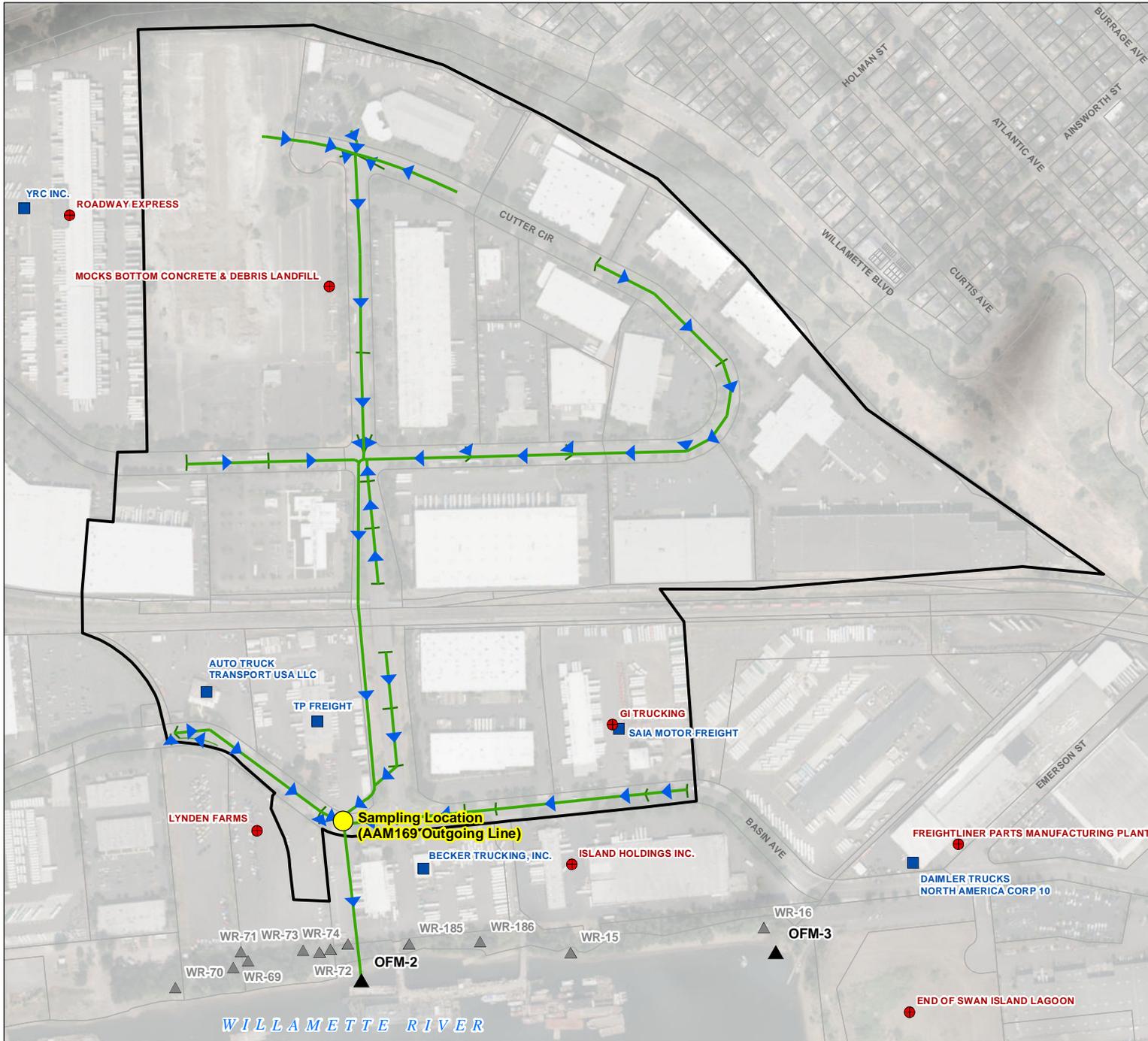
- Sampling Location
- Basin 45
- DEQ ECSI Site
- NPDES Stormwater Permit
- City Outfall
- Non-City Outfall
- Storm Line
- Tax Lot



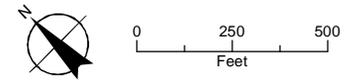
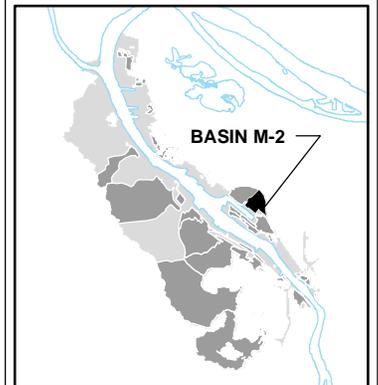
Date: June 2018  
 Data Sources: BES, METRO, Air Photo taken  
 Summer 2014



**FIGURE A-7**  
**Outfall Basin M-2**  
 2016-2017 Stormwater  
 Sampling Locations

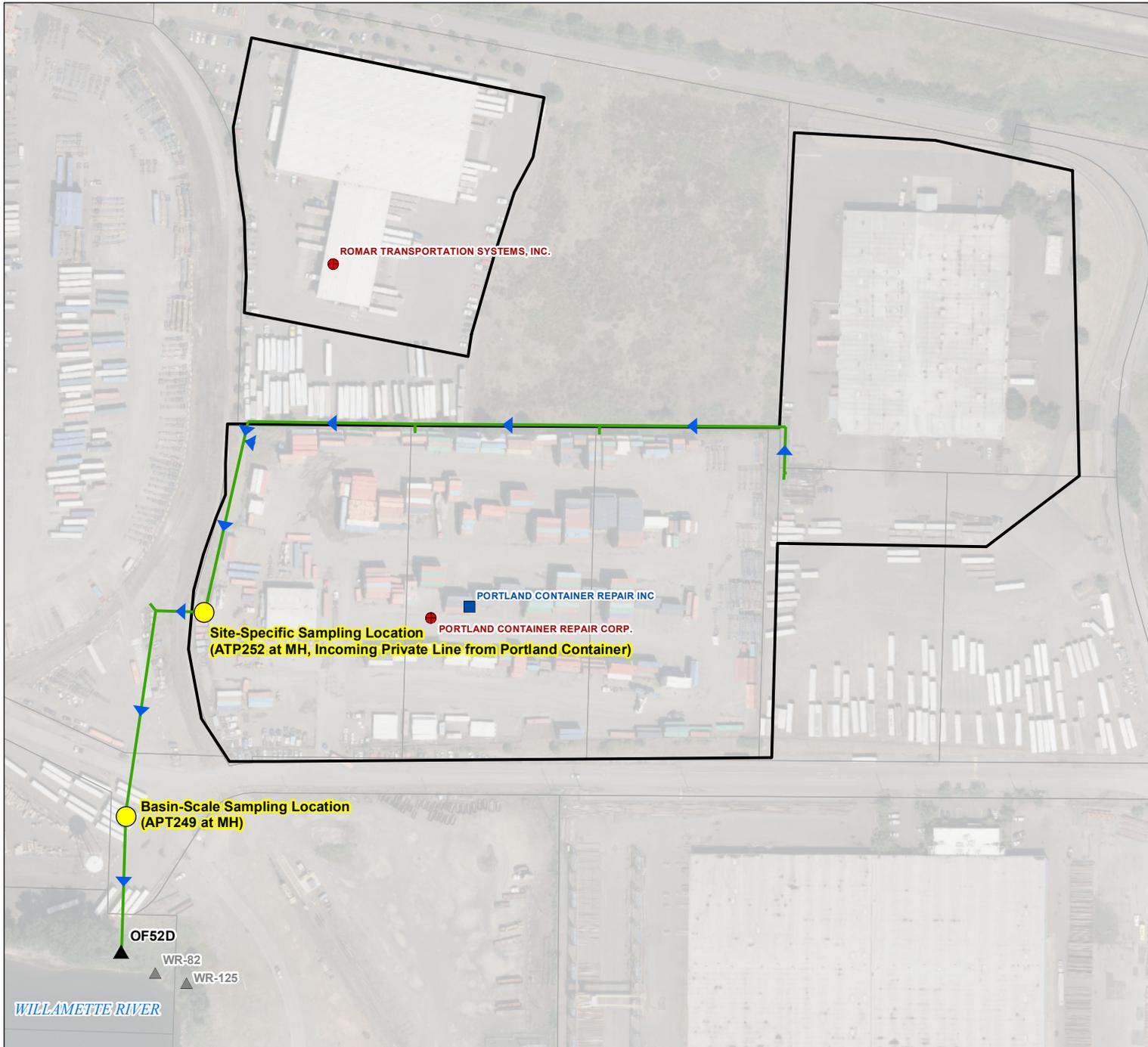


- LEGEND**
- Sampling Location
  - Basin M-2
  - DEQ ECSI Site
  - NPDES Stormwater Permit
  - ▲ City Outfall
  - ▲ Non-City Outfall
  - ▶ Storm Line
  - Tax Lot



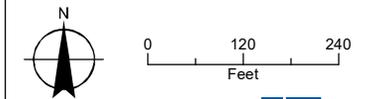
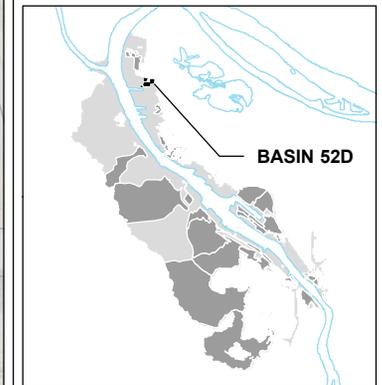
Date: June 2018  
 Data Sources: BES, METRO, Air Photo taken Summer 2014

**FIGURE A-8**  
**Outfall Basin 52D**  
 2016-2017 Stormwater  
 Sampling Locations



**LEGEND**

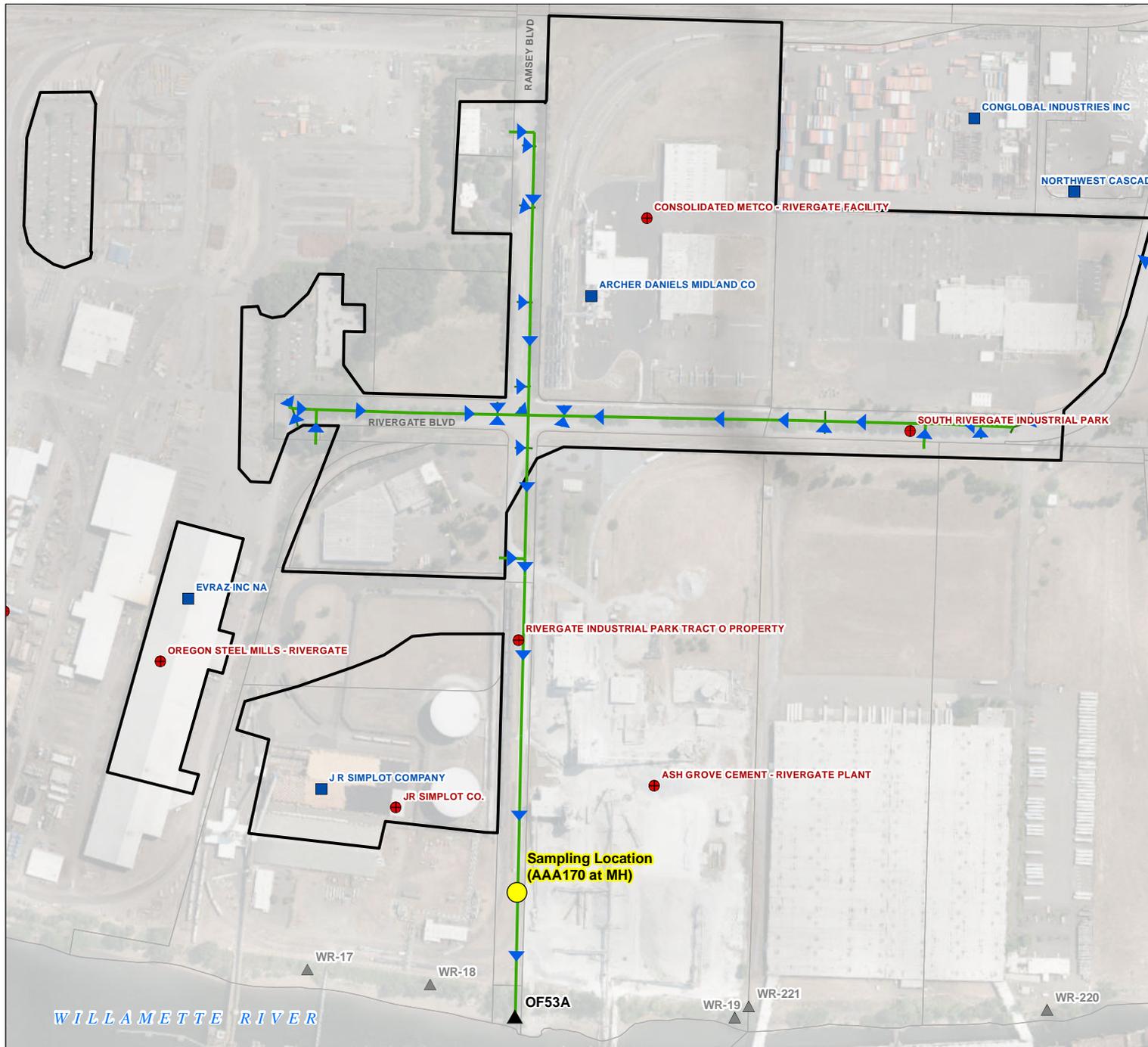
- Sampling Location
- Basin 52D
- DEQ ECSI Site
- NPDES Stormwater Permit
- City Outfall
- Non-City Outfall
- Storm Line
- Tax Lot



Date: June 2018  
 Data Sources: BES, METRO, Air Photo taken  
 Summer 2014

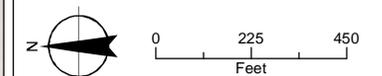
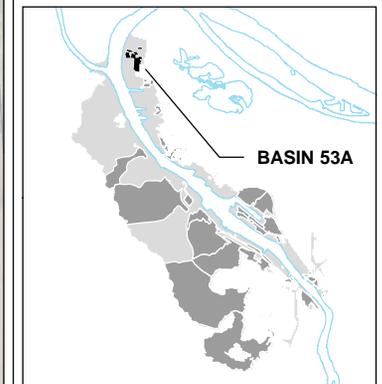


**FIGURE A-9**  
**Outfall Basin 53A**  
 2016-2017 Stormwater  
 Sampling Locations

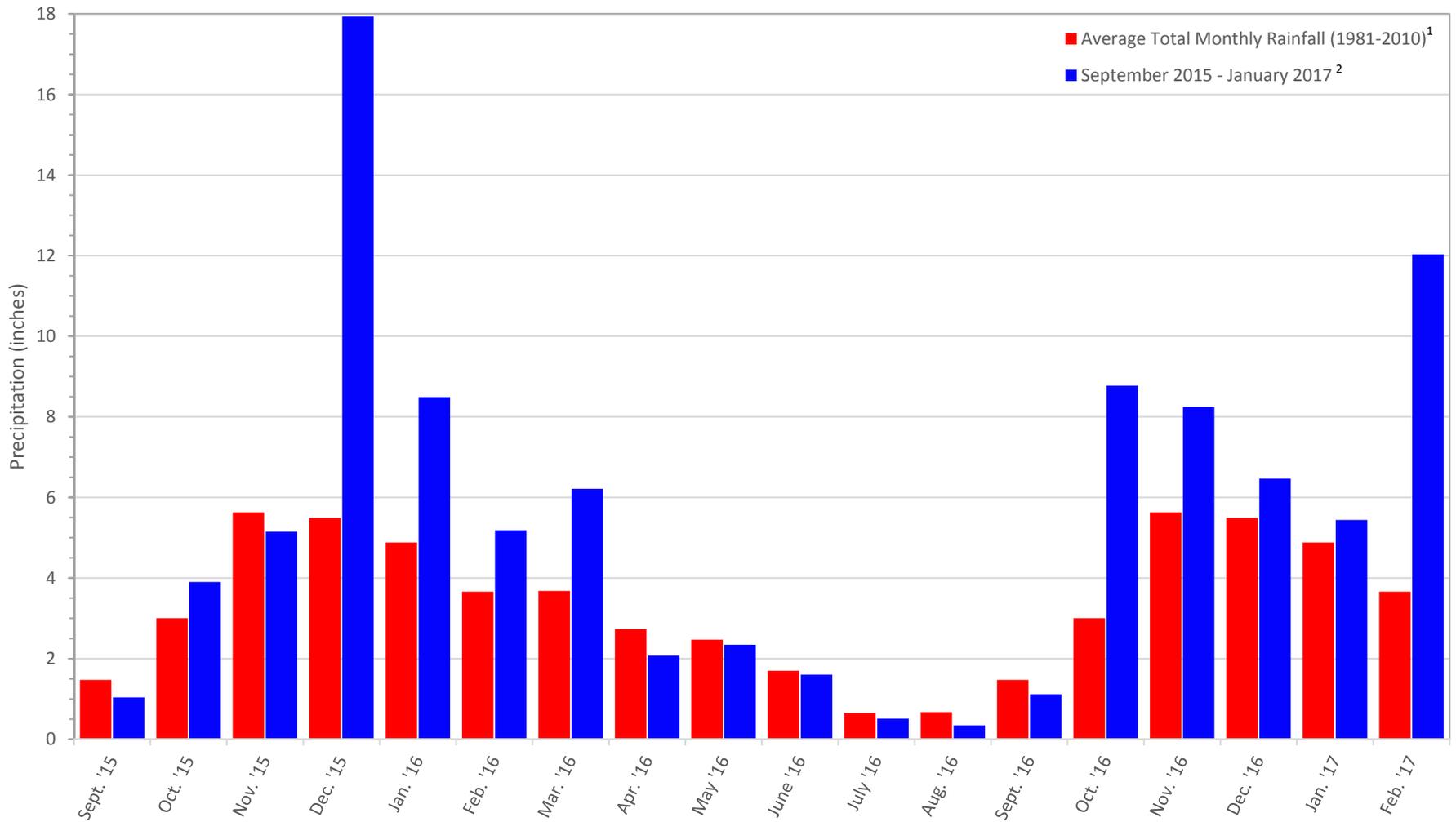


**LEGEND**

- Sampling Location
- Basin 53A
- DEQ ECSI Site
- NPDES Stormwater Permit
- City Outfall
- Non-City Outfall
- Storm Line
- Tax Lot



# Monthly Rainfall



Sources:

1. Portland International Airport, Period 1981 - 2010 (NOAA, 2016; <http://www.ncdc.noaa.gov/cdo-web/datatools/normals>)

2. Monthly data are based on hourly rainfall data obtained from the City of Portland Hydra Rainfall Network (<http://or.water.usgs.gov/non-usgs/bes/>) and averaged for the following four rain gages in the Portland Harbor: Stations #82-Shipyard, #117-Albina, #121-Yeon, and #204-Swan Island

Figure A - 10

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**Attachment A1**  
**Field Documentation**



Project Portland Harbor - OF17 sampling  
Location OF17  
Subject \_\_\_\_\_

Date 9/25/15  
Personnel MSS, JXB

0830	Rainfall is beginning. Radar indicates a moderately intense but narrow band of rainfall entering the area. River level forecast shows current low Willamette River levels with the lowest level of the day occurring within the next few hours.
0905	Rainfall intensifying - will head out to site to evaluate runoff and flow from the outfall.
0925	On-site to moderate steady rain and abundant runoff visible in adjacent vicinity. The outfall is currently exposed fully with active flow exiting the pipe. The flow appears to include stormwater flow with moderately turbid flow and material indicative of stormwater (i.e. leaves, etc.) entrained in the flow. Will remain on site to monitor the flow and allow more rain to fall prior to collecting sample.
0950	Rainfall intensity is decreasing. Flow has become more turbid and has visible stormwater runoff component. Will wait a bit longer to ensure that runoff from the entire basin is <del>reps</del> reaching the outfall prior to collecting the sample.
1014	Flow continues to be quite turbid and level has increased slightly. Will collect sample and duplicate.

Attachments:





Project Portland Harbor - Basin 17 Stormwater  
Location OF 17 Date 10/10/15  
Subject \_\_\_\_\_ Personnel MJS

1300	Rainfall began about 12:30pm and has been raining steadily since then, gradually increasing in intensity
1340	Rain has let up. Radar indicates another pulse of rain approaching. Will head to site to assess flow.
1408	On-site at OF 17 - Flow appears to contain stormwater runoff, with debris associated with stormwater and moderately high turbidity. Rain gauges indicate that only 0.08" has fallen but radar no longer appears as promising as earlier, and forecast has bumped down the forecasted rainfall amounts, so will go ahead and collect sample. The rainfall that did occur fell over the course of the last two hours, so flow at the outfall should now be representative of the entire basin.
1418	Collected samples and took field parameters
1436	Shortly after samples were collected there ceased to be positive flow exiting the outfall and water from the river is beginning to back up the channel exiting the outfall - the tide must have turned and is now coming back in.
1512	Very strong band of rain currently moving through - will return to site

Attachments:



Project Portland Harbor Basin 17 SW

Location OF 17

Date 10/10/15

Subject \_\_\_\_\_

Personnel MOS

1544 Despite heavy rain and audible flow up the pipe, the river is now substantially backed up the outfall pipe and there is not positive flow exiting the outfall. Therefore it is ~~not~~ we cannot be sure if the water at the outfall represents solely stormflow of the outfall and not river water. will not collect sample.

Attachments:

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody  
 Bureau of Environmental Services



Work Order #: \_\_\_\_\_  
 Collected By: MJS

Date: 10/10/15

Client Name: Director's Office Matrix: Stormwater  
 Project Name: Portland Harbor

**Requested Analyses**

Lab Number	Location ID	Sample Date	Sample Time	Sample Type	Special Instructions: Basin 17 Stormwater Grabs										# of Containers	Remarks	
					TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn))	Total Mercury	PCB Aroclors (Low-level)	PCB Congeners (Pace)	PAHs +phthalates (low-level)	Pesticides (Low-level at CAS)	SVOCs	Conductivity (umhos/cm) Meter: <u>Combo 5</u>	pH (pH units) Meter: <u>Combo 5</u>			Temperature (Deg C) Meter: <u>Combo 5</u>
01	17_16SW	10/10/15	1418	G	●	●	●	●	●	●	●	●	●	240	7.0	18.5	SW-17-AAT597 3660 NW Front Ave

Relinquished By: Signature: <u>[Signature]</u> Date: <u>10/10/15</u> Printed Name: <u>Mat Sulliva</u> Time: <u>1458</u>	Received By: Signature: <u>[Signature]</u> Date: <u>10-10-15</u> Printed Name: <u>Randy Ketzemer</u> Time: <u>1458</u>	Relinquished By: Signature: _____ Date: _____ Printed Name: _____ Time: _____	Received By: Signature: _____ Date: _____ Printed Name: _____ Time: _____
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Project PDX Harbor Basin 17 Stormwater  
 Location \_\_\_\_\_ Date 10/31/15  
 Subject \_\_\_\_\_ Personnel RCB/MJS

1221	Checked in w MJS to determine if the storm was coming in at the right time to sample. Lt. Rn falling in Portland at the time. Radar showed cell moving north of city. Agreed to check in in approx 1 hr.
1337	RCB calls MJS. Moderate steady rain falling - good runoff. Tide table indicate good storm timing coinciding w/ low tide. MJS & RCB agree to meet at WPCL to attempt sample.
1426	Depart <sup>WPB</sup> WPCL
1439.	Arrived on site to moderate steady rain. Observed positive flow discharging from outfall P7 at about ~0.5 fps Took photos
1448	Collected samples from OF17, conductivity field readings of 34 $\mu\text{S}/\text{cm}$ are supportive of stormwater discharge and are significantly lower than ambient Willamette R. conductivity of ~170-180 $\mu\text{S}/\text{cm}$ .
1450	Depart site to relinquish samples at WPCL

Attachments:





Project Portland Harbor Stormwater

Project No. \_\_\_\_\_

Location NON

Date 3/9/16

Subject Event 1 grabs

By MJS, JJM

0800 - light rain currently falling, so far only 0.03" today. Will wait for rain to intensify.

0930 - rain is intensifying - so far 0.07" of rain. Will proceed to sites.

0950 - on site at M2-SW1, to steady rain and abundant runoff. Will set up traffic control to access site.

1010 - there is good positive flow at site and it does not appear that the river is backed up. Samples are quite turbid. Took photos of manhole and vicinity as well as sample.

1034 - on site at 44-SW20 to steady light rain and abundant runoff. Samp. There is good flow from multiple laterals and main line. Able to collect sample from outlet without being impacted by individual laterals. Sample is moderately turbid.

1050 - on site at 45-SW1 to continued steady light rain and abundant visible runoff. Sample is very turbid.

1130 - on site at 52D-SW5 to steady light rain and good flow in the manhole. Sample is extremely turbid.

1145 - on site at 52D-SW6. ~~swale~~ is to continued light steady rainfall. Swale is full and discharging to manhole. Samples are extremely turbid. Took photos of configuration.

1250 - on site at 53A-SW1 to steady rain and good free-flow in the manhole. Collected sample and DUP. Sample

Attachments is slightly turbid.



Project Portland Urban Stormwater

Project No. \_\_\_\_\_

Location \_\_\_\_\_

Date 3/9/16

Subject Event 1 grabs

By MJS, JJM

- 1335 - on-site at 17-16SW timed to coincide with low-tide, but outfall is submerged. Could not collect a sample of outfall discharge.
- 1344 - on-site at 16-SW1 to continued light rain. There is abundant runoff and flow in the manhole. Sample is moderately turbid.
- 1408 on-site at 16-SW2 to continued steady rain and good runoff. Began by collecting FDB sample @ 1408 and 16-SW2 sample at 1412. Sample had low turbidity.
- 1446 - on site at ~~of 17-17~~ Basin 17 alternate site (AAT 596) because outfall was submerged. There is still steady rain and good flow in the vault, ~~the river is in~~ There is some pooled water in the vault but it doesn't appear that the river is backed up into the vault as it is still free flowing out the outlet, the top of which is visible. Attempted to collect sample from the vicinity of the outlet. sample was moderately turbid.
- 1540 - 1512 - on site at 19-SW2 to steady heavy rain and good flow in the manhole. Collected sample from ~~downstream of~~ the outlet of the manhole. Sample was slightly turbid.

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody  
 Bureau of Environmental Services



Work Order #:  
 Collected By: MTS, JSM

Date: 3/8/16

Client Name: Director's Office  
 Project Name: Portland Harbor

Matrix: Stormwater

Requested Analyses

Lab Number	Location ID	Sample Date	Sample Time	Sample Type	Requested Analyses					Conductivity (umhos/cm) Meter: Smartroll 2+3	pH (pH units) Meter: Smartroll 2+3	Temperature (Deg C) Meter: Smartroll 2+3	# of Containers	Remarks	
					TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn))	Total Mercury	PCB Congeners	PAHs +phthalates (low-level)						Pesticides (Low-level) <sup>1</sup>
01	M2_SW1	3/9/2016	1010	G	●	●	●	●	●	●	43	6.1	10.4	1	SW-M2-AAAM169 5949 N BASIN AVE DS OF MH
	44_SW20	3/9/2016	1039	G	●	●	●	●	●	●	27	6.4	10.6	1	SW-44-ABC352 931 N River St, DS of MH
	45_SW1	3/9/2016	1053	G	●	●	●	●	●	●	30	6.4	10.2	1	SW-45-ABC319 N Essex & River, DS of MH
	52D_SW5	3/9/2016	1132	G	●	●	●	●	●	●	110	7.2	9.8	1	SW-52D-APT249 9930 N Burgard Way, at MH
	52D_SW6	3/9/2016	1150	G	●	●	●	●	●	●	142	9.3	10.8	1	SW-52D-APT252-Surface Container Mouth Swale
	53A_SW1	3/9/2016	1253	G	●	●	●	●	●	●	65	7.7	10.4	1	SW-53A-AAA170 13939 N Rivergate Blvd, at MH
	16_SW1	3/9/2016	1350	G	●	●	●	●	●	●	31	6.9	10.4	1	SW-16-AAA408 3551 NW Front Ave, DS of MH
	16_SW2	3/9/2016	1412	G	●	●	●	●	●	●	71	6.9	10.1	1	SW-16-ANH937-SE 2615 NW Industrial St, US in 12"
	17_17SW	3/9/2016	1446	G	●	●	●	●	●	●	91	7.4	9.5	1	SW17-AA1596 3721 NW Front Ave, Vault Outlet
	19_SW2	3/9/2016	1540	G	●	●	●	●	●	●	8	7.7	10.1	1	SW-19-CALBAG Galbag SMH, 4927 NW Front Ave

← smartroll 3 → smartroll 2 →

Relinquished By: Signature: <i>[Signature]</i> Date: 3/9/16 Printed Name: <i>[Name]</i>	Received By: Signature: <i>[Signature]</i> Date: Printed Name:	Relinquished By: Signature: Date: Printed Name:	Received By: Signature: Date: Printed Name:
--	---	--	--

Water Pollution Control Laboratory  
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 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody



Bureau of Environmental Services

Work Order #:

Collected By:

Date: 3/9/16

Client Name: Director's Office  
 Project Name: Portland Harbor

Matrix: Stormwater

Requested Analyses

Lab Number	Location ID	Sample Date	Sample Time	Sample Type	2016 Stormwater Outfall Monitoring COC										# of Containers	Remarks		
					TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn))	Total Mercury	PCB Congeners	PAHs +phthalates (low-level)	Pesticides (Low-level) <sup>1</sup>	Conductivity (umhos/cm)	Meter:	pH (pH units)	Meter:			Temperature (Deg C)	Meter:
01	FDBLANK	3/9/2016	1408	G	●	●	●	●	●									Field Decon Blank of Grab Baller
	FIELDUP	3/9/2016		G	●	●	●	●	●									Field Duplicate

Relinquished By: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: 3/9/16 Time: 1649

Received By: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Relinquished By: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Received By: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_



Project Portland Harbor Stormmeter

Project No. \_\_\_\_\_

Location OF 19 (19-SW3)

Date 3/8/16

Subject 3/9/16 Event set-up + FDB collection

By MJS, JJM, AJA

11:00 Arrived on-site to light but steady rain and elevated flow in manhole. Because of difficulty of collecting a Field Decan Blank sample with the currently discharging perched lateral, it was decided to remove the band/tubing and perform the decan and FDB collection ~~with~~ above ground and then re-install.

12:22 - ~~FDB~~ Collected Field Decan Blank sample after decanning with the following: soapy, tap, ~~DI~~, 10% nitric acid, DI, 10% acetone solution, VDDT.

Programmed flow meter with a ~~fris~~ trigger volume of 12.29 cf which corresponds to a storm total of 0.75". Because there is currently some light rain, programmed sampler with a delay to begin on 3/9/16 @ 00:45

3/9/16 0800 - only 0.03" of rain has fallen since midnight and storm total forecast has increased to 1" ~~so~~ Assumedly no triggers have been collected yet so will re-program the flowmeter with a new trigger volume based on a 1" storm to ~~ensure~~ enable the sampler to run through the night. (16172 cf)



Project Portland Harbor  
Location OF 19 (19-SW3)  
Subject Event Status Check, bottle swap

Project No. N/A  
Date 3/9/16  
By JTM, MJS

1522 Arrive @ OF 19. Currently raining, consistent rain since 0800 this morning.

Entrant reports that sampler status is @ aliquot 1 of three, bottle 4. Since staffing is not an issue this evening, crew to return later this evening to swap bottles. Currently raining heavily, lateral flowing directly into sampler making bottle swap impossible.

1900 ARRIVED <sup>ALQUOTS</sup> OF 3, 141 DITK 6, FIVE FULL BOTTLES. STOP SAMPLER.

3/10/16 1041 rainfall ended overnight and flow has approached base-flow levels. On-site to retrieve full bottles and shut down sampler. Retrieved 4 2/3 bottles, but its likely that some represent base-flow and will be discarded.





# COMPOSITE BOTTLE DATA SHEET

City of Portland - Environmental Services  
Field Operations

Fiscal Year and Event No. 2015-2016 Event 1

Project Portland Harbor SW Site OF 19 Project No. \_\_\_\_\_  
 Setup: Date 3/8/16 Arrival Time (PST) 1100 Personnel MJS, JSM, AJA  
 First Check: Date 3/9/16 Arrival Time (PST) 1900 Personnel MJS, WCR  
 Second Check: Date 3/10/16 Arrival Time (PST) 1041 Personnel MJS, JSM  
 Third Check: Date \_\_\_\_\_ Arrival Time (PST) \_\_\_\_\_ Personnel \_\_\_\_\_

### Aliquot Data

Swap	Bottle No.	Aliquot No.	Date	Time (PST)	Missed?	Codes	Swap	Bottle No.	Aliquot No.	Date	Time (PST)	Missed?	Codes
	1	1	3/9/16	0803				5	13	3/9/16	1648		
		2		0953			14		1728				
		3		1048			15		1813				
	2	4		1133			6	16			1853		
		5	1218			17		1958					
		6	1308			18		2103					
	3	7		1413			7	19			2203		
		8	1453			20		2308					
		9	1523			21		3/10/16 0008					
	4	10		1543			8	22			0043		
		11	1558			23		0108					
		12	1618			24		0158					

### Bottle Data

Bottle No.	Sample characteristics (turbidity, volume., etc.)	Missed aliquots, comments
1	Full, turbid	3 triggers
2	↓, turbid	↓
3	↓, turbid	
4	↓, turbid	
5	↓, turbid	3 triggers
6	1/3 Full, moderately turbid	1 trigger
7	Full, moderately turbid	3 triggers
8	Full, moderately turbid	3 triggers

Notes Included sample bottles 1-9 in the composite sample. Excluded bottles 10 + 11 from the sample because they contained only base flow.

Submitted sample and Duplicate sample to lab.

Composite Notes: Churn splitter used?  used teflon churn splitter



# COMPOSITE BOTTLE DATA SHEET

City of Portland - Environmental Services  
Field Operations

Fiscal Year and Event No. FY15-16 Event 1

Project Portland Harbor SW Site OF 19 Project No. \_\_\_\_\_

Check: Date \_\_\_\_\_ Arrival Time (PST) \_\_\_\_\_ Personnel \_\_\_\_\_

Check: Date \_\_\_\_\_ Arrival Time (PST) \_\_\_\_\_ Personnel \_\_\_\_\_

Check: Date \_\_\_\_\_ Arrival Time (PST) \_\_\_\_\_ Personnel \_\_\_\_\_

### Aliquot Data

Swap	Bottle No.	Aliquot No.	Date	Time (PST)	Missed?	Codes	Swap	Bottle No.	Aliquot No.	Date	Time (PST)	Missed?	Codes
	9	25	3/10/16	0303					37				
	10	26	↓	0413				38					
		27		0533				39					
		28		0653				40					
		29		0818				41					
	11	30	↓	0943				42					
		31						43					
		32						44					
		33						45					
		34						46					
		35						47					
		36						48					

### Bottle Data

Bottle No.	Sample characteristics (turbidity, volume., etc.)	Missed aliquots, comments
9	Full, low turbidity	3 triggers
10	Full, low turbidity	
11	2/3 full, low turbidity	
12		
13		
14		
15		
16		

Notes \_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_

Composite Notes: Churn splitter used?



**City of Portland  
Environmental Services  
Field Operations**

**Trigger Volume Calculation Worksheet  
(for a basin of known area)**

Project Name: NPDES Stormwater Mon

Project #: \_\_\_\_\_

4010.001

Storm Event D: 2\_12-13\_11

Monitoring Site	Forecasted Rainfall Amount (inches)	Forecasted Rainfall Amount (feet)	Basin Size (acres)	Basin Size (square feet)	Basin Rainfall Volume (cubic feet)	Estimated Runoff Coefficient	Anticipated Runoff Volume (cubic feet)	Number of Sample Bottles in Sampler Configuration	Number of Aliquots per Bottle	Trigger Volume per Aliquot (cubic feet)
OF-19	0.45	0.0375	486	21170160	793881	0.22	174654	8	3	7277

Monitoring Site	Forecasted Rainfall Amount (inches)	Forecasted Rainfall Amount (feet)	Basin Size (acres)	Basin Size (square feet)	Basin Rainfall Volume (cubic feet)	Estimated Runoff Coefficient	Anticipated Runoff Volume (cubic feet)	Number of Sample Bottles in Sampler Configuration	Number of Aliquots per Bottle	Trigger Volume per Aliquot (cubic feet)
OF-19	0.6	0.0500	486	21170160	1058508	0.22	232872	8	3	9703

Monitoring Site	Forecasted Rainfall Amount (inches)	Forecasted Rainfall Amount (feet)	Basin Size (acres)	Basin Size (square feet)	Basin Rainfall Volume (cubic feet)	Estimated Runoff Coefficient	Anticipated Runoff Volume (cubic feet)	Number of Sample Bottles in Sampler Configuration	Number of Aliquots per Bottle	Trigger Volume per Aliquot (cubic feet)
OF-19	0.75	0.0625	486	21170160	1323135	0.22	291090	8	3	12129

Monitoring Site	Forecasted Rainfall Amount (inches)	Forecasted Rainfall Amount (feet)	Basin Size (acres)	Basin Size (square feet)	Basin Rainfall Volume (cubic feet)	Estimated Runoff Coefficient	Anticipated Runoff Volume (cubic feet)	Number of Sample Bottles in Sampler Configuration	Number of Aliquots per Bottle	Trigger Volume per Aliquot (cubic feet)
OF-19	1	0.0833	486	21170160	1764180	0.22	388120	8	3	16172



Project Portland Harbor - Grabs

Project No. \_\_\_\_\_

Location \_\_\_\_\_

Date 5/19/16

Subject 2016 stormwater Outfall Monitoring

By MJS, JYB

1308 sporadic and localized showers are forecasted for the day. Currently first major shower of the day is occurring - will report to closest sites, basin 44 + 45.

1320 - on-site at 45-SW1. Rainfall has just ended but there is still runoff in mainline as well as catch basin laterals. There is sufficient flow to sample but will hold off on sample collection until next shower to ensure that there is contribution from the most distal portions of the basin.

1347 - Rain intensifying. Will collect Field Decan Blank sample while we wait for rainfall to runoff to arrive at manhole from points further up-basin.

1400 - There has been consistent flow in the manhole since arrival on site 40 minutes ago - will assume that we are now receiving flow from entire basin and will begin sampling. Collected duplicate alongside 45 SW1 sample - sample was moderately turbid.

1412 - on site at 44-SW20. Rainfall has stopped but there continues to be abundant flow in the manhole as well as catch basins and laterals. will collect sample. Sample was moderately turbid.

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody  
 Bureau of Environmental Services



Work Order #: \_\_\_\_\_  
 Collected By: MJS, JXB

Date: 5/19/16

Client Name: Director's Office Matrix: Stormwater  
 Project Name: Portland Harbor

Lab Number		Sample Date	Sample Time	Sample Type	TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn))	Total Mercury	PCB Congeners	PAHs +phthalates (low-level)	Pesticides (Low-level) <sup>1</sup>	Conductivity (umhos/cm) Meter: <u>Smartroll 1</u>	pH (pH units) Meter: <u>''''</u>	Temperature (Deg C) Meter: <u>''''</u>	# of Containers	Remarks
01	45.5w1	5/19/16	1402	G	0	0	0	0	0	0	29	6.2	16.3		
	FDB		1355	G	0	0	0	0	0	0	47	6.3	17.5		
	44.5w1d		1416	G	0	0	0	0	0	0					
	DWP			G	0	0	0	0	0	0					

Requested Analyses

Relinquished By: \_\_\_\_\_ Date: 5/19/16  
 Signature: \_\_\_\_\_  
 Printed Name: Jermiah Bawden Time: 1515

Received By: \_\_\_\_\_ Date: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_

Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_

Received By: \_\_\_\_\_ Date: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_



Project Portland Harbor 2016 outfall Mon.

Location NW Kittredge & Front (OF19)

Date 9/15/16

Subject Set-up for anticipated 9/17/16 event

Personnel MJS, JXL, AJA

1100

on-site to decon sampler tubing and install clean bottles for sampling event - also to re-position sampler tubing intake to avoid sediment which is expected to migrate down the line during storm event

- Removed band containing sample tubing and brought to the surface to perform decon. Performed decon with the following solutions: soapy tap, 10% nitric acid, DI water, 10% acetone, ultrapur DI water.

- ~~Reinst~~ Moved tubing several inches off the invert but still beneath the surface of the water and reinstalled the band.

- Installed 8 clean bottles in sampler base and removed the lids. ~~RS~~

- Programmed sampler with a delay to begin no earlier than Saturday 9/17/16 @ 0300. Additionally programmed a level enable of 3.0" of flow (which is ~1.5" above current base flow of ~1.5")

- Programmed flowmeter with a trigger volume of 4857 of which corresponds to a storm total of 0.3" of rainfall.



Project	<u>Portland Harbor 2016 OF man</u>	Date	<u>9/17/16</u>
Location	_____	Personnel	<u>MSS, KEB, ELP</u>
Subject	<u>- grabs</u>		
1020	Currently light but steady rain is falling. Has been raining for several hours so will assume that there is flow coming from the entire basin for even the largest basins.		
1050	- on-site at 52D SW6. System is partially filled but with much remaining capacity. Not discharging to city collection system.		
1107	On-site at 52D-SW5 to continued light rain. There is abundant flow in pipe collected sample. Sample is moderately turbid.		
1120	Attempted to gain access to 53A SW1 but facility is closed for the weekend and could not gain access. M2-SW1		
1147	On-site at MX <sup>MSS</sup> to very light but steady drizzle. There is heavy flow in the pipe. will collect sample. Sample has very low turbidity.		
1218	on-site @ 16-SW2 to continued steady light rain and consistent runoff. Good flow in 12" line. collected sample.		
1255	on-site @ 16 SW1 to continued steady rain and abundant runoff. There is very heavy flow in the storm line will collect sample.		
Attachments:	_____		



Project	<u>Portland Harbor 2016 OF Mon</u>	Date	<u>9/17/16</u>
Location	_____	Personnel	<u>MSS, EIP, KEB</u>
Subject	<u>Grab samples</u>		
1316	on-site at 19-SW2. Rainfall has stopped but there is still some active runoff and there is abundant flow in the stormline. will collect sample		
~1330	Arrive at OF 19 composite sample location. Currently there is a lull in the rain but there is still elevated flow in the storm line and the sampler program is still active. Pulled bottles 1-5 and refilled sampler with empty bottles 9-13 and re-started sample program. Collected a test aliquot and sampler is working well. Some errors ("No More Liquid") on several <del>sample</del> aliquots - likely due to sediment migrating down the basin during the storm but should not impact sample - Will be able to compensate for reduced volume in some sample bottles by taking the same volume from each (i.e. the volume of the bottle with the least sample)		
Attachments:			



Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody



Bureau of Environmental Services

Date: 9-17-16

Work Order #: W161149

Collected By: KEB/MJS/ECY

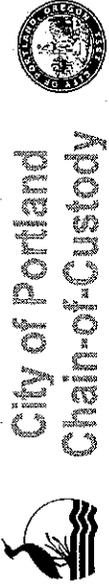
Client Name: Director's Office Matrix: Stormwater  
 Project Name: Portland Harbor

Requested Analyses **SMARTROLL #34**

Lab Number	2016 Stormwater Outfall Monitoring COC		Sample Date	Sample Time	Sample Type	TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs +phthalates (low-level)	Pesticides (Low-level)	Conductivity (umhos/cm) Meter:	pH (pH units) Meter:	Temperature (Deg C) Meter:	# of Containers	Remarks
	Location ID	Sample Date														
01	52D-SW5	9-17-16	1107	G								57	7.50	17.0	4	
02	M35W1	9-17-16	1158	G								74	7.0	16.2	4	
03	16-SW2	9-17-16	1220	G								174	6.9	17.3	4	
04	16-SW1	9-17-16	1303	G								33	7.3	17.5	4	
05	19-SW2	9-17-16	1321	G								34	7.3	18.5	4	

Inquired By: *Emma* Date: 9-17-16  
 Signature: *Emma*  
 Relinquished By: *Emma* Date: 9-17-16  
 Signature: *Emma*  
 Received By: *Emma* Date: 9-17-16  
 Signature: *Emma*  
 Printed Name: EMMA PRICHARD 1437  
 Time: 1437  
 Printed Name: K. KATZMAN  
 Time: 1437

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5686  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody

Bureau of Environmental Services

Date: 9/19/16

Work Order #: W162160

Collected By: M35, JXL, ASA, KEB, ECP

Client Name: Directors Office  
 Matrix: Stormwater  
 Project Name: Portland Harbor

Requested Analyses

Lab Number	2016 Stormwater Outfall Monitoring Composite Sample COC		Sample Type	Composite End Date/Time	Composite Start Date/Time	TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs + phthalates (low-level)	# of Containers	Remarks
	Location ID	Location ID										
19_SW3	19_SW3	9/17/16 0642	C	9/17/16 1337		●	●	●	●	●	4	SW-19-AAP918 (OF19) 4900 NW Kirtledge Ave, DS of MH
4-35	4-35		C			●	●	●	●	●		Field Duplicate

Relinquished By: Signature: [Signature] Date: 9/19/16  
 Printed Name: Nicholas Semms 1041  
 Received By: Signature: [Signature] Date: 9/19/16  
 Printed Name: Nicholas Semms 1041



# COMPOSITE BOTTLE DATA SHEET

City of Portland - Environmental Services  
Field Operations

Fiscal Year and Event No. 2016 Event 2

Project Portland Harbor OF Mon Site 19-SW3 Project No.       
 Setup: Date 9-15-16 Arrival Time (PST) 1342 1100 Personnel MJS, JXL, AJA  
 First Check: Date 9-17-16 Arrival Time (PST) 1342 Personnel KEB/MJS/ECF  
 Second Check: Date 9/18/16 Arrival Time (PST) 0950 Personnel MJS, JXL  
 Third Check: Date      Arrival Time (PST)      Personnel     

### Aliquot Data

Swap	Bottle No.	Aliquot No.	Date	Time (PST)	Missed?	Codes	Swap	Bottle No.	Aliquot No.	Date	Time (PST)	Missed?	Codes
	1	1	9-17-16	0642			5	13	9-17-16	1302			
		2		0832				14	1337	NO MORE LIQUID			
		3		0857				15	1502	No liquid detected			
	2	4		0912			16	1522	"				
		5		0927	N.O.M.O.R.E. L.I.Q.U.I.D.		17	1622	"				
	3	6		0947	N.M.L.		18	1637	↓				
		7		1002	N.M.L.		19	1647					
		8		1042	N.M.L.		20	1657					
	4	9		1107	N.M.L.		21	1707					
		10		1132			22	1727					
		11		1227	N.M.L.		23	1802					
		12		1247			24	9/17/16 1902					

### Bottle Data

Bottle No.	Sample characteristics (turbidity, volume., etc.)	Missed aliquots, comments
1	3/4 full, moderately turbid	3 aliquots
2	2/3 full	3 aliquots
3	Full	3 aliquots
4	Full	3 aliquots
5	2/3 full	2 aliquots
6	empty	Kinked tubing, no aliquots
7	empty	"
8	empty	"

Notes

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Composite Notes: Churn splitter used?  Bottle 2 has the least volume at 1150ml.  
Will Pull 1000 ml From bottles 1-4, and 667 ml From  
bottle 5 (b/c it only has 2 triggers). Some coarse sand and  
gravel was lost from composite bottles during the transfer into  
graduated sampler and churn splitter.



# COMPOSITE BOTTLE DATA SHEET

City of Portland - Environmental Services  
Field Operations

Fiscal Year and Event No. FY 2016 Event 2

Project Portland Harbor OFW Site OF19-NW Killidge? Front Project No. N/A  
2nd Check: Date 9/18/16 Arrival Time (PST) 10:0950 Personnel JXL, MJS  
 Check: Date \_\_\_\_\_ Arrival Time (PST) \_\_\_\_\_ Personnel \_\_\_\_\_  
 Check: Date \_\_\_\_\_ Arrival Time (PST) \_\_\_\_\_ Personnel \_\_\_\_\_

### Aliquot Data

Swap	Bottle No.	Aliquot No.	Date	Time (PST)	Missed?	Codes	Swap	Bottle No.	Aliquot No.	Date	Time (PST)	Missed?	Codes
	9	25	9/17/16	2022	No liquid detector				37				
		26	9/18/16	0047	"				38				
		27							39				
		28							40				
		29							41				
		30							42				
		31							43				
		32							44				
		33							45				
		34							46				
		35							47				
		36							48				

### Bottle Data

Bottle No.	Sample characteristics (turbidity, volume., etc.)	Missed aliquots, comments
9	empty,	1
10		
11		
12		
13		
14		
15		
16		

Notes

Kinked tubing prevented sampler from collecting aliquots

Composite Notes: Churn splitter used?



Project Portland Harbor Stormwater

Location \_\_\_\_\_

Date 10/13/16

Subject Stormwater Outfall Monitoring

Personnel MJS, AJA

0745	Rain has been falling since ~ midnight and ~ 0.5" has fallen so far. Will head out to sites and begin sampling.
0858	On-site at 44-SW20 to steady rain and abundant runoff. Sample is grayish brown with low turbidity.
0917	On-site at 45-SW1 to steady rain and heavy runoff. Sample is moderately turbid.
0940	On-site at M2-SW1 to steady rain and heavy runoff. Collected sample which is moderately turbid.
1042	On-site at 52D-SW6 to steady light rain and abundant runoff. Stormwater treatment system is at capacity and is discharging to city storm system. Will collect sample. Sample is extremely turbid.
1058	On-site at 52D-SW5 to continued steady rain and abundant runoff. Sample is very turbid.
1120	On-site at 53A-SW1 to steady rain and abundant runoff. Sample is moderately turbid.
1247	On-site @ 16-SW1 to continued steady rain and heavy flow in the storm line. Collected sample. Sample has low turbidity.
1310	On-site @ 16-SW2 to steady rain and abundant runoff. Sampled lateral during a higher pulse of flow which occurred every few minutes. Sample has low turbidity.

Attachments:





Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



Work Order #: \_\_\_\_\_  
 Date: 10/13/16  
 Collected By: MJS, ASA

Client Name: Director's Office  
 Project Name: **Portland Harbor**  
 Matrix: Stormwater

**Requested Analyses**

Lab Number	Location ID	Sample Date	Sample Time	Sample Type	Requested Analyses						# of Containers	Remarks
					TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn))	Total Mercury	PCB Congeners	PAHs +phthalates (low-level)	Pesticides (Low-level) <sup>1</sup>		
01	FDB	10/13/16	1332	G	0	0	0	0	0	0	4	
	DUP	10/13/16	—	G	0	0	0	0	0	0	4	

Relinquished By: Signature: <u>Matt Bullin</u> Printed Name: <u>Matt Bullin</u> Date: _____ Time: _____	Received By: Signature: _____ Printed Name: _____ Date: _____ Time: _____	Relinquished By: Signature: _____ Printed Name: _____ Date: _____ Time: _____	Received By: Signature: _____ Printed Name: _____ Date: _____ Time: _____
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Project Portland Harbor Stormwater OF Mon  
Location OF 19 - NW Kirtbridge ? Front  
Subject Event 3 Setup

Project No. N/A  
Date 10/12/2016  
By JXL, MJS, AJA, KER

12:00 Arrive @ OF19. Entrant notes that sediment, gravel observed during previous entries appears to have been transported downstream.

12:28 Calibrated sampler volume @ 600mL. Sampler aliquot initially 500mL

12:50 Decontaminated sampler teflon-lined tubing following SOP 7.06a - Non-phosphate detergent/soupy, distilled water (DI) rinse, 10% nitric acid rinse, DI water rinse, 10% acetone rinse, DI rinse, Ultrapure DI rinse.

13:00 Reinstalled tubing/band segment. Entrant confirmed sensor reading accurately. Meter 1.1", manual 1.5". Adjusted meter depth up ~0.4" to match manual measurement. Velocity measurements match. Departures in agreement. Uncapped bottles, ensured distributor arm in position 1.

13:26 Departed site  
1354 (1254 PST)

10/13/16 Arrived on site to perform a bottle change and check program status. Witnessed collection of aliquot 2 of 3 in bottle 3. Halted program and removed bottles containing sample. Bottle 1 was 2/3 full with the first aliquot reported as missed, however sample time was indicated as 10/12/16 @ 1320 which was before sampling program began. Assume that was a result of ~~decon~~<sup>MJS</sup> manual sample collected to verify sample volume while setting up the program prior to the beginning of storm-

Attachments



Project Portland Harbor Stormwater OF Mon  
Location OF-19, NW Kittredge + Front Date 10/13/16  
Subject Event 3 Personnel MJS, AJA

Bottle 2 was completely empty despite sampler program report indicating that all 3 <sup>water</sup> ~~samplers~~ <sup>samples</sup> were successfully collected. Suspect that there was a misalignment of the distributor arm as there was some water in the sampler base. Moved distributor arm to each bottle to check alignment and appeared to be aligned correctly at each bottle. Moved bottle 4 into the bottle 1 position and likewise for the remaining empty bottles and added bottles 9-11. Uncapped bottles, changed the sampler battery and restarted program in beginning in the bottle 1 position.

10/14/16 0902

On-site @ OF-19. Last significant rainfall was around midnight and flow data <sup>shows that</sup> ~~has~~ flow approached base flow conditions. Will halt the sampler program. Recorded sample times from sampler report and recorded on composite bottle data sheet. It appears that there has been an issue with inconsistent sample volume delivery and that there were some missed samples. Bottle #4 only has ~1/3 of a bottle, however there were no error codes in the sample report, ~~not~~ suggesting that no samples were missed. We're assuming that 3 aliquots were collected ~~and~~ but the volume of sample was low for some reason, perhaps due to the sample strainer being partially blocked or due to high

Attachments:



Project Portland Harbor Stormwater OF Mon  
Location OP-19, NW Kitttridge & Front  
Subject Event 3

Date 10/14/16  
Personnel MSS, KEB

velocity of the flow (which exceeded 4 fps for the time of all 3 aliquots). Bottle 5 was  $\sim 2/3$  full and the sampler <sup>MSS</sup> report indicated an error for the first aliquot (1715). Similarly bottle 6 was  $\sim 1/2$  full and the sampler report indicated that the last aliquot (10/14/16 0155) had an error. We are assuming that both bottles 5 and 6 only received 2 of 3 aliquots.

- Capped bottles and pulled sampler and sampler/flowmeter cable. Detached sampler tubing and covered with a clean glove. ~~They~~ will transport sample bottles back to the lab in the sampler body.
- Discussed w/ LAs the inconsistent sample volumes and missed samples and described what we believe that each bottle represents and decided to ~~can~~ go forward with having the samples analyzed despite the problems we encountered.

We created a composite sample as described below: Measured the volume of bottle 4 (3 aliquots) at 620 ml. The only other bottle that received 3 aliquots ~~was~~ (according to the sampler) was bottle 2 - but ~~the~~ there was no sample in that bottle and will not be represented in the composite sample. All other bottles to be included (i.e. bottles 1, 3, 5 and 6) received 2 aliquots. 415 ml ( $2/3$  of 620 ml) were taken from each of those bottles to be included in the composite sample. Bottle 7



Project Portland Harbor Stormwater OF Mon  
Location OF 19, NW Kittredge + Front  
Subject Event 3

Date 10/14/16  
Personnel MSS, KEB

was excluded from the composite sample b/c it was collected after the storm ended.  
Pulled samples from each bottle by shaking and pouring into a glass 1 L graduated cylinder (decontaminated with nitric and acetone). Compositing in a 14 L teflon churn splitter (received the same decon). Composite sample was churned while splitting into analyte specific bottles.

Attachments:



# COMPOSITE BOTTLE DATA SHEET

City of Portland - Environmental Services  
Field Operations

Fiscal Year and Event No. 2016 Event 3

Project Portland Harbor SW Site OF-19 (NW K. Tr. Ledge + Front) Project No. \_\_\_\_\_  
 Setup: Date 10/12/16 Arrival Time (PST) 1200 Personnel MJS, JXL  
 First Check: Date 10/13/16 Arrival Time (PST) 1354 Personnel MJS, AJA  
 Second Check: Date 10/14/16 Arrival Time (PST) 0902 Personnel MJS, KEB  
 Third Check: Date \_\_\_\_\_ Arrival Time (PST) \_\_\_\_\_ Personnel \_\_\_\_\_

### Aliquot Data

Swap	Bottle No.	Aliquot No.	Date	Time (PST)	Missed?	Codes	Swap	Bottle No.	Aliquot No.	Date	Time (PST)	Missed?	Codes
	1	1	10/12/16	1320	X			5	13	10/13/16	1900		
		2	10/13/16	0225					14		2020		
		3			0500					15		2115	
	2	4		0655	X			6	16		2225		
		5		0915	X				17	10/14/16	0155	X sample timeout	
		6		1020	X				18		0635	X sample timeout	
	3	7		1135				7	19				
		8		1300					20				
	4	9		1435					21				
		10		1530					22				
		11		1620					23				
	5	12		1715	X	sample timeout			24				

### Bottle Data

Bottle No.	Sample characteristics (turbidity, volume., etc.)	Missed aliquots, comments
1	2/3 full - 2 aliquots	415 ml
2	empty - 3 aliquots	missed 3 samples 0 ml
3	2/3 full - 2 aliquots	415 ml
4	1/3 full - 3 aliquots	620 ml (entire bottle)
5	2/3 full - 2 aliquots	415 ml
6	1/2 full - 2 aliquots	missed 1 sample 415 ml
7	1/3 full - 1 aliquot	missed 1 sample 415 ml
8		0 ml

volume included in composite

Notes Had issues with inconsistent sample volume delivery and several missed samples as listed above. Used the entire volume (620 ml) of sample from bottle 4 (which represents 3 aliquots). Pulled a proportional volume from the other bottles which contained sample (i.e. 415 ml from bottles that had 2 aliquots) to maintain a flow-proportioned sample. Had no sample for bottle 2. Excluded bottle 7 from sample as flow had returned to base-flow.

Composite Notes: Churn splitter used?  used a teflon churn splitter and 1000 ml glass graduated cylinder (both received the following decon: soapy, tap, 10% nitric acid, DI water, acetone, ultrapure DI water)

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody  
 Bureau of Environmental Services

Work Order #: \_\_\_\_\_  
 Collected By: MJS, JKL, ASA, KES

Date: 10/14/16

Client Name: Directors Office Matrix: Stormwater  
 Project Name: Portland Harbor

**Requested Analyses**

2016 Stormwater Outfall Monitoring Composite Sample COC			Requested Analyses								
Lab Number	Location ID	Composite Start Date/Time	Composite End Date/Time	Sample Type	TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn))	Total Mercury	PCB Congeners	PAHs +phthalates (low-level)	# of Containers	Remarks
	19_SW3	10/13/16 0835	10/14/16 0155	C	●	●	●	●	●	4	SW-19-AAP918 (OF19) 4900 NW Kittredge Ave. DS of MH
	FIELD DUB			C	●	●	●	●	●		Field Duplicate

Relinquished By: Signature: <u>[Signature]</u> Printed Name: <u>Matt Sullivan</u> Date: <u>10/14/16</u> Time: <u>12:34</u>	Received By: Signature: _____ Printed Name: _____ Date: _____ Time: _____	Relinquished By: Signature: _____ Printed Name: _____ Date: _____ Time: _____	Received By: Signature: _____ Printed Name: _____ Date: _____ Time: _____
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Project Portland Harbor Stormwater  
 Location \_\_\_\_\_ Date 11/5/16  
 Subject OF 19 19-SW2 grabs Personnel REB

Background	OF 19 composite storm was set to run for rain forecasted to fall on 11/5/16. Sample 19-SW2 was requested to be sampled during the composite storm so this grab sample was targeted for today's sampling event. Light rain falling early in the morning, but intensity picked up at ~ 1030 and I mobilized to WPCL to prepare to sample 19-SW2
1123	Arrived on-site @ PPV to access manhole to collect 19-SW2. Upon arrival, I walked around the site to locate a PPV employee so I could check in w/ them to get permission to sample. I could not find anyone in the office, but an employee named Francis walked out of a bay door and I approached him to get permission to sample. I told him I was with the City, Field Operations, and that I was there to collect a storm water sample, and the sampling location on their property was part of a network of sites for this stormwater monitoring project. He said that was ok and gave me permission to sample. Francis then went back inside and I proceeded to sample 19-SW2
1135	19-SW2 sample collected. pH was quite low, 4.8, but stormwater did not have any peculiar odor or color.
1142	Departed site.

Attachments:





Project Portland Harbor

Location OF-19 (NW Kittredge & Front)

Date 11/3/16

Subject 2016 Stormwater Outfall Mon (Event 4)

Personnel MJS, JXL

<p>1400</p>	<p>On-site to set up for event #4. Flowmeter appears to be reading accurately with manual measurements in agreement with flowmeter readings for both level and velocity.</p> <ul style="list-style-type: none"> <li>- Removed old tubing and re-installed new teflon-lined tubing that had been decontaminated at WPCL. Reinstalled with sample head closer to the invert as it appears that all accumulated gravel has been flushed from the system during previous storms. Additional objective of installing new tubing is to eliminate <del>any</del> tubing splices (which are potential leak sources) and to eliminate any sags which could be holding water during purge cycles and potentially disrupting the delivery of the correct sample volume.</li> <li>- Re-set the sample counter on the flowmeter.</li> <li>- Disabled the liquid detector on the sampler (<del>to</del> assuming that the liq. detector is a source of previous sample volume issues)</li> <li>- Calibrated sampler volume to 600ml per sample</li> <li>- Started sampler program</li> </ul>
<p>1540</p>	<p>- Departed site.</p>
<p>11/4/16</p>	<p>1300 - Based on most recent forecast will program the flowmeter <del>for</del><sup>with</sup> trigger volume of 12129 cf <del>whi</del> per aliquot, which corresponds to a storm of 0.75".</p>
<p>Attachments:</p>	



Project	<u>Portland Harbor</u>	Date	<u>11/5/16</u>
Location	<u>OF19 - NW Kittredge + Front</u>	Personnel	<u>MJS</u>
Subject	<u>2016 stormwater OF Mon - Event #4</u>		
2225(PST)	On-site to heavy rain and heavy flow in manhole. Program was done (had collected 24th aliquot ~10 minutes prior). Recorded sample times and capped and removed all 8 full bottles. Replaced with bottles 9-16, removed lids, added ice and changed sampler battery.		
2735	Re-started sampler program.		
11/6/16 12:11	On-site for pickup of samples. Bottles 9-11 contain sample (bottle 11 has only 1 trigger). It appears that the sample volume may be slightly high b/c there is some water in sampler base indicating that bottles have over-filled. Checked sample volume by pumping a sample and just under 600ml was delivered. Decrease in head when sampler is lowered into manhole may result in delivery of a greater volume. Tested by lowering into manhole and collecting a sample into an empty bottle. Retrieved sampler and measured volume at 825ml. Based on this it appears that <del>~500ml</del> each bottle was overfilled by ~500ml.		
	Based on hydrograph discarded bottles 10 and 11 as they represent the return to base flow after the storm has ended. Composited bottles 1-9 in a decontaminated teflon churn splitter and subsampled into analysis bottles.		
Attachments:			



# COMPOSITE BOTTLE DATA SHEET

City of Portland - Environmental Services  
Field Operations

Fiscal Year and Event No. 2016/2017 Event 4

Project Portland Harbor Site OF 19 - NW Kittredge & Funt Project No.           

Setup: Date 11/3/16 Arrival Time (PST) 1400 Personnel MJS, JXL

First Check: Date 11/5/16 Arrival Time (PST) 2225 Personnel MJS

Second Check: Date 11/6/16 Arrival Time (PST) 1211 Personnel MJS, RCB

Third Check: Date            Arrival Time (PST)            Personnel           

### Aliquot Data

Swap	Bottle No.	Aliquot No.	Date	Time (PST)	Missed?	Codes	Swap	Bottle No.	Aliquot No.	Date	Time (PST)	Missed?	Codes
	1	1	11/5	0741				5	13	1705			
		2		0850					14		1735		
		3		1035					15		1750		
	2	4	11/5	1120			6	16	1800	1845			
		5		1145				17			1915		
		6		1240				18			1940		
	3	7	11/5	1410			7	19	2000	2025			
		8		1500				20			2105		
		9		1610				21			2140		
	4	10	11/5	1635			8	22	2215				
		11		1635				23		2215			
		12		1650				24		2215			

### Bottle Data

2228 PST at swap

Bottle No.	Sample characteristics (turbidity, volume., etc.)	Missed aliquots, comments
1	Full, moderately turbid ↓	3 triggers ↓
2		
3		
4		
5		
6		
7		
8		

Notes 11/5/16 2228 performed bottle swap after the final sample of bottle 8. Installed bottles 9-16 and re-started sampler program.  
11/6/16 1211 - Picked bottles 9-11 which had sample. Based on hydrograph, composited bottles 1-9, and discarded 10+11 as they reflected the return to baseflow after the storm.

Composite Notes: reflor Churn splitter used?  Churned bottles 1-5 and retained 5L for composite. Churned bottles 6-9 and retained 4L for composite. Combined both (9L total), churned and subsampled into analysis bottles.





**City of Portland  
Environmental Services  
Field Operations**

**Trigger Volume Calculation Worksheet**  
(for a basin of known area)

**Project Name:** Portland Harbor      **Project #:** 4010.001      **Storm Event Date:** 11/5/2016

Monitoring Site	Forecasted Rainfall Amount (inches)	Forecasted Rainfall Amount (feet)	Basin Size (acres)	Basin Size (square feet)	Basin Rainfall Volume (cubic feet)	Estimated Runoff Coefficient	Anticipated Runoff Volume (cubic feet)	Number of Sample Bottles in Sampler Configuration	Number of Aliquots per Bottle	Trigger Volume per Aliquot (cubic feet)
OF-19	0.75	0.0625	486	21170160	1323135	0.22	291090	8	3	12129



City of Portland  
Environmental Services  
**FLOW MONITORING DATA SHEET**

Data file transferred to s:\   
Data imported into Profile   
Data file review \_\_\_\_\_  
Notes transferred to database \_\_\_\_\_

Project Portland Harbor Site OF 19 - NW Holgate Front  
 Personnel JXL, MJS Date 1/31/16 Arrival Clock Time 1400  
 Activities  Installation  Upload  Removal  Check  Battery Swap  Sensor Swap  Other \_\_\_\_\_  
 Devices  FL90X  FL90X - Telemetered  Telog  Sigma  Other \_\_\_\_\_  
 Meter ID 2190 Entry Made  no  yes  n/a

**INSTALLATION / PROGRAMMING** Node No. \_\_\_\_\_  
 Sensor type(s) and S/N(s) \_\_\_\_\_  
 Sensor / band location \_\_\_\_\_  
 Channel dimensions \_\_\_\_\_ Channel material \_\_\_\_\_ Monitoring interval \_\_\_\_\_  
 Channel geometry \_\_\_\_\_ Installation method  band  bolted  both  other \_\_\_\_\_

Meter Time in Agreement with PST (+/-3min)  Adjustment (describe below) Battery 4x Pb Acid  
 Field Upload  Office Upload Desiccant  O.K.  Changed (Type \_\_\_\_\_) Voltage 13.2V  
 File name N/A Laptop yellow dell XFR DTU \_\_\_\_\_

Arrival Meter Measurements	Arrival Actual	Depart. Meter Measurements	Depart. Actual
Meter time (PST) <u>13:20</u>		Meter time (PST) <u>N/A</u>	
Level <u>2.3"</u>	Level <u>2.4"</u>	Level _____	Level <u>N/A</u>
Velocity <u>1.4fps</u>	Velocity <u>1.4fps</u>	Velocity _____	Velocity _____
Flow <u>0.28cks</u>		Flow _____	

Notes: 14:00 on-site to setup for Event 4. Arrival measurements in agreement.  
Event removed old tubing, installed new tubing decontaminated @ WPCL  
Re-set sample count on flow meter, cleared sample data  
15:15 Calibrated sampler volume (600mL) w/ disabled liquid level detector.  
Initiated sampler program  
15:40 Departed site.

Next time: \_\_\_\_\_  
 Data file review notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody  
 Bureau of Environmental Services



Work Order #:

Collected By: MJS, RLR

Date: 11/6/16

Client Name: Directors Office  
 Project Name: **Portland Harbor**  
 Matrix: Stormwater

**Requested Analyses**

Lab Number		Location ID	Composite Start Date/Time	Composite End Date/Time	Sample Type	TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn))	Total Mercury	PCB Congeners	PAHs +phthalates (low-level)	# of Containers	Remarks
2016 Stormwater Outfall Monitoring Composite Sample COC		19_SW3	11/5/16 0741	11/6/16 0125	C	●	●	●	●	●	4	SW-19-AAP918 (OF-19) 4900 NW Klitridge Ave. DS of MH Field Duplicate
		<del>FIELD DUPLICATE</del>			<del>C</del>	<del>●</del>	<del>●</del>	<del>●</del>	<del>●</del>	<del>●</del>		

Relinquished By: Signature: <u>[Signature]</u> Printed Name: <u>Matt Sullivan</u> Date: <u>11/6/16</u> Time: <u>1303</u>	Received By: Signature: <u>[Signature]</u> Printed Name: <u>Urbahn</u> Date: <u>11/6/16</u> Time: <u>1303</u>	Relinquished By: Signature: _____ Printed Name: _____ Date: _____ Time: _____	Received By: Signature: _____ Printed Name: _____ Date: _____ Time: _____
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Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
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 Bureau of Environmental Services



Work Order #: \_\_\_\_\_  
 Collected By: MJ, ALB

Date: 2/8/17

Client Name: Director's Office Matrix: Stormwater  
 Project Name: Portland Harbor

2016 Stormwater Outfall Monitoring COC				Requested Analyses						# of Containers	Remarks				
Lab Number	Location ID	Sample Date	Sample Time	Sample Type	TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn))	Total Mercury	PCB Congeners	PAHs +phthalates (low-level)			Pesticides (Low-level) <sup>1</sup>			
01	53A.SW1	2/8/17	0818	G										4	
	FDB	2/8/17	0814	G										4	

Relinquished By: Signature: <u>[Signature]</u> Printed Name: <u>Matt Abbin</u> Date: <u>2/8/17</u> Time: <u>0850</u>	Received By: Signature: _____ Printed Name: _____ Date: _____ Time: _____	Relinquished By: Signature: _____ Printed Name: _____ Date: _____ Time: _____	Received By: Signature: _____ Printed Name: _____ Date: _____ Time: _____
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General Conditions, Photos of hole + Runoff,  
Dup at 44

Page 1 of 1

Project	<u>PORTLAND HARBOR</u>	Date	<u>2-8-17</u>
Location	<u>44-SW20, 45-SW1, M2-SW1</u>	Personnel	<u>WEB/JSA</u>
Subject	<u>GRAPS</u>		
0900	DEPART WPCL		
0938	ARRIVE AT 44-SW20 TO LIGHT RAIN. GOOD GUTTER FLOW. TAKE SAMPLE + (DUP) AT 0947. RUN OFF <del>IS</del> HAS MODERATE TURBIDITY & IS LIGHT BROWN IN COLOR. DEPART AT 1003. ↳ NO ODOR.		
1005	ARRIVE AT 45-SW1. STEADY MODERATE RAIN. COLLECT SAMPLE AT 1010. RUN OFF HAS MODERATE TURBIDITY & IS LIGHT BROWN IN COLOR. DEPART AT 1019. ↳ NO ODOR.		
1031	ARRIVE AT M2-SW1. SET UP TRAFFIC CONTROL PER JSA. LOST DEDICATED DECON-ED BEAKER IN MANHOLE DUE TO INSUFFICIENT STRING LENGTH. REUSED BEAKER FROM PREVIOUS SITE. RINSED BEAKER 4 TIMES IN STORMWATER FLOW IN NODE PRIOR TO SAMPLING. FLOW IN NODE WAS SUFFICIENTLY DEEP TO SUBMERGE BEAKER DURING RINSES. COLLECTED SAMPLE AT 1049. WITH VERY LIGHT, STEADY RAINFALL & MODERATE GUTTER FLOW. RUNOFF HAS MODERATE TURBIDITY, LIGHT GRAY IN COLOR, & PETROLEUM ODOR. BREAK DOWN TRAFFIC CONTROL. DEPART SITE AT 1107 FOR WPCL.		
1130	ARRIVE AT WPCL		
Attachments:			

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody  
 Bureau of Environmental Services



Work Order #: KE3 A54  
 Collected By: KE3 A54

Date: 2/8/12

Client Name: Director's Office Matrix: Stormwater  
 Project Name: Portland Harbor

2016 Stormwater Outfall Monitoring COC

<sup>1</sup>Pesticides only required for samples from Outfalls 17 and 44

Requested Analyses Smartwell 3-1

Lab Number	Location ID	Sample Date	Sample Time	Sample Type	TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs +phthalates (low-level)	Pesticides (Low-level) <sup>1</sup>	Conductivity (umhos/cm)	pH (pH units)	Temperature (Deg C)	# of Containers	Remarks
01	44-SW20	2/8/12	0947	G	0	0	0	0	0	0	209	6.4	4.9	5	
	45-SW1		1010	G	0	0	0	0	0	0	29	6.6	4.5	4	
	M2-SW1		1057	G	0	0	0	0	0	0	45	6.1	5.1	4	
	Dap	2/8/12		G	0	0	0	0	0	0				5	

Relinquished By: [Signature] Date: 2/8/12 Time: 1148  
 Signature: [Signature] Date: 2/8/12 Time: 1148  
 Printed Name: Andrew Hensberg  
 Signature: [Signature] Date: 2/8/12 Time: 1148  
 Printed Name: K. Katzenberger  
 Signature: [Signature] Date: 2/8/12 Time: 1148  
 Printed Name: [Signature]  
 Signature: [Signature] Date: 2/8/12 Time: 1148  
 Printed Name: [Signature]

## Attachment A2

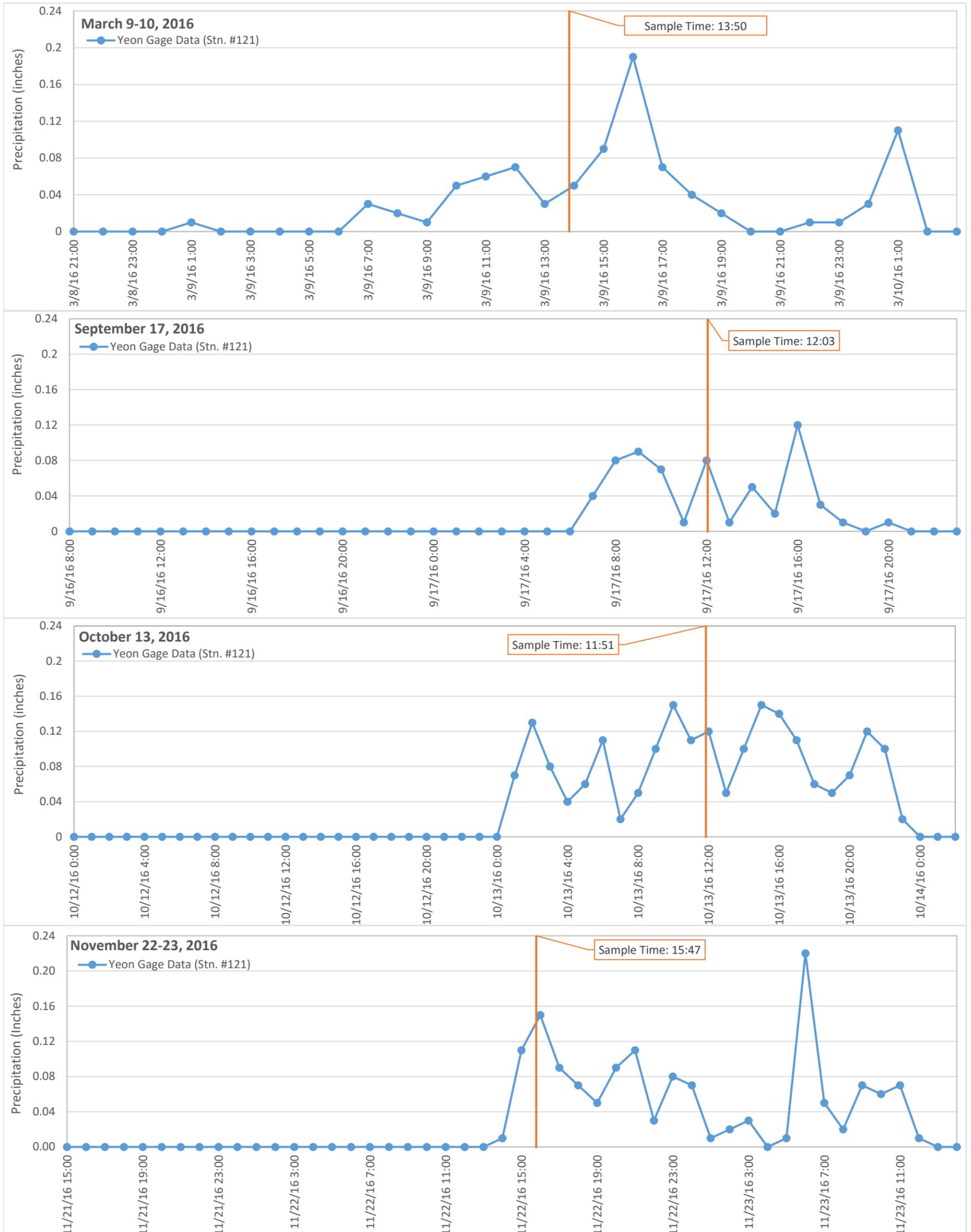
### Storm Event Precipitation Graphs (Stormwater Grab Sampling)

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**Attachment A2**  
**Storm Event Precipitation Graphs**  
**(2015 - 2017 Stormwater Grab Sampling)**

## Outfall Basin 16 Storm Event Data



Outfall Basin	Sample Location		Sample Date and Time (PST)	Sample Type	Antecedent Dry Period (hours) <sup>(1)</sup>	Forecasted Rainfall Total (inches) <sup>(2)</sup>	First Flush Event? <sup>(3)</sup>
	Location ID	Feature					
16	16_SW1	Manhole AAX408	3/9/2016 13:50	Grab	14	0.37 – 0.52+	No
			9/17/2016 12:03	Grab	>24	0.14 – 0.25+	No
			10/13/2016 11:51	Grab	>24	0.88 – 1.18+	No
			11/22/2016 15:47	Grab	>24	0.14 – 0.21+	Yes

PST = Pacific Standard Time

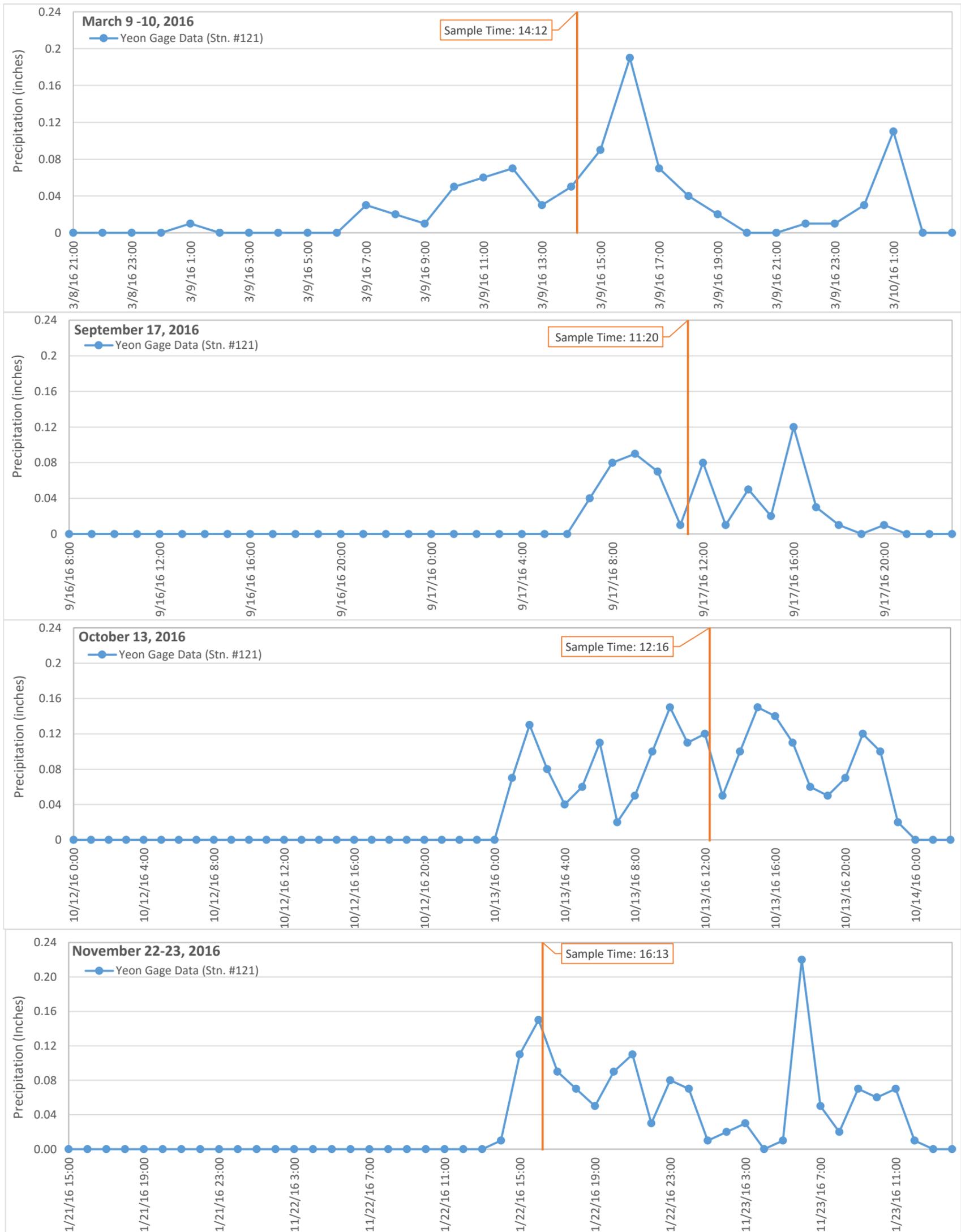
Rain gage data obtained from USGS, Oregon Water Science Center (<http://or.water.usgs.gov/non-usgs/bes/>)

(1) Cumulative rainfall during this time less than 0.10 inch.

(2) Forecasted rainfall data provided by Extended Range Forecasting, Inc.

(3) First flush sampling is typically conducted within the first 3 hours of stormwater discharge, but varies depending on the basin size and land use characteristics. Best professional judgment was utilized to characterize first flush criteria for each storm.

## Basin 16 Paired/Site-Specific Location Storm Event Data



Outfall Basin	Sample Location		Sample Date and Time (PST)	Sample Type	Antecedent Dry Period (hours) <sup>(1)</sup>	Forecasted Rainfall Total (inches) <sup>(2)</sup>	First Flush Event? <sup>(3)</sup>
	Location ID	Feature					
16	16_SW2	Manhole ANH937	3/9/2016 14:12	Grab	14	0.37 – 0.52+	No
			9/17/2016 11:20	Grab	>24	0.14 – 0.25+	No
			10/13/2016 12:16	Grab	>24	0.88 – 1.18+	No
			11/22/2016 16:13	Grab	>24	0.14 – 0.21+	Yes

PST = Pacific Standard Time

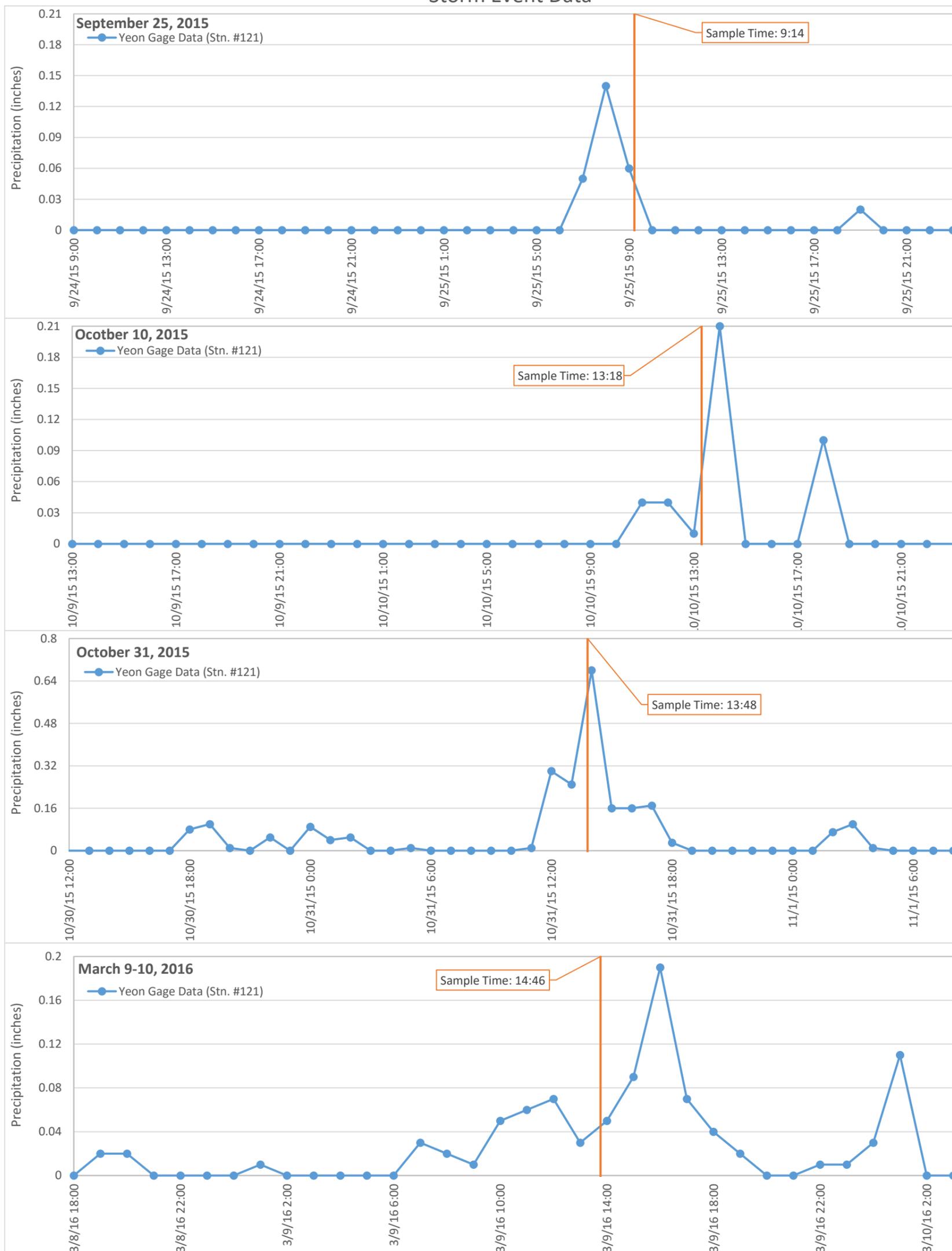
Rain gage data obtained from USGS, Oregon Water Science Center (<http://or.water.usgs.gov/non-usgs/bes/>)

(1) Cumulative rainfall during this time less than 0.10 inch.

(2) Forecasted rainfall data provided by Extended Range Forecasting, Inc.

(3) First flush sampling is typically conducted within the first 3 hours of stormwater discharge, but varies depending on the basin size and land use characteristics. Best professional judgment was utilized to characterize first flush criteria for each storm.

## Outfall Basin 17 Storm Event Data



Outfall Basin	Sample Location		Sample Date and Time (PST)	Sample Type	Antecedent Dry Period (hours) <sup>(1)</sup>	Forecasted Rainfall Total (inches) <sup>(2)</sup>	First Flush Event? <sup>(3)</sup>
	Location ID	Feature					
17	17_16SW	Outfall	9/25/2015 9:14	Grab	>24	0.12 – 0.21+	Yes
			10/10/2015 13:18	Grab	>24	0.42 – 0.63+	Yes
			10/31/2015 13:48	Grab	9	1.29 – 1.73+	No
	17_17SW	MH AAT596 <sup>(4)</sup>	3/9/2016 14:46	Grab	14	0.37 – 0.52+	No

PST = Pacific Standard Time

Rain gage data obtained from USGS, Oregon Water Science Center (<http://or.water.usgs.gov/non-usgs/bes/>)

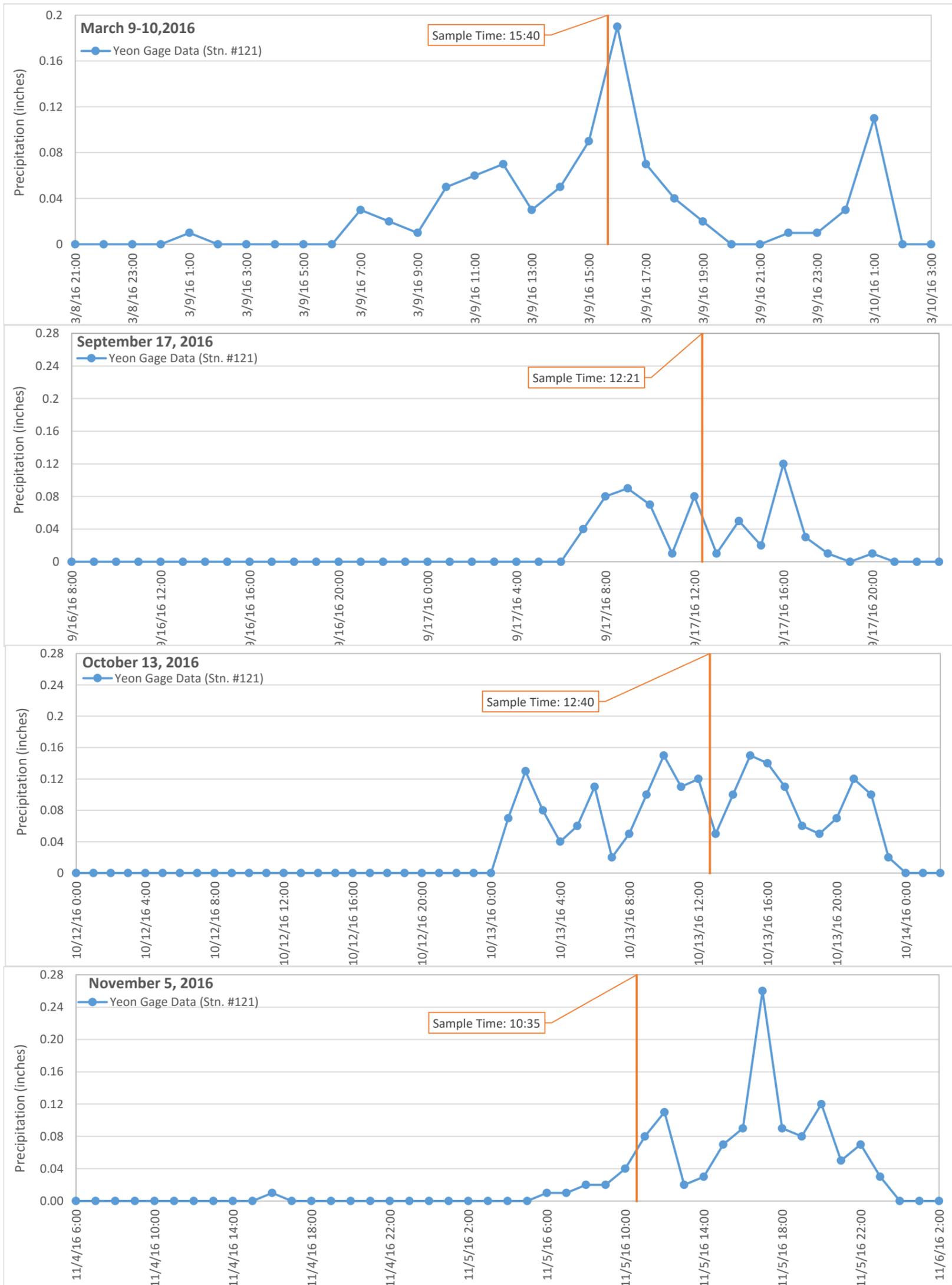
(1) Cumulative rainfall during this time less than 0.10 inch.

(2) Forecasted rainfall data provided by Extended Range Forecasting, Inc.

(3) First flush sampling is typically conducted within the first 3 hours of stormwater discharge, but varies depending on the basin size and land use characteristics. Best professional judgment was utilized to characterize first flush criteria for each storm.

(4) This location was selected as an alternative sampling location in the event the outfall was submerged below the river. As with the primary sampling location (the outfall), this location also represents discharge from all of the Basin 17 drainage area.

## Basin 19 Paired/Site-Specific Location Storm Event Data



Outfall Basin	Sample Location		Sample Date and Time (PST)	Sample Type	Antecedent Dry Period (hours) <sup>(1)</sup>	Forecasted Rainfall Total (inches) <sup>(2)</sup>	First Flush Event? <sup>(3)</sup>
	Location ID	Feature					
19	19_SW2	Stormwater Sampling Manhole at 4927 NW Front	3/9/2016 15:40	Grab	14	0.37 – 0.52+	No
			9/17/2016 12:21	Grab	>24	0.14 – 0.25+	No
			10/13/2016 12:40	Grab	>24	0.88 – 1.18+	No
			11/5/2016 10:35	Grab	>24	0.57 – 0.78+	No

PST = Pacific Standard Time

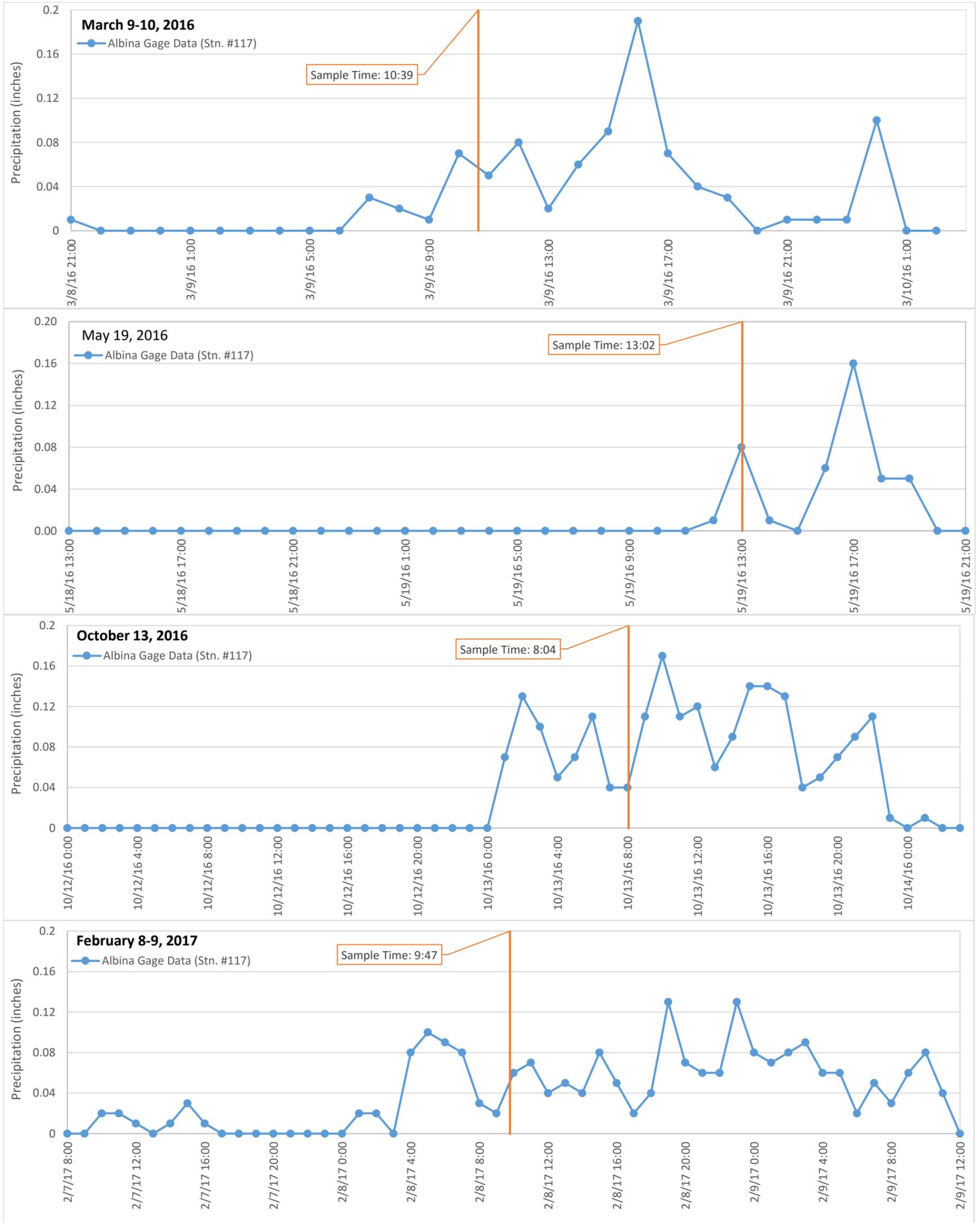
Rain gage data obtained from USGS, Oregon Water Science Center (<http://or.water.usgs.gov/non-usgs/bes/>)

(1) Cumulative rainfall during this time less than 0.10 inch.

(2) Forecasted rainfall data provided by Extended Range Forecasting, Inc.

(3) First flush sampling is typically conducted within the first 3 hours of stormwater discharge, but varies depending on the basin size and land use characteristics. Best professional judgment was utilized to characterize first flush criteria for each storm.

## Outfall Basin 44 Storm Event Data



Outfall Basin	Sample Location		Sample Date and Time (PST)	Sample Type	Antecedent Dry Period (hours) <sup>(1)</sup>	Forecasted Rainfall Total (inches) <sup>(2)</sup>	First Flush Event? <sup>(3)</sup>
	Location ID	Feature					
44	44_SW20	Manhole ABC352	3/9/2016 10:39	Grab	14	0.37 – 0.52+	No
			5/19/2016 13:02	Grab	>24	0.12	Yes
			10/13/2016 8:04	Grab	>24	0.88 – 1.18+	No
			2/8/2017 9:47	Grab	14	0.48 - 0.63+	No

PST = Pacific Standard Time

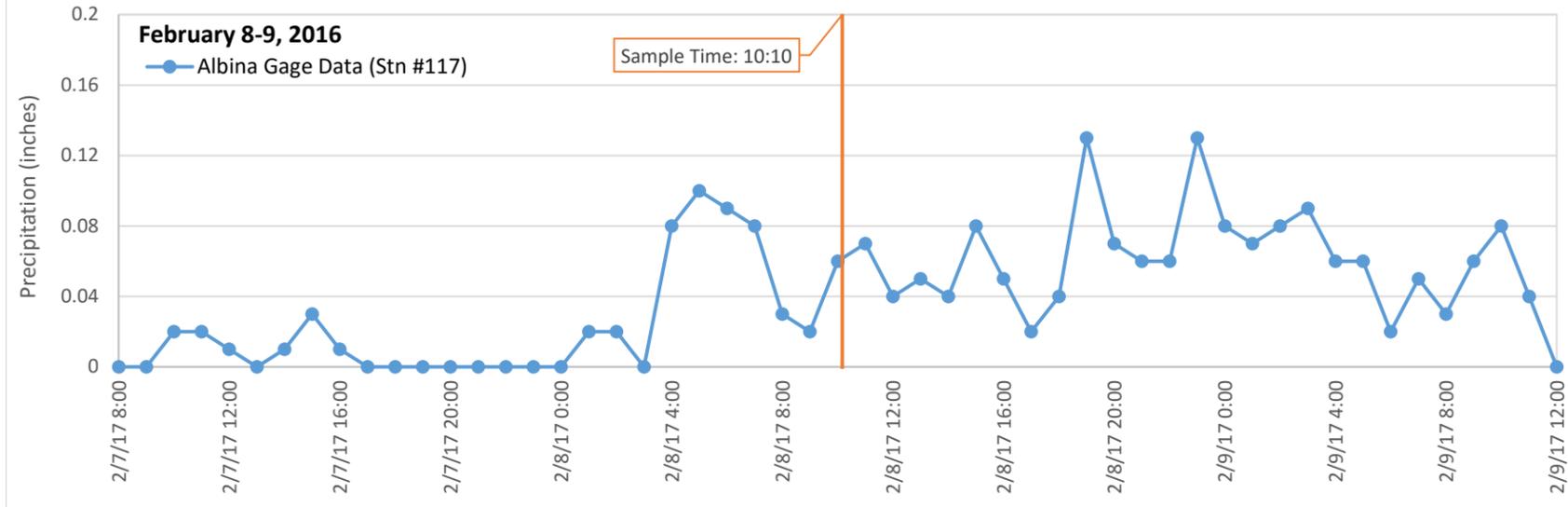
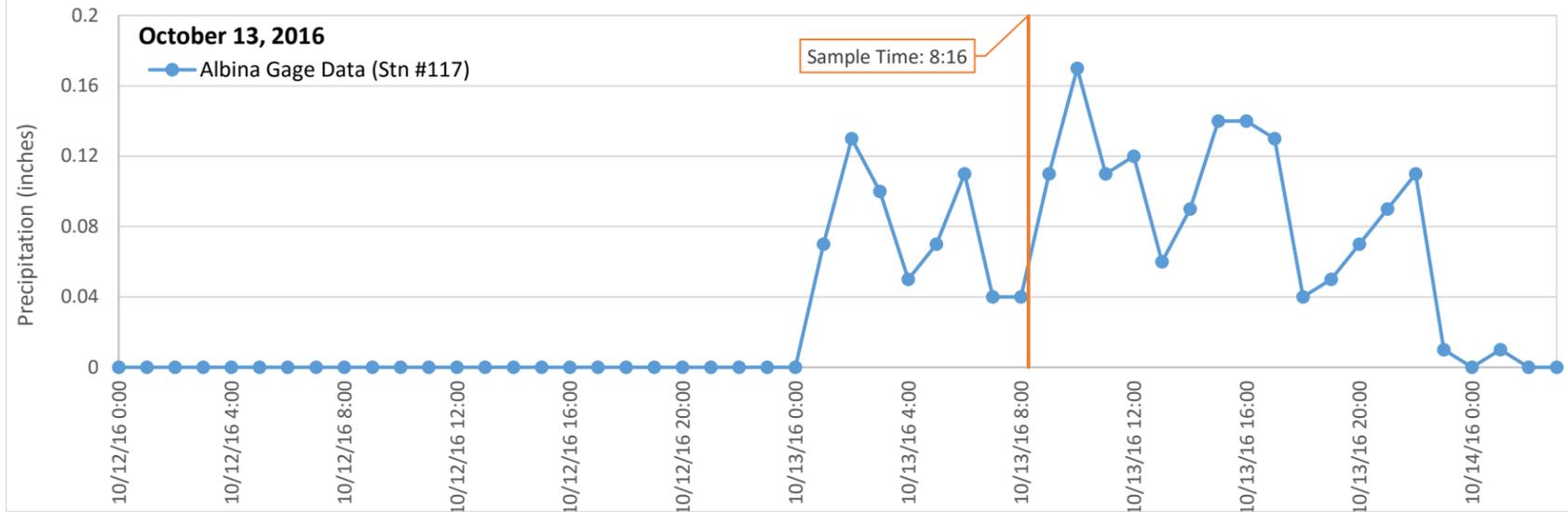
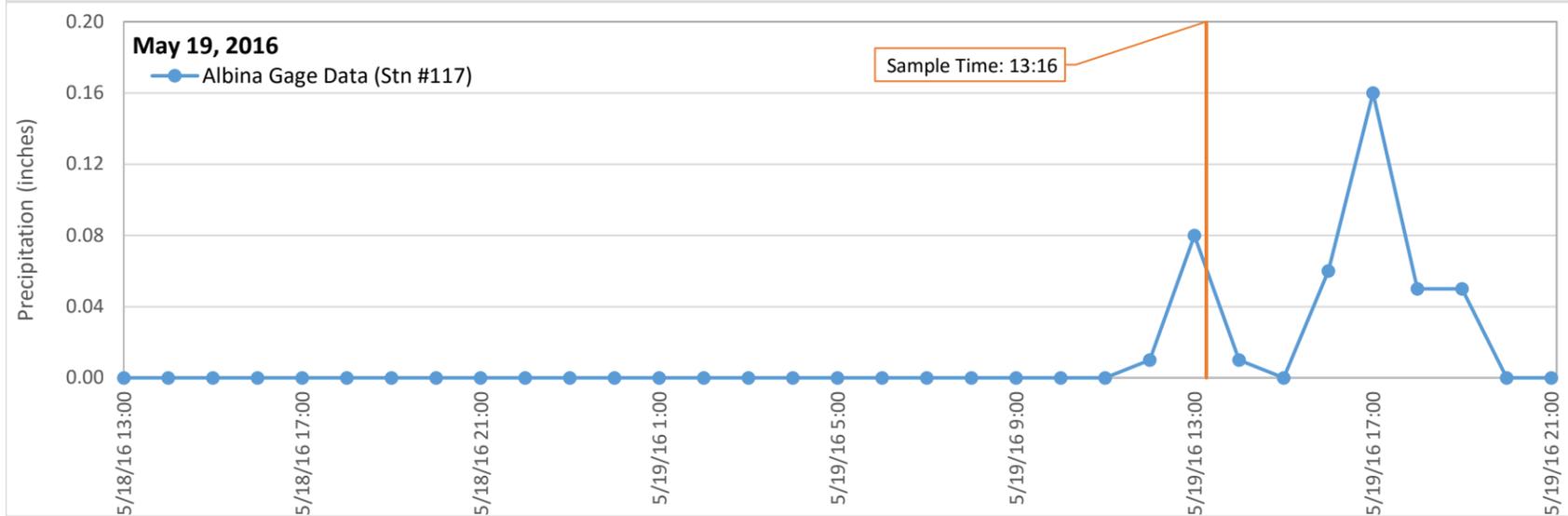
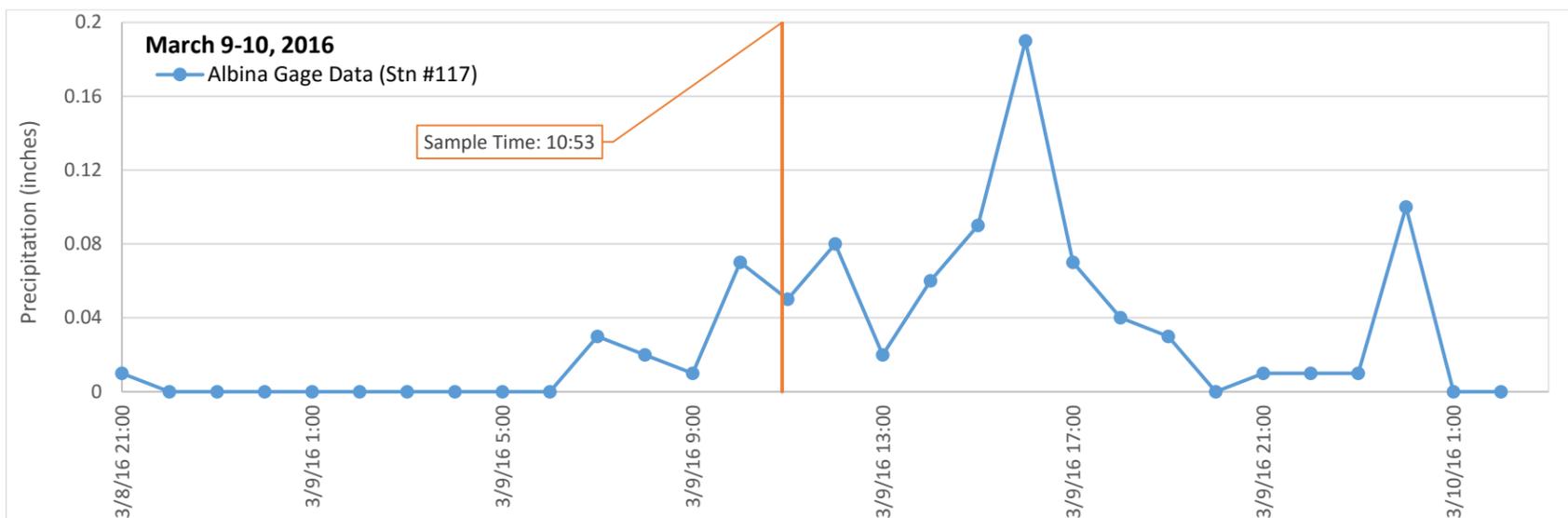
Rain gage data obtained from USGS, Oregon Water Science Center (<http://or.water.usgs.gov/non-usgs/bes/>)

(1) Cumulative rainfall during this time less than 0.10 inch.

(2) Forecasted rainfall data provided by Extended Range Forecasting, Inc.

(3) First flush sampling is typically conducted within the first 3 hours of stormwater discharge, but varies depending on the basin size and land use characteristics. Best professional judgment was utilized to characterize first flush criteria for each storm.

## Outfall Basin 45 Storm Event Data



Outfall Basin	Sample Location		Sample Date and Time (PST)	Sample Type	Antecedent Dry Period (hours) <sup>(1)</sup>	Forecasted Rainfall Total (inches) <sup>(2)</sup>	First Flush Event? <sup>(3)</sup>
	Location ID	Feature					
45	45_SW1	Manhole ABC319	3/9/2016 10:53	Grab	14	0.37 – 0.52+	No
			5/19/2016 13:16	Grab	>24	0.12	Yes
			10/13/2016 8:16	Grab	>24	0.88 – 1.18+	No
			2/8/2017 10:10	Grab	14	0.48 - 0.63+	No

PST = Pacific Standard Time

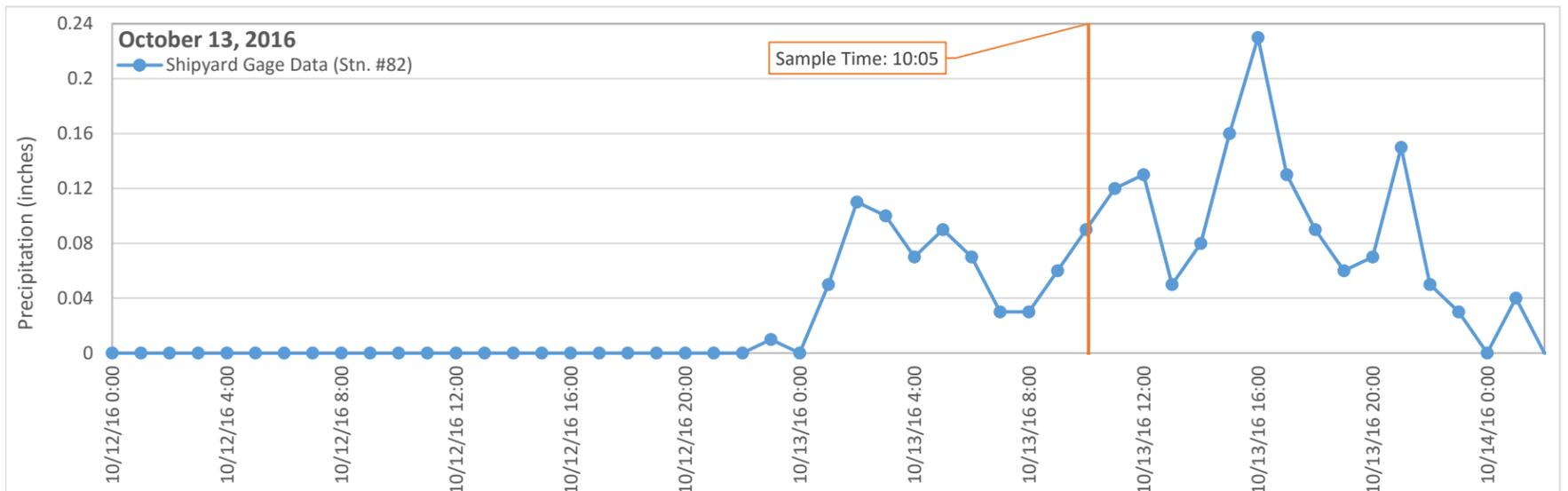
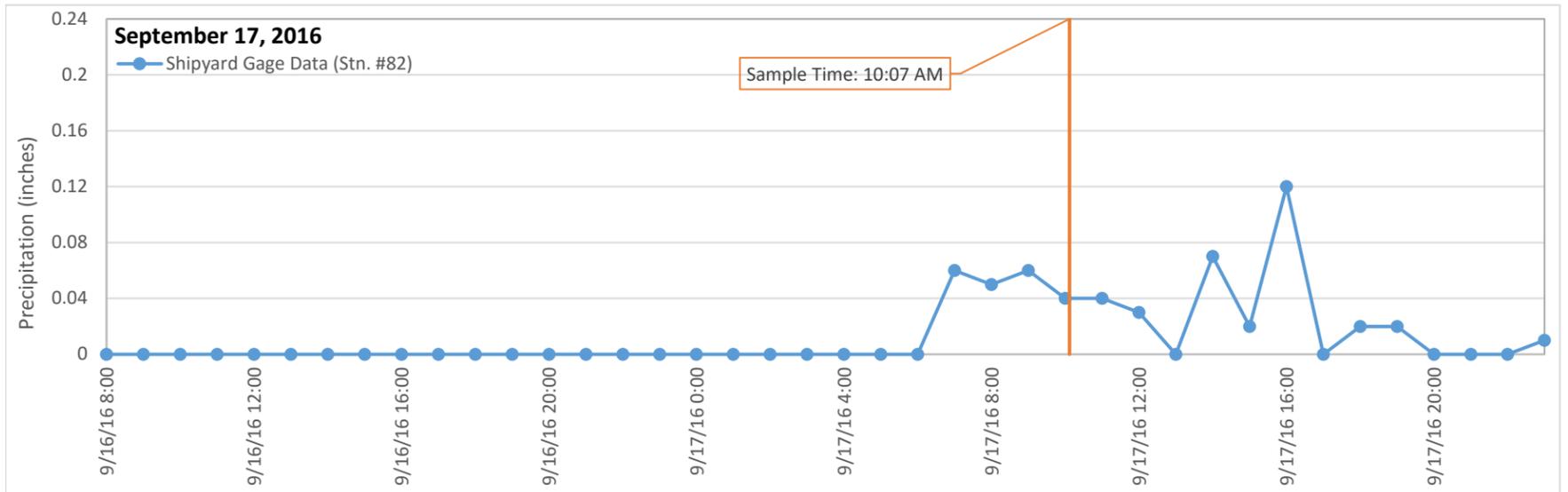
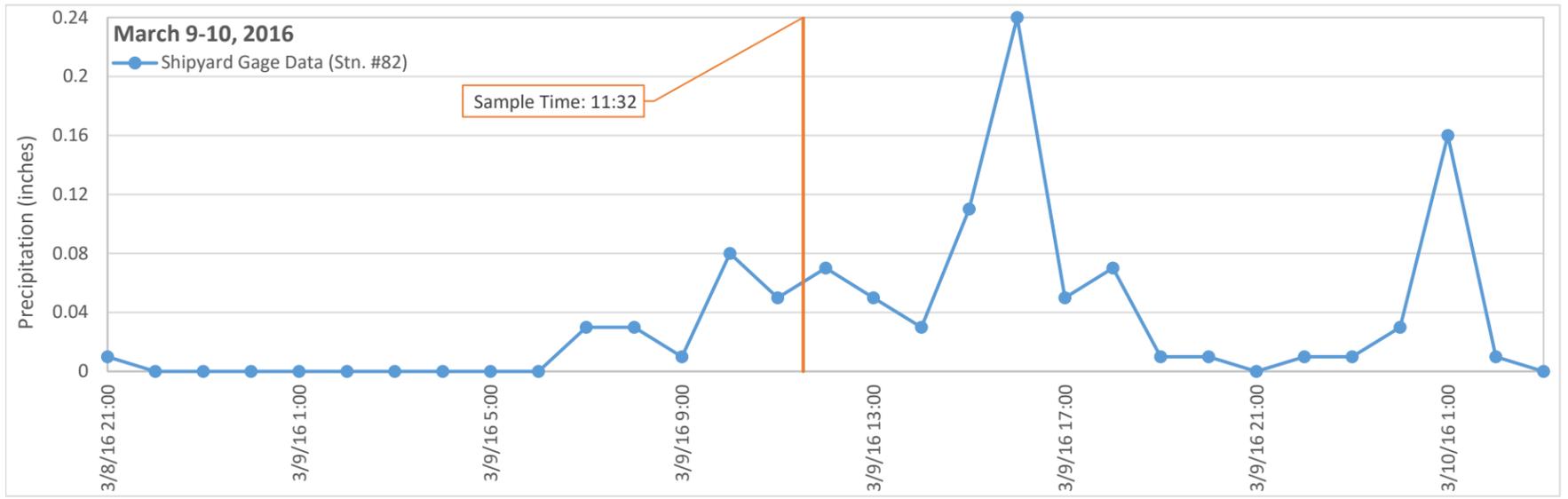
Rain gage data obtained from USGS, Oregon Water Science Center (<http://or.water.usgs.gov/non-usgs/bes/>)

(1) Cumulative rainfall during this time less than 0.10 inch.

(2) Forecasted rainfall data provided by Extended Range Forecasting, Inc.

(3) First flush sampling is typically conducted within the first 3 hours of stormwater discharge, but varies depending on the basin size and land use characteristics. Best professional judgment was utilized to characterize first flush criteria for each storm.

## Outfall Basin 52D Storm Event Data



Outfall Basin	Sample Location		Sample Date and Time (PST)	Sample Type	Antecedent Dry Period (hours) <sup>(1)</sup>	Forecasted Rainfall Total (inches) <sup>(2)</sup>	First Flush Event? <sup>(3)</sup>
	Location ID	Feature					
52D	52D_SW5	Manhole APT249	3/9/2016 11:32	Grab	17	0.37 – 0.52+	No
			9/17/2016 10:07	Grab	>24	0.14 – 0.25+	No
			10/13/2016 10:05	Grab	>24	0.88 – 1.18+	No
			Note <sup>(4)</sup>	--	--	--	--

PST = Pacific Standard Time

Rain gage data obtained from USGS, Oregon Water Science Center (<http://or.water.usgs.gov/non-usgs/bes/>)

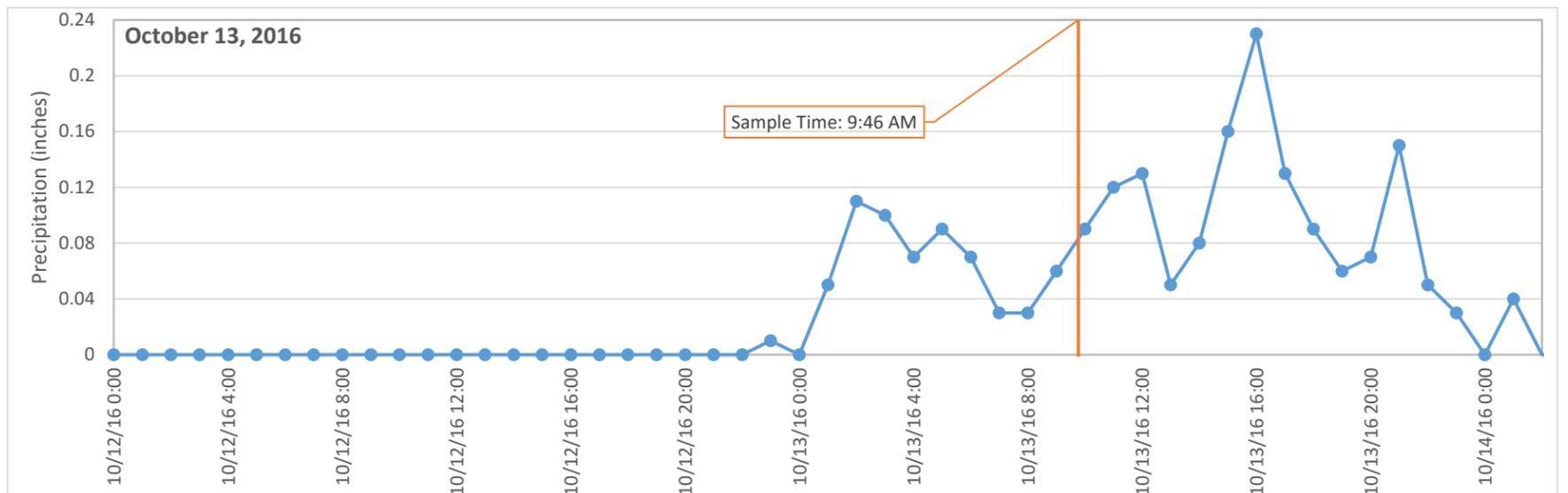
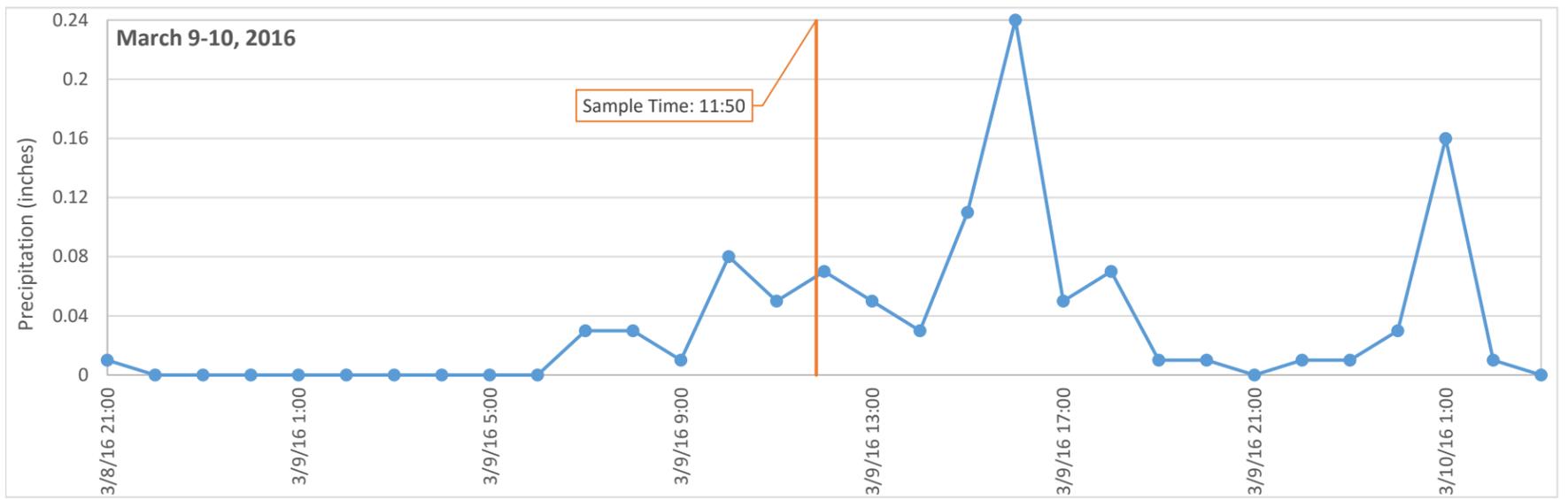
(1) Cumulative rainfall during this time less than 0.10 inch.

(2) Forecasted rainfall data provided by Extended Range Forecasting, Inc.

(3) First flush sampling is typically conducted within the first 3 hours of stormwater discharge, but varies depending on the basin size and land use characteristics. Best professional judgment was utilized to characterize first flush criteria for each storm.

(4) Monitoring was discontinued at this location after three events because results indicated additional source control was warranted at the upgradient Portland Container site (monitoring location 52D\_SW6).

## Basin 52D Paired/Site-Specific Location Storm Event Data



Outfall Basin	Sample Location		Sample Date and Time (PST)	Sample Type	Antecedent Dry Period (hours) <sup>(1)</sup>	Forecasted Rainfall Total (inches) <sup>(2)</sup>	First Flush Event? <sup>(3)</sup>
	Location ID	Feature					
52D	52D_SW6	Manhole APT252	3/9/2016 11:50	Grab	17	0.37 – 0.52+	No
			9/17/2016 0:00	Note <sup>(4)</sup>	--	--	--
			10/13/2016 9:46	Grab	>24	0.88 – 1.18+	No
			Note <sup>(5)</sup>	Grab	--	--	--

PST = Pacific Standard Time

Rain gage data obtained from USGS, Oregon Water Science Center (<http://or.water.usgs.gov/non-usgs/bes/>)

(1) Cumulative rainfall during this time less than 0.10 inch.

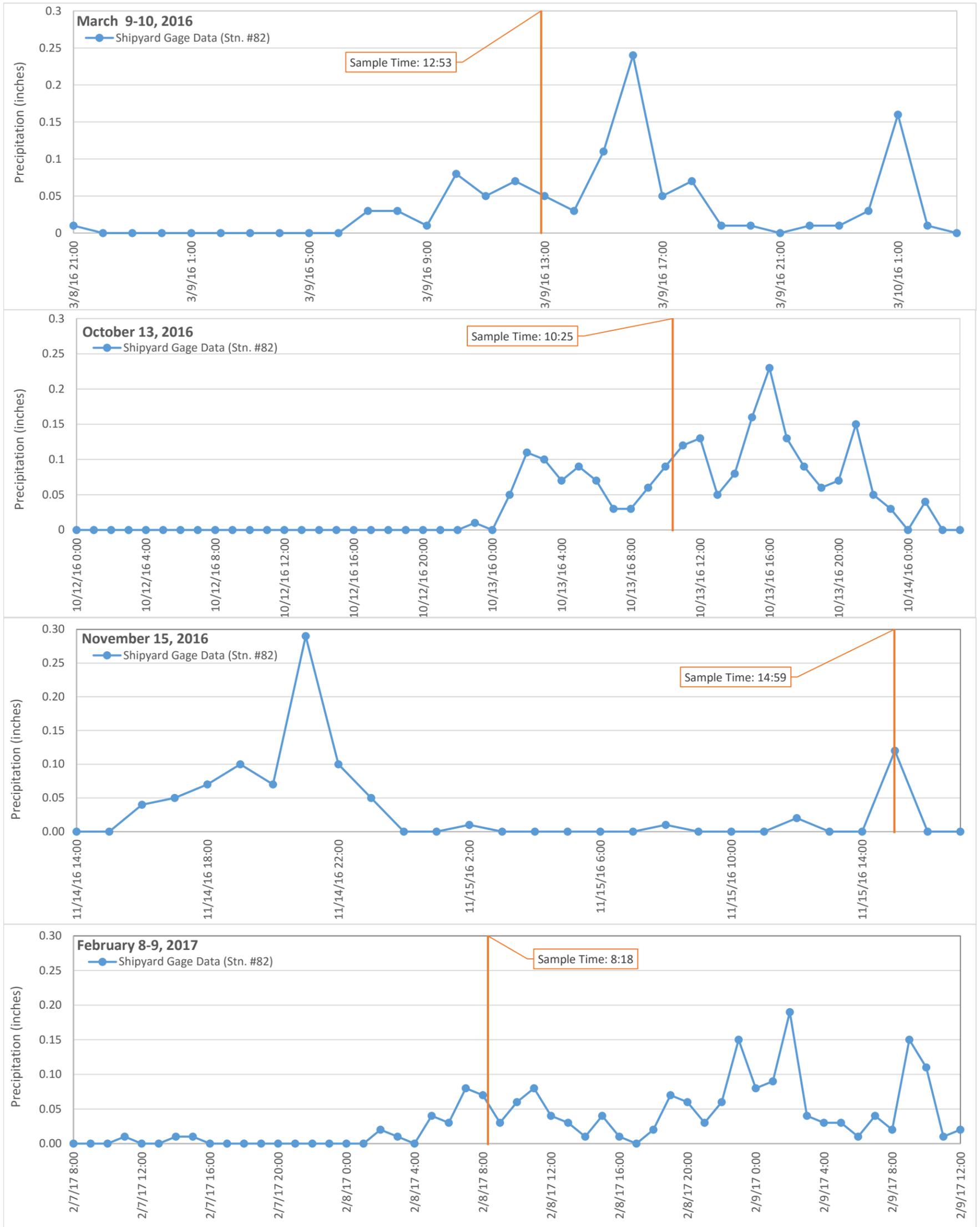
(2) Forecasted rainfall data provided by Extended Range Forecasting, Inc.

(3) First flush sampling is typically conducted within the first 3 hours of stormwater discharge, but varies depending on the basin size and land use characteristics. Best professional judgment was utilized to characterize first flush criteria for each storm.

(4) Sample not collected during this event because no discharge was occurring at this location; the paired downgradient basin-scale location (52D\_SW5) was sampled on this date.

(5) Monitoring was discontinued at this location because results indicated additional source control was warranted at this location (Portland Container).

## Outfall Basin 53A Storm Event Data



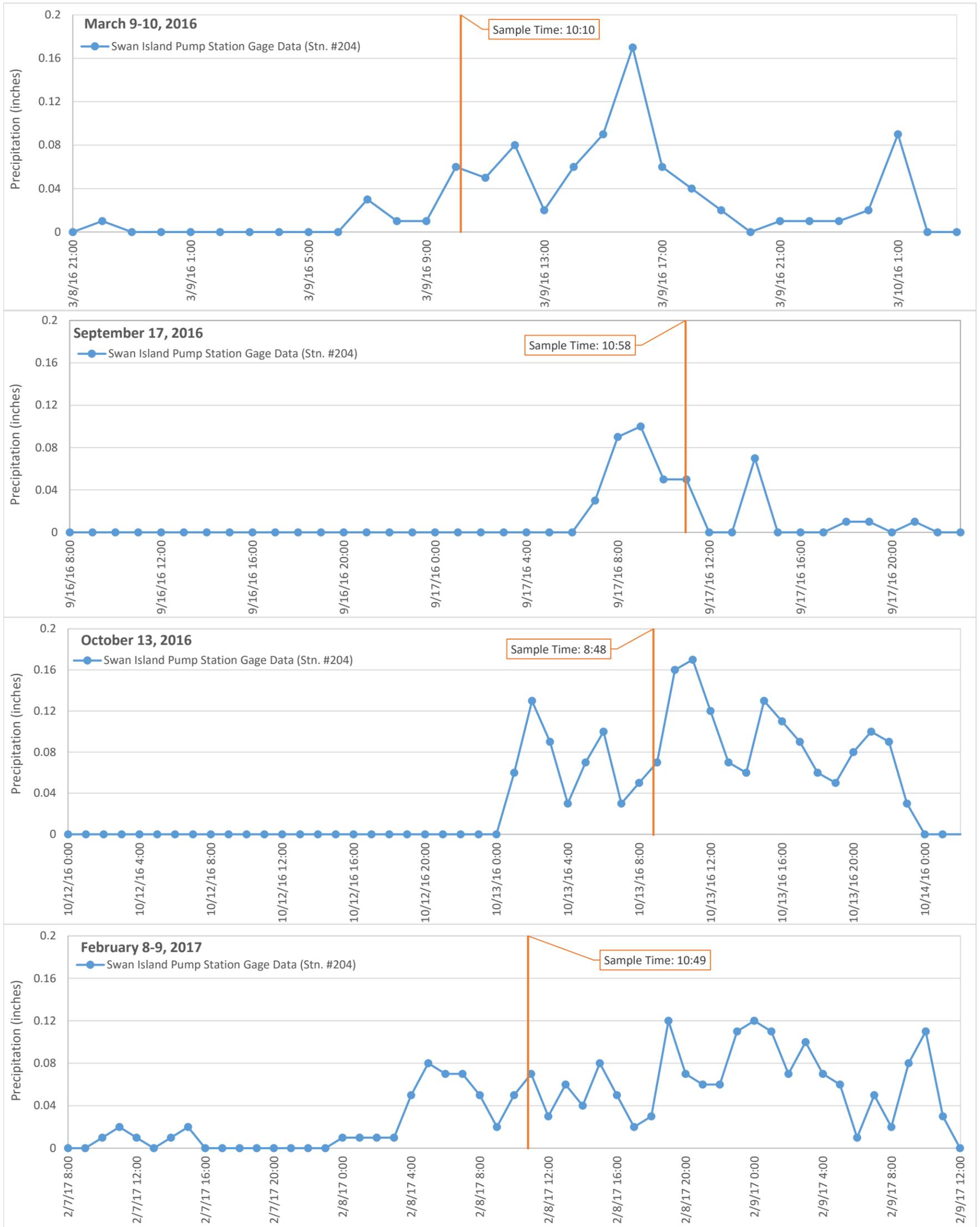
Outfall Basin	Sample Location		Sample Date and Time (PST)	Sample Type	Antecedent Dry Period (hours)	Forecasted Rainfall Total (inches)	First Flush Event?
	Location ID	Feature					
53A	53A_SW1	Manhole AAA170	3/9/2016 12:53	Grab	17	0.37 – 0.52+	No
			10/13/2016 10:25	Grab	>24	0.88 – 1.18+	No
			11/15/2016 14:59	Grab	15	0.23 – 0.38+	Yes
			2/8/2017 8:18	Grab	>24	0.48 - 0.63+	No

PST = Pacific Standard Time

Rain gage data obtained from USGS, Oregon Water Science Center (<http://or.water.usgs.gov/non-usgs/bes/>)

- (1) Cumulative rainfall during this time less than 0.10 inch.
- (2) Forecasted rainfall data provided by Extended Range Forecasting, Inc.
- (3) First flush sampling is typically conducted within the first 3 hours of stormwater discharge, but varies depending on the basin size and land use characteristics. Best professional judgment was utilized to characterize first flush criteria for each storm.

## Outfall Basin M-2 Storm Event Data



Outfall Basin	Sample Location		Sample Date and Time (PST)	Sample Type	Antecedent Dry Period (hours)	Forecasted Rainfall Total (inches)	First Flush Event?
	Location ID	Feature					
M-2	M2-SW1	Manhole AAM169	3/9/2016 10:10	Grab	15	0.37 – 0.52+	No
			9/17/2016 10:58	Grab	>24	0.14 – 0.25+	No
			10/13/2016 8:48	Grab	>24	0.88 – 1.18+	No
			2/8/2017 10:49	Grab	>24	0.48 - 0.63+	No

PST = Pacific Standard Time

Rain gage data obtained from USGS, Oregon Water Science Center (<http://or.water.usgs.gov/non-usgs/bes/>)

- (1) Cumulative rainfall during this time less than 0.10 inch.
- (2) Forecasted rainfall data provided by Extended Range Forecasting, Inc.
- (3) First flush sampling is typically conducted within the first 3 hours of stormwater discharge, but varies depending on the basin size and land use characteristics. Best professional judgment was utilized to characterize first flush criteria for each storm.

## Attachment A3

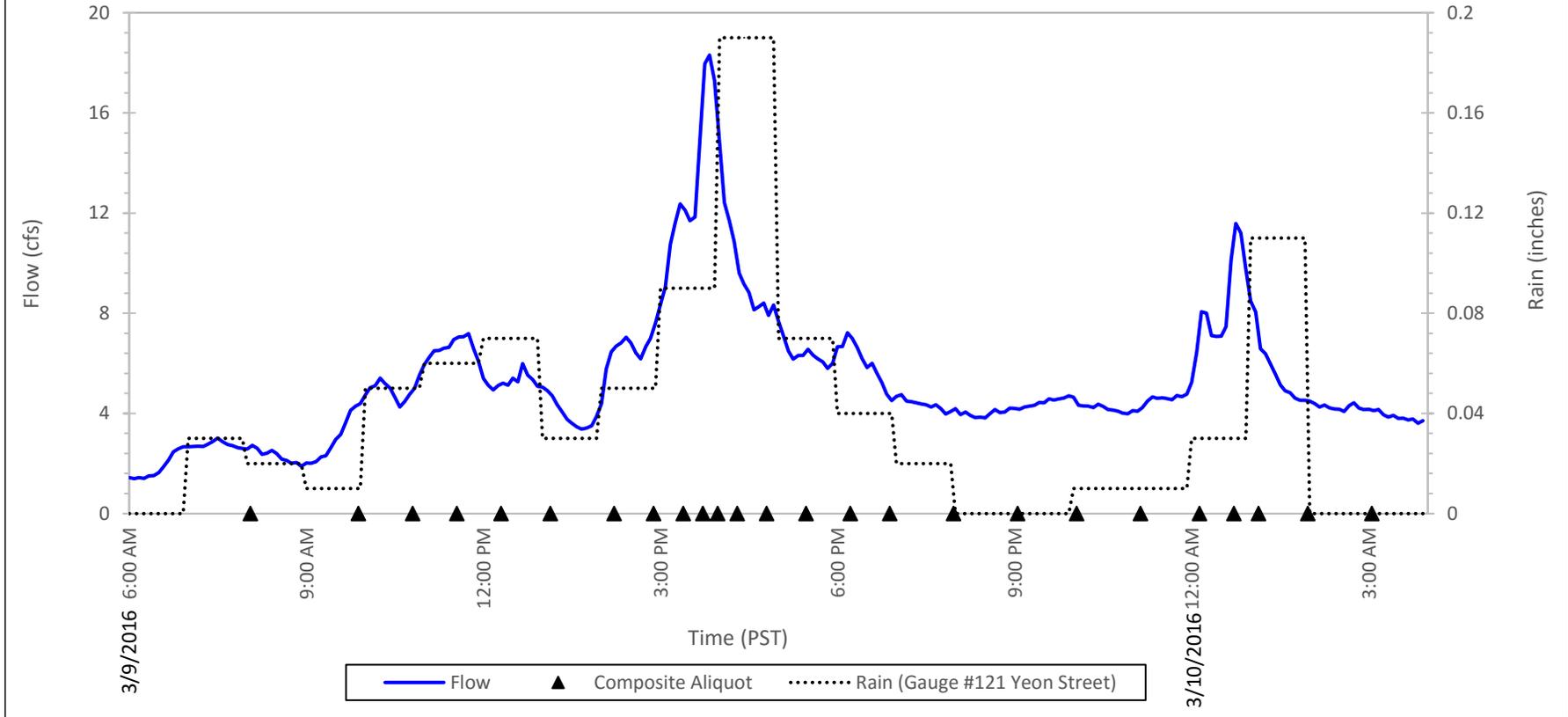
# Hydrographs for Flow-Weighted Composite Samples (Outfall 19)

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**Attachment A3**  
**Hydrographs for Flow-Weighted**  
**Composite Samples**

### Basin 19 (SW\_2) Flow-Weighted Composite Sampling Hydrograph March 9 - 10, 2016



#### Summary of Storm Event Statistics, Outfall 19 Flow-Weighted Composite Sample Event 1

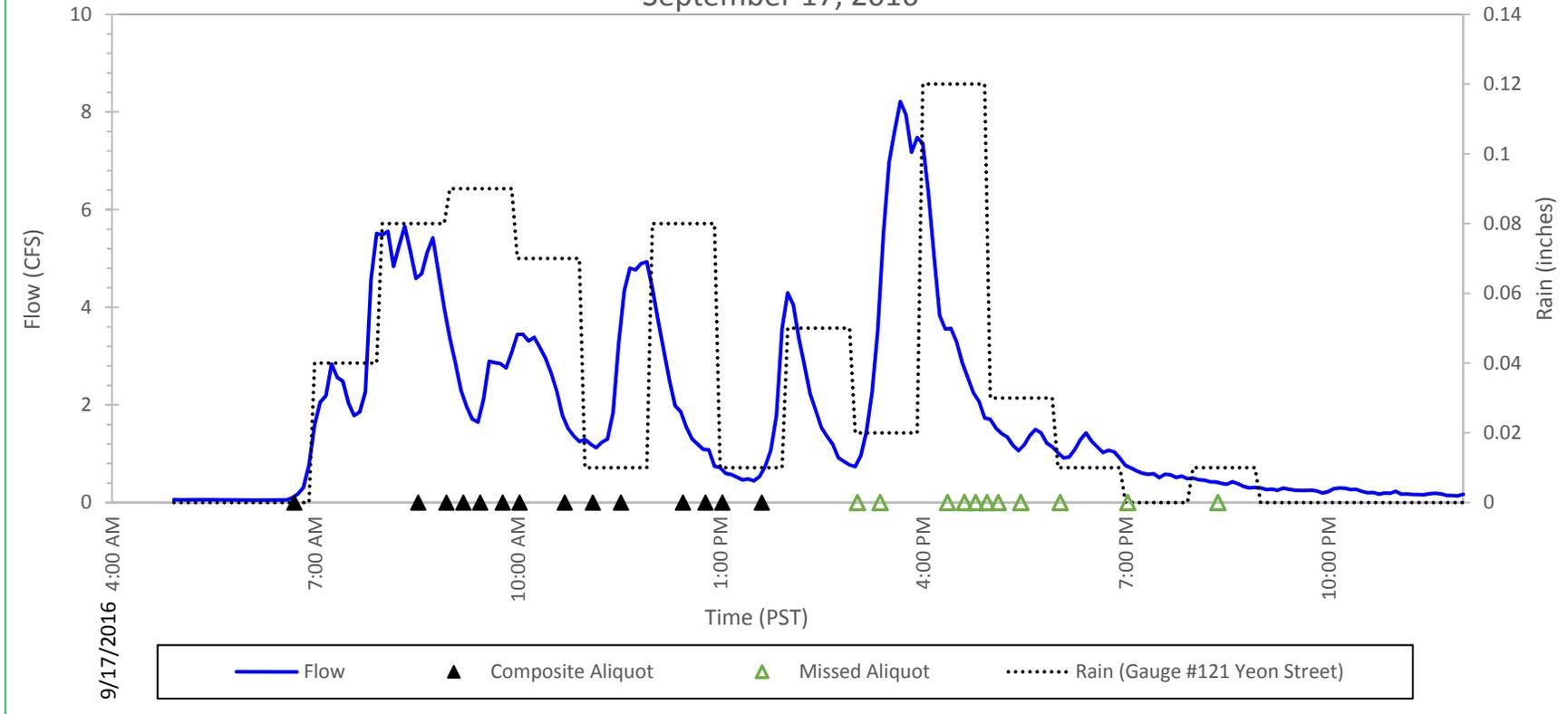
Sample Date	Duration (hours) <sup>(1)</sup>	Antecedent Dry Period (hours) <sup>(2)</sup>	Minimum Forecasted Rainfall Total (inches) <sup>(3)</sup>
3/9/2016 - 3/10/2016	31	14	0.37

(1) Duration of flow generated from storm-event runoff.

(2) Cumulative rainfall during this time less than 0.10 inches.

(3) Minimum forecasted rainfall data for the provided Extended Range Forecasting, Inc.

### Basin 19 (SW\_2) Flow-Weighted Composite Sampling Hydrograph September 17, 2016



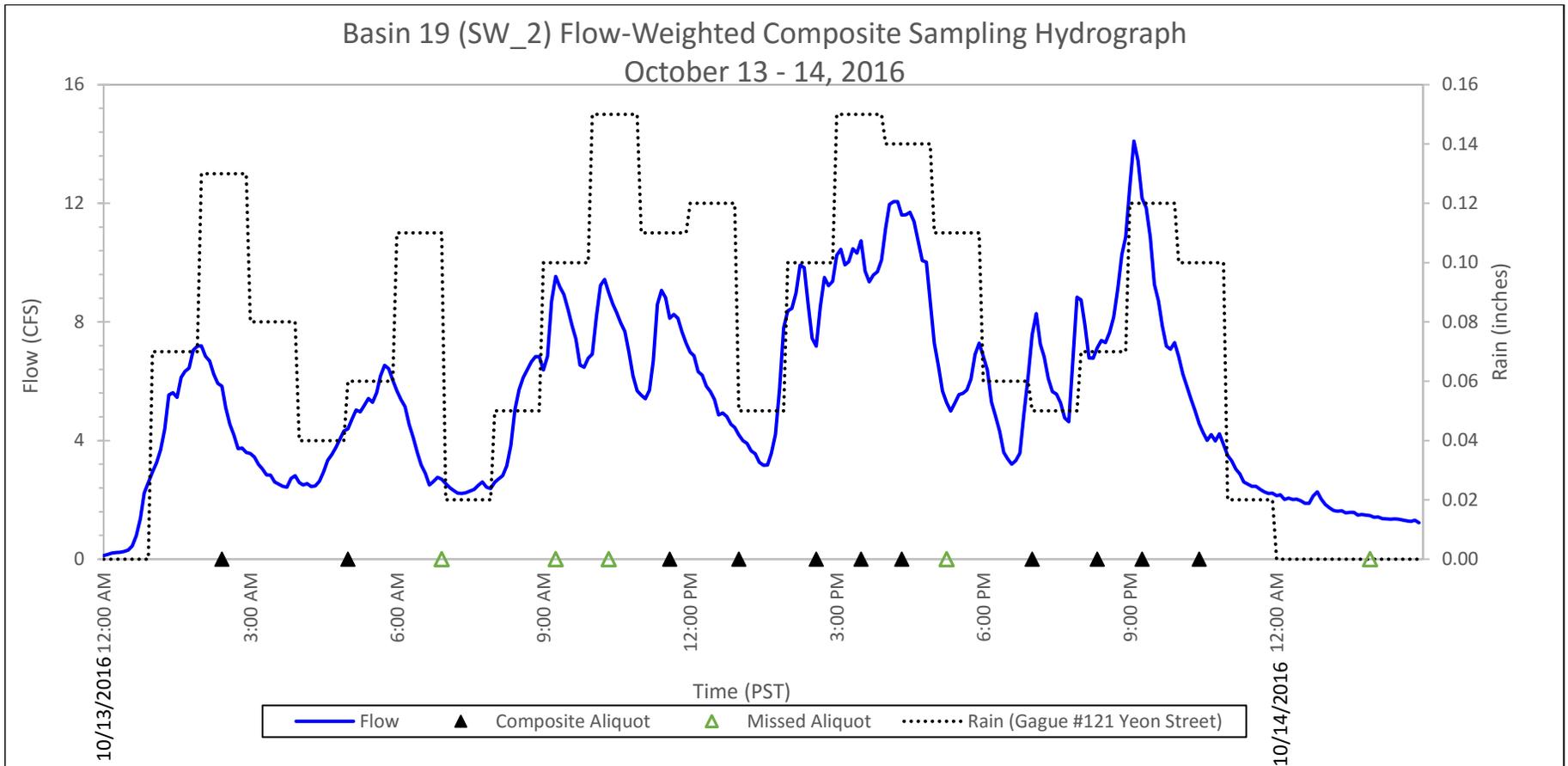
#### Summary of Storm Event Statistics, Outfall 19 Flow-Weighted Composite Sample Event 2

Sample Date	Duration (hours) <sup>(1)</sup>	Antecedent Dry Period (hours) <sup>(2)</sup>	Minimum Forecasted Rainfall Total (inches) <sup>(3)</sup>
9/17/2016	14	>24	0.14

(1) Duration of flow generated from storm-event runoff.

(2) Cumulative rainfall during this time less than 0.10 inches.

(3) Minimum forecasted rainfall data for the provided Extended Range Forecasting, Inc.



Summary of Storm Event Statistics, Outfall 19 Flow-Weighted Composite Sample Event 3

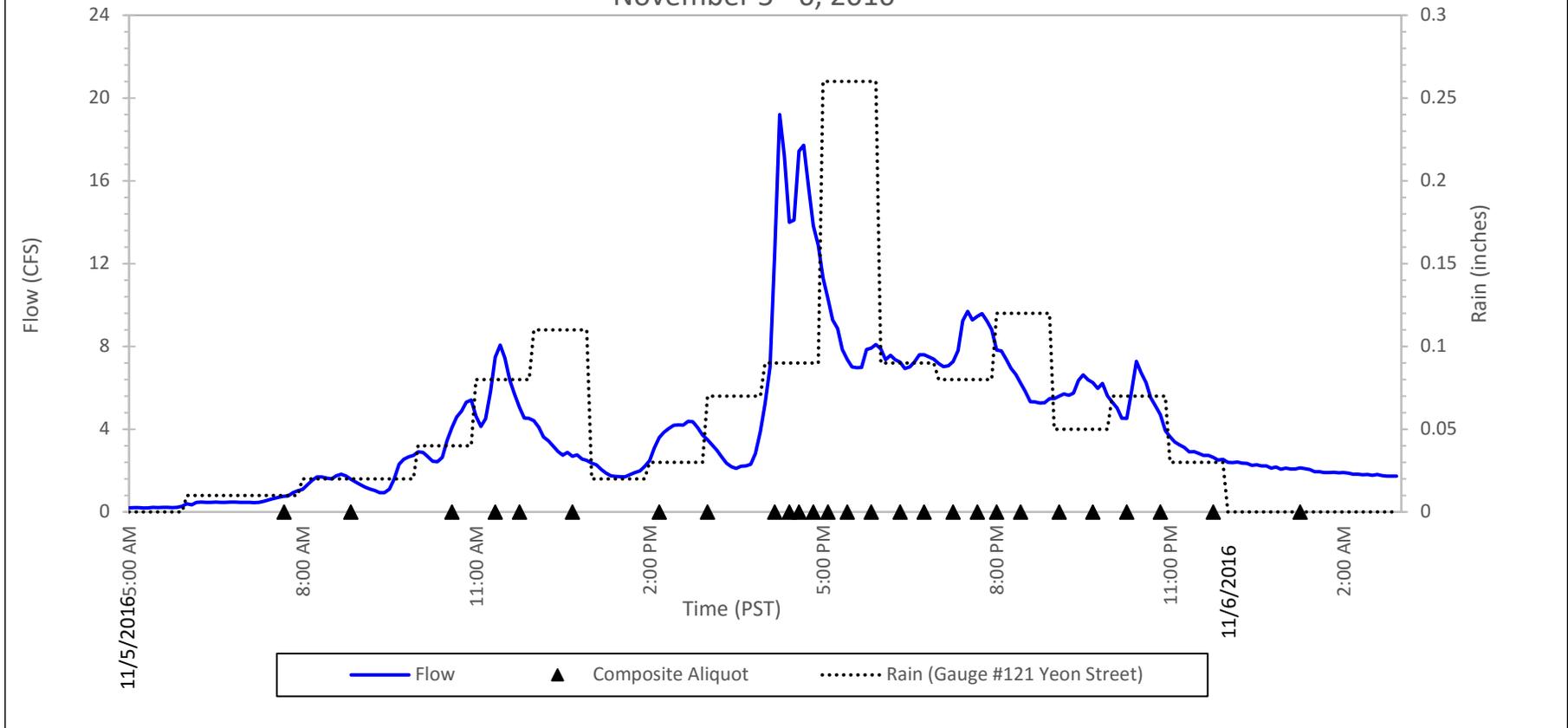
Sample Date	Duration (hours) <sup>(1)</sup>	Antecedent Dry Period (hours) <sup>(2)</sup>	Minimum Forecasted Rainfall Total (inches) <sup>(3)</sup>
10/13/2016 -10/14/2016	25	>24	0.88

(1) Duration of flow generated from storm-event runoff.

(2) Cumulative rainfall during this time less than 0.10 inches.

(3) Minimum forecasted rainfall data for the provided Extended Range Forecasting, Inc.

### Basin 19 (SW\_2) Flow-Weighted Composite Sampling Hydrograph November 5 - 6, 2016



#### Summary of Storm Event Statistics, Outfall 19 Flow-Weighted Composite Sample Event 4

Sample Date	Duration (hours) <sup>(1)</sup>	Antecedent Dry Period (hours) <sup>(2)</sup>	Minimum Forecasted Rainfall Total (inches) <sup>(3)</sup>
11/5/2016 - 11/6/2016	19	>24	0.57

(1) Duration of flow generated from storm-event runoff.

(2) Cumulative rainfall during this time less than 0.10 inches.

(3) Minimum forecasted rainfall data for the provided Extended Range Forecasting, Inc.

**Attachment A5**

**Laboratory Reports and Data Review Memoranda**

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**Attachment A5  
Laboratory Reports and Data Review  
Memoranda**

**(Provided on CD Only)**



55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

## Laboratory Data QA/QC Review Outfall Basin 17

**To:** File  
**From:** Andrew Davidson, GSI  
**Date:** November 10, 2015

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during a source control investigation sampling event conducted by the City of Portland (City). One stormwater sample (W15I174-01) and one duplicate sample (W15I174-02) were collected in Outfall Basin 17 on September 25, 2015 and submitted for analyses.

The laboratory analyses for these source control program samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Total Field Conductivity – FO SOP 1.03a (W15I174-01 only)
  - Field PH – FO SOP 1.01a (W15I174-01 only)
  - Field temperature – FO SOP 1.05a (W15I174-01 only)
  - Total Suspended Solids -- SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCLSOP M-10
  - Semivolatile Organic Compounds (SVOCs) – EPA 8270
  - Polynuclear Aromatic Hydrocarbons (PAHs) and phthalates – EPA 8270 - SIM
  - Polychlorinated Biphenyl (PCB) Aroclors – EPA 8082
- ALS Environmental (under subcontract to WPCL)
  - Organochlorine Pesticides – EPA 8081B
- Pace Analytical (under subcontract to Test America)
  - PCB Congeners – EPA 1668A

The WPCL summary reports and the subcontracted laboratories' data reports for all analyses associated with this sampling event are attached for review.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and available:

- Chain-of-custody for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method blanks and/or field decontamination blanks
- Internal standard recoveries within laboratory control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike/matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control/duplicate laboratory control (LC/DLC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the subcontracted laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures appear to have been adequate indicating that sample integrity was maintained throughout the sample collection and delivery process.

## **Analysis Holding Times**

The samples were extracted and analyzed within the acceptable method-specific holding times for all analyses.

## **Method Blanks**

Method blanks were processed during the following analyses: total suspended solids, total metals, total mercury, SVOCs, PAHs and phthalates, PCB Aroclors, organochlorine pesticides, and PCB congeners. No analytes were detected in any of the blank samples processed.

## **Field Decontamination Blanks**

Field decontamination blanks were not collected during this sampling event.

## **Internal Standard Recoveries**

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. Labeled internal standard recoveries were within method-specified

target ranges for the two samples, the method blank, and the LC/DLC samples. Pace reports that the data were automatically corrected for variation in recovery and accurate values were obtained.

## Surrogate Recoveries

Surrogate recoveries were processed during the laboratory analyses of SVOCs, PAHs and phthalates, PCB Aroclors, and organochlorine pesticides. Surrogate recoveries were within control limits with two exceptions:

- Recovery of the surrogate compound 2-methylnaphthalene-d10 was slightly below acceptance criteria in the laboratory blank and LCS sample analyzed during the analysis of PAHs and phthalates. WPCL reports that the sample results may be low estimates. However, because surrogate recoveries associated with the two stormwater samples were within method control limits during the analysis of PAHs and phthalates, no adjustments were made to the stormwater data based on these results.

## Matrix Spike/Matrix Spike Duplicate

MS samples were processed during the laboratory analysis of total metals, mercury, SVOCs, PAHs and phthalates, and Aroclors. MSD samples were processed during the analysis of PAHs and phthalates. MS/MSD recoveries and RPDs were within acceptance limits for all spiked analytes with the following exceptions:

- Recovery of the compounds 4-chloroaniline, 3-nitroaniline, and 4-nitroaniline were below acceptance criteria in the MS sample processed during the SVOC analysis. WPCL reports that the associated sample results may be low estimates. Sample results for these three compounds in both stormwater samples were non-detects. These values are flagged “UJ” to indicate that while the analyte was not detected above the reported sample quantitation limit, the reported quantitation limit is approximate and may be inaccurate or imprecise.
- Recovery of the compounds benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene were slightly below acceptance criteria in the MSD sample processed during the analysis of PAHs and phthalates. Associated sample results are flagged “J” to indicate that the sample results may be low estimates.
- Recovery of Aroclor 1016/1242 in the MS sample processed during the analysis of PCB Aroclors was affected by non-Aroclor peaks and well above acceptance criteria. However, WPCL reports that the analyte was not detected in the samples and sample results are not affected.

In the analysis of organochlorine pesticides by ALS Environmental, insufficient volume was received to perform a MS/MSD for the stormwater sample. ALS reports that LCS/DLCS was analyzed and reported in lieu of the MS/MSD for these samples.

## Laboratory Control Samples/Duplicate Laboratory Control Samples

LC samples were processed during the analyses of TSS, total metals, mercury, SVOCs, PAHs and phthalates, PCB Aroclors, organochlorine pesticides, and PCB congeners. DLC samples were processed during the analyses of pesticides and PCB congeners. LC/DLC recoveries and RPDs were within laboratory control limits with the following exceptions:

- Recovery of the compound 1,4-dichlorobenzene was below laboratory control criteria in the LC sample processed during the analysis of SVOCs. WPCL reports that associated sample results may be low estimates. 1,4-dichlorobenzene was not detected in either sample. However, the associated non-detects are flagged “UJ” to indicate that while the analyte was not detected above the reported sample quantitation limit, the reported quantitation limit is approximate and may be inaccurate or imprecise.
- Recoveries of 1-methylnaphthalene and 2-methylnaphthalene were below laboratory control criteria in the LC sample processed during the analysis of PAHs and phthalates. WPCL reports that associated sample results may be low estimates. Neither 1-methylnaphthalene nor 2-methylnaphthalene were detected in either stormwater sample. The associated non-detect values are flagged “UJ” to indicate that while the analyte was not detected above the reported sample quantitation limit, the reported quantitation limit is approximate and may be inaccurate or imprecise.
- ALS reports that the LC sample processed during the analysis of pesticides was contaminated due to the extraction of a sample with high concentrations of pesticides prior to the LC sample. Recoveries and RPDs associated with this sample exceed lab control criteria, but the contamination appears to have only affected the LC sample. The analytes in question were not detected in the associated field samples, and recoveries in the DLC sample met control criteria. Accordingly, the sample data is not affected and no further corrective action is appropriate.

## Duplicate Samples

In addition to the field duplicate sample, W15I174-02, lab duplicate samples were processed during the analyses of TSS, total metals, mercury, and SVOCs. All RPDs were within acceptance criteria.

## Additional Information

- In the evaluation of SVOCs, the continuing calibration verification (CCV) recoveries were high for several analytes in the LC and MS samples, potentially producing a high bias for associated results in the LC and MS samples. However, CCV results during sample runs were not affected and no further adjustments were made to the field sample results.
- In the evaluation of pesticides, the initial calibration verification (ICV) criterion was not met on the confirmation column for Endrin Aldehyde. ALS reports that the results were reported from the column with an acceptable ICV, and the data quality was not affected. The CCV criteria were not met on the confirmation column for 4,4'-DDT and

Methoxychlor. ALS reports that the results were reported from the column with an acceptable CCV, and no further corrective action is necessary. The upper control criterion was exceeded for beta-BHC in the CCV, but the analyte was not detected in either field sample. No further corrective action was taken.

- The reporting limit is elevated for all target pesticide analytes in both field samples; ALS reports that matrix interference from non-target background components prevented adequate resolution of the target compounds at the reporting limit. No pesticides were detected in either field sample. Sample results for which ALS indicates additional elevation of the reporting limit (flagged Ui in the subcontracted report) are flagged “UJ” to indicate that the reported quantitation limit is approximate and may be inaccurate or imprecise.



City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



October 23, 2015

Linda Scheffler  
Director's Office

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Work Order  
**W151174**

Project  
**Portland Harbor**

Received  
09/25/15 12:01

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

*Jennifer Shackelford*

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W151174</b>	Project Mgr: Linda Scheffler
Received: 9/25/15 12:01	
Submitted By: Field Operations	

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
17_16SW	W151174-01	Stormwater	Grab	09/25/15 10:14	09/25/15 10:14	
Field Duplicate	W151174-02	Stormwater	Grab	09/25/15 10:14	09/25/15 10:14	

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field conductivity

17_16SW : W151174-01										
Conductivity*	123	umhos/cm			1	B15I450	09/25/15	09/25/15	FO SOP 1.03a	

Field pH

17_16SW : W151174-01										
pH*	7.8	pH Units			1	B15I450	09/25/15 10:14	09/25/15	FO SOP 1.01a	

Field temperature

17_16SW : W151174-01										
Temperature*	18.0	°C			1	B15I450	09/25/15 10:14	09/25/15	FO SOP 1.05a	

**General Chemistry**

Total Suspended Solids

17_16SW : W151174-01										
Total suspended solids	63	mg/L	2	2		B15I388	09/26/15	09/26/15	SM 2540D	

Field Duplicate : W151174-02

Total suspended solids	61	mg/L	2	2		B15I388	09/26/15	09/26/15	SM 2540D	
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Reported: 10/23/15 14:48

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Total Metals**

Total Metals by ICPMS

17\_16SW : W151174-01

Arsenic	1.67 ug/L	0.100	0.100	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Cadmium	0.132 ug/L	0.100	0.100	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Chromium	3.86 ug/L	0.200	0.200	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Copper	20.3 ug/L	0.200	0.200	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Lead	6.58 ug/L	0.100	0.100	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Mercury	0.0274 ug/L	0.00100	0.00100	3	B15I418	09/28/15	10/01/15	WPCLSOP M-10	
Nickel	2.92 ug/L	0.200	0.200	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Zinc	95.2 ug/L	0.500	0.500	1	B15I405	09/28/15	10/02/15	EPA 200.8	

Field Duplicate : W151174-02

Arsenic	1.65 ug/L	0.100	0.100	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Cadmium	0.130 ug/L	0.100	0.100	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Chromium	3.84 ug/L	0.200	0.200	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Copper	20.2 ug/L	0.200	0.200	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Lead	6.46 ug/L	0.100	0.100	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Mercury	0.0261 ug/L	0.00100	0.00100	3	B15I418	09/28/15	10/01/15	WPCLSOP M-10	
Nickel	2.89 ug/L	0.200	0.200	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B15I405	09/28/15	10/02/15	EPA 200.8	
Zinc	95.3 ug/L	0.500	0.500	1	B15I405	09/28/15	10/02/15	EPA 200.8	

Reported: 10/23/15 14:48

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics**

Semivolatile Organic Compounds by GCMS

17\_16SW : W151174-01

Acenaphthene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Acenaphthylene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Anthracene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Benzo(a)anthracene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Benzo(a)pyrene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Benzo(b)fluoranthene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Benzo(g,h,i)perylene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Benzo(k)fluoranthene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
4-Bromophenylphenyl ether	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Butyl benzyl phthalate	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
4-Chloro-3-methylphenol	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
4-Chloroaniline	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	M4
Bis(2-chloroethoxy) methane	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Bis(2-chloroethyl) ether	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Bis(2-chloroisopropyl) ether	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2-Chloronaphthalene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2-Chlorophenol	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
4-Chlorophenylphenyl ether	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Chrysene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Di-n-butyl phthalate	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Di-n-octyl phthalate	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Dibenzo(a,h)anthracene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Dibenzofuran	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
1,2-Dichlorobenzene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
1,3-Dichlorobenzene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
1,4-Dichlorobenzene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	L1
3,3'-Dichlorobenzidine	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2,4-Dichlorophenol	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Diethyl phthalate	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2,4-Dimethylphenol	ND	ug/L	2.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Dimethyl phthalate	1.9	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
4,6-Dinitro-2-methylphenol	ND	ug/L	2.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2,4-Dinitrophenol	ND	ug/L	5.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2,4-Dinitrotoluene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2,6-Dinitrotoluene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Bis(2-ethylhexyl) phthalate	2.3	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Fluoranthene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Fluorene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Hexachlorobenzene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Hexachlorobutadiene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Hexachlorocyclopentadiene	ND	ug/L	2.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Hexachloroethane	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	

Reported: 10/23/15 14:48

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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Water Pollution Control Laboratory**

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**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics**

Semivolatile Organic Compounds by GCMS

17\_16SW : W151174-01

Indeno(1,2,3-cd)pyrene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Isophorone	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2-Methylnaphthalene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2-Methylphenol	ND	ug/L	2.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
3- & 4-Methylphenol	ND	ug/L	2.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Naphthalene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2-Nitroaniline	ND	ug/L	2.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
3-Nitroaniline	ND	ug/L	2.0		1	B15I437	09/30/15	10/06/15	EPA 8270	M4
4-Nitroaniline	ND	ug/L	2.0		1	B15I437	09/30/15	10/06/15	EPA 8270	M4
Nitrobenzene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2-Nitrophenol	ND	ug/L	2.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
4-Nitrophenol	ND	ug/L	5.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
N-Nitrosodimethylamine*	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
N-Nitrosodi-n-propylamine	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
N-Nitrosodiphenylamine	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Pentachlorophenol	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Phenanthrene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Phenol	1.3	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Pyrene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2,3,4,6-Tetrachlorophenol	ND	ug/L	2.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
1,2,4-Trichlorobenzene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2,4,5-Trichlorophenol	ND	ug/L	2.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
2,4,6-Trichlorophenol	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Fluorophenol	5.5	ug/L	6.06	90%	23-129	B15I437	09/30/15	10/06/15	EPA 8270	
Phenol-d6	4.9	ug/L	6.06	80%	9.7-130	B15I437	09/30/15	10/06/15	EPA 8270	
Nitrobenzene-d5	5.9	ug/L	6.06	97%	46-141	B15I437	09/30/15	10/06/15	EPA 8270	
2-Fluorobiphenyl	5.1	ug/L	6.06	85%	49-122	B15I437	09/30/15	10/06/15	EPA 8270	
2,4,6-Tribromophenol	5.8	ug/L	6.06	96%	30-159	B15I437	09/30/15	10/06/15	EPA 8270	
p-Terphenyl-d14	5.8	ug/L	6.06	95%	24-143	B15I437	09/30/15	10/06/15	EPA 8270	

Field Duplicate : W151174-02

Acenaphthene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Acenaphthylene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Anthracene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Benzo(a)anthracene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Benzo(a)pyrene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Benzo(b)fluoranthene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Benzo(g,h,i)perylene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Benzo(k)fluoranthene	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
4-Bromophenylphenyl ether	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
Butyl benzyl phthalate	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
4-Chloro-3-methylphenol	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	
4-Chloroaniline	ND	ug/L	1.0		1	B15I437	09/30/15	10/06/15	EPA 8270	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics**

Semivolatile Organic Compounds by GCMS

Field Duplicate : W151174-02

Bis(2-chloroethoxy) methane	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Bis(2-chloroethyl) ether	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Bis(2-chloroisopropyl) ether	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2-Chloronaphthalene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2-Chlorophenol	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
4-Chlorophenylphenyl ether	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Chrysene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Di-n-butyl phthalate	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Di-n-octyl phthalate	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Dibenzo(a,h)anthracene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Dibenzofuran	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
1,2-Dichlorobenzene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
1,3-Dichlorobenzene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
1,4-Dichlorobenzene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
3,3'-Dichlorobenzidine	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2,4-Dichlorophenol	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Diethyl phthalate	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2,4-Dimethylphenol	ND	ug/L	2.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Dimethyl phthalate	1.9	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
4,6-Dinitro-2-methylphenol	ND	ug/L	2.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2,4-Dinitrophenol	ND	ug/L	5.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2,4-Dinitrotoluene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2,6-Dinitrotoluene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Bis(2-ethylhexyl) phthalate	2.3	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Fluoranthene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Fluorene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Hexachlorobenzene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Hexachlorobutadiene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Hexachlorocyclopentadiene	ND	ug/L	2.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Hexachloroethane	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Indeno(1,2,3-cd)pyrene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Isophorone	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2-Methylnaphthalene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2-Methylphenol	ND	ug/L	2.0		1	B151437	09/30/15	10/06/15	EPA 8270	
3- & 4-Methylphenol	ND	ug/L	2.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Naphthalene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2-Nitroaniline	ND	ug/L	2.0		1	B151437	09/30/15	10/06/15	EPA 8270	
3-Nitroaniline	ND	ug/L	2.0		1	B151437	09/30/15	10/06/15	EPA 8270	
4-Nitroaniline	ND	ug/L	2.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Nitrobenzene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2-Nitrophenol	ND	ug/L	2.0		1	B151437	09/30/15	10/06/15	EPA 8270	
4-Nitrophenol	ND	ug/L	5.0		1	B151437	09/30/15	10/06/15	EPA 8270	

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Reported: 10/23/15 14:48

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics**

Semivolatile Organic Compounds by GCMS

Field Duplicate : W151174-02

N-Nitrosodimethylamine*	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
N-Nitrosodi-n-propylamine	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
N-Nitrosodiphenylamine	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Pentachlorophenol	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Phenanthrene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Phenol	1.1	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
Pyrene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2,3,4,6-Tetrachlorophenol	ND	ug/L	2.0		1	B151437	09/30/15	10/06/15	EPA 8270	
1,2,4-Trichlorobenzene	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2,4,5-Trichlorophenol	ND	ug/L	2.0		1	B151437	09/30/15	10/06/15	EPA 8270	
2,4,6-Trichlorophenol	ND	ug/L	1.0		1	B151437	09/30/15	10/06/15	EPA 8270	

**Surrogate**

	Result	Expected	%Rec	Limits(%)						
2-Fluorophenol	5.6 ug/L	6.06	93%	23-129	B151437	09/30/15	10/06/15	EPA 8270		
Phenol-d6	4.9 ug/L	6.06	81%	9.7-130	B151437	09/30/15	10/06/15	EPA 8270		
Nitrobenzene-d5	6.1 ug/L	6.06	100%	46-141	B151437	09/30/15	10/06/15	EPA 8270		
2-Fluorobiphenyl	5.4 ug/L	6.06	88%	49-122	B151437	09/30/15	10/06/15	EPA 8270		
2,4,6-Tribromophenol	7.0 ug/L	6.06	116%	30-159	B151437	09/30/15	10/06/15	EPA 8270		
p-Terphenyl-d14	6.6 ug/L	6.06	108%	24-143	B151437	09/30/15	10/06/15	EPA 8270		

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

17\_16SW : W151174-01

Acenaphthene	0.035	ug/L	0.020	0.020	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Acenaphthylene	0.023	ug/L	0.020	0.020	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Anthracene	0.028	ug/L	0.020	0.020	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Benzo(a)anthracene	0.019	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Benzo(a)pyrene	0.024	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	0.045	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.063	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	M4
Benzo(k)fluoranthene	0.013	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Chrysene	0.043	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Fluoranthene	0.12	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Fluorene	0.026	ug/L	0.020	0.020	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.023	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	M4
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	L1
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	L1
Naphthalene	ND	ug/L	0.080	0.080	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Phenanthrene	0.11	ug/L	0.020	0.020	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Pyrene	0.16	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Dimethyl phthalate	1.9	ug/L	1.0	0.50	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.8	ug/L	1.0	0.50	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.17	ug/L	0.229	72%	60.4-153	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Fluoranthene-d10	0.24	ug/L	0.229	105%	69-149	B15I436	09/30/15	10/01/15	EPA 8270-SIM	

Field Duplicate : W151174-02

Acenaphthene	0.035	ug/L	0.020	0.020	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Acenaphthylene	0.022	ug/L	0.020	0.020	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Anthracene	0.029	ug/L	0.020	0.020	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Benzo(a)anthracene	0.021	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Benzo(a)pyrene	0.026	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	0.049	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.066	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	0.012	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Chrysene	0.043	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Fluoranthene	0.12	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Fluorene	0.027	ug/L	0.020	0.020	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.023	ug/L	0.010	0.010	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15I436	09/30/15	10/01/15	EPA 8270-SIM	L1

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

Field Duplicate : W151174-02

2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B151436	09/30/15	10/01/15	EPA 8270-SIM	L1
Naphthalene	0.046	ug/L	0.040	0.040	1	B151436	09/30/15	10/01/15	EPA 8270-SIM	
Phenanthrene	0.11	ug/L	0.020	0.020	1	B151436	09/30/15	10/01/15	EPA 8270-SIM	
Pyrene	0.16	ug/L	0.010	0.010	1	B151436	09/30/15	10/01/15	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B151436	09/30/15	10/01/15	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B151436	09/30/15	10/01/15	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B151436	09/30/15	10/01/15	EPA 8270-SIM	
Dimethyl phthalate	2.0	ug/L	1.0	0.50	1	B151436	09/30/15	10/01/15	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B151436	09/30/15	10/01/15	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.7	ug/L	1.0	0.50	1	B151436	09/30/15	10/01/15	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.14	ug/L	0.229	63%	60.4-153	B151436	09/30/15	10/01/15	EPA 8270-SIM	
Fluoranthene-d10	0.22	ug/L	0.229	96%	69-149	B151436	09/30/15	10/01/15	EPA 8270-SIM	

**Polychlorinated Biphenyls (PCBs)**

PCB Aroclors by GC-ECD

17\_16SW : W151174-01

Aroclor 1016/1242	ND	ug/L	0.0245	0.0245	1	B151424	09/29/15	09/30/15	EPA 8082	
Aroclor 1221	ND	ug/L	0.0490	0.0490	1	B151424	09/29/15	09/30/15	EPA 8082	
Aroclor 1232	ND	ug/L	0.0245	0.0245	1	B151424	09/29/15	09/30/15	EPA 8082	
Aroclor 1248	ND	ug/L	0.0245	0.0245	1	B151424	09/29/15	09/30/15	EPA 8082	
Aroclor 1254	ND	ug/L	0.0245	0.0245	1	B151424	09/29/15	09/30/15	EPA 8082	
Aroclor 1260	ND	ug/L	0.0245	0.0245	1	B151424	09/29/15	09/30/15	EPA 8082	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
Tetrachloro-m-xylene	0.0221	ug/L	0.0490	45%	32.8-105	B151424	09/29/15	09/30/15	EPA 8082	
Decachlorobiphenyl	0.0451	ug/L	0.0490	92%	29-133	B151424	09/29/15	09/30/15	EPA 8082	

Field Duplicate : W151174-02

Aroclor 1016/1242	ND	ug/L	0.0250	0.0250	1	B151424	09/29/15	09/30/15	EPA 8082	
Aroclor 1221	ND	ug/L	0.0500	0.0500	1	B151424	09/29/15	09/30/15	EPA 8082	
Aroclor 1232	ND	ug/L	0.0250	0.0250	1	B151424	09/29/15	09/30/15	EPA 8082	
Aroclor 1248	ND	ug/L	0.0250	0.0250	1	B151424	09/29/15	09/30/15	EPA 8082	
Aroclor 1254	ND	ug/L	0.0250	0.0250	1	B151424	09/29/15	09/30/15	EPA 8082	
Aroclor 1260	ND	ug/L	0.0250	0.0250	1	B151424	09/29/15	09/30/15	EPA 8082	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
Tetrachloro-m-xylene	0.0204	ug/L	0.0500	41%	32.8-105	B151424	09/29/15	09/30/15	EPA 8082	
Decachlorobiphenyl	0.0419	ug/L	0.0500	84%	29-133	B151424	09/29/15	09/30/15	EPA 8082	

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**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B15I388</b>										
<b>Blank (B15I388-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					09/26/15 :09/26/15	
<b>LCS (B15I388-BS1)</b>										
Total suspended solids	100	mg/L			100		100% (90-110)		09/26/15 :09/26/15	
<b>Duplicate (B15I388-DUP1) Source: W151174-01</b>										
Total suspended solids	62	mg/L	2	2		63		2 (20)	09/26/15 :09/26/15	
<b>Duplicate (B15I388-DUP2) Source: W151176-17</b>										
Total suspended solids	320	mg/L	2	2		340		6 (20)	09/26/15 :09/26/15	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B15I405</b>										
<b>Blank (B15I405-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					09/28/15 :10/02/15	
Cadmium	ND	ug/L	0.100	0.100					09/28/15 :10/02/15	
Chromium	ND	ug/L	0.200	0.200					09/28/15 :10/02/15	
Copper	ND	ug/L	0.200	0.200					09/28/15 :10/02/15	
Lead	ND	ug/L	0.100	0.100					09/28/15 :10/02/15	
Nickel	ND	ug/L	0.200	0.200					09/28/15 :10/02/15	
Silver	ND	ug/L	0.100	0.100					09/28/15 :10/02/15	
Zinc	ND	ug/L	0.500	0.500					09/28/15 :10/02/15	
<b>LCS (B15I405-BS1)</b>										
Arsenic	9.72	ug/L	0.100	0.100	10.0		97% (85-115)		09/28/15 :10/02/15	
Cadmium	10.1	ug/L	0.100	0.100	10.0		101% (85-115)		09/28/15 :10/02/15	
Chromium	9.89	ug/L	0.200	0.200	10.0		99% (85-115)		09/28/15 :10/02/15	
Copper	10.1	ug/L	0.200	0.200	10.0		101% (85-115)		09/28/15 :10/02/15	
Lead	9.98	ug/L	0.100	0.100	10.0		100% (85-115)		09/28/15 :10/02/15	
Nickel	9.95	ug/L	0.200	0.200	10.0		100% (85-115)		09/28/15 :10/02/15	
Silver	10.6	ug/L	0.100	0.100	10.0		106% (85-115)		09/28/15 :10/02/15	
Zinc	51.8	ug/L	0.500	0.500	50.0		104% (85-115)		09/28/15 :10/02/15	
<b>Duplicate (B15I405-DUP1) Source: W15I161-01</b>										
Arsenic	0.564	ug/L	0.100	0.100		0.566		0.4 (20)	09/28/15 :10/02/15	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	09/28/15 :10/02/15	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B151405**

<b>Duplicate (B151405-DUP1)</b>		<b>Source: W151161-01</b>								
Chromium	0.314 ug/L	0.200	0.200		0.311	0.8 (20)		09/28/15 :10/02/15		
Copper	1.66 ug/L	0.200	0.200		1.68	1 (20)		09/28/15 :10/02/15		
Lead	0.348 ug/L	0.100	0.100		0.353	1 (20)		09/28/15 :10/02/15		
Nickel	0.587 ug/L	0.200	0.200		0.585	0.4 (20)		09/28/15 :10/02/15		
Silver	ND ug/L	0.100	0.100		ND	(20)		09/28/15 :10/02/15		
Zinc	2.79 ug/L	0.500	0.500		2.78	0.1 (20)		09/28/15 :10/02/15		

<b>Duplicate (B151405-DUP3)</b>		<b>Source: W151165-01</b>								
Arsenic	1.14 ug/L	0.100	0.100		1.15	0.7 (20)		09/28/15 :10/02/15		
Cadmium	ND ug/L	0.100	0.100		ND	(20)		09/28/15 :10/02/15		
Chromium	0.207 ug/L	0.200	0.200		0.216	4 (20)		09/28/15 :10/02/15		
Copper	6.97 ug/L	0.200	0.200		7.06	1 (20)		09/28/15 :10/02/15		
Lead	1.39 ug/L	0.100	0.100		1.41	1 (20)		09/28/15 :10/02/15		
Nickel	5.35 ug/L	0.200	0.200		5.42	1 (20)		09/28/15 :10/02/15		
Silver	0.134 ug/L	0.100	0.100		0.145	8 (20)		09/28/15 :10/02/15		
Zinc	17.3 ug/L	0.500	0.500		17.5	0.9 (20)		09/28/15 :10/02/15		

<b>Matrix Spike (B151405-MS1)</b>		<b>Source: W151161-01</b>								
Arsenic	20.2 ug/L	0.300	0.300	20.0	0.566	98% (70-130)		09/28/15 :10/02/15		
Cadmium	20.3 ug/L	0.300	0.300	20.0	ND	101% (70-130)		09/28/15 :10/02/15		
Chromium	20.1 ug/L	0.600	0.600	20.0	0.311	99% (70-130)		09/28/15 :10/02/15		
Copper	21.7 ug/L	0.600	0.600	20.0	1.68	100% (70-130)		09/28/15 :10/02/15		
Lead	20.7 ug/L	0.300	0.300	20.0	0.353	102% (70-130)		09/28/15 :10/02/15		
Nickel	20.5 ug/L	0.600	0.600	20.0	0.585	100% (70-130)		09/28/15 :10/02/15		
Silver	20.7 ug/L	0.300	0.300	20.0	ND	104% (70-130)		09/28/15 :10/02/15		
Zinc	107 ug/L	1.50	1.50	100	2.78	104% (70-130)		09/28/15 :10/02/15		

<b>Matrix Spike (B151405-MS2)</b>		<b>Source: W151165-01</b>								
Arsenic	21.8 ug/L	0.300	0.300	20.0	1.15	103% (70-130)		09/28/15 :10/02/15		
Cadmium	19.6 ug/L	0.300	0.300	20.0	ND	98% (70-130)		09/28/15 :10/02/15		
Chromium	19.3 ug/L	0.600	0.600	20.0	0.216	95% (70-130)		09/28/15 :10/02/15		
Copper	27.3 ug/L	0.600	0.600	20.0	7.06	101% (70-130)		09/28/15 :10/02/15		
Lead	22.5 ug/L	0.300	0.300	20.0	1.41	105% (70-130)		09/28/15 :10/02/15		
Nickel	25.5 ug/L	0.600	0.600	20.0	5.42	101% (70-130)		09/28/15 :10/02/15		
Silver	20.5 ug/L	0.300	0.300	20.0	0.145	102% (70-130)		09/28/15 :10/02/15		
Zinc	121 ug/L	1.50	1.50	100	17.5	103% (70-130)		09/28/15 :10/02/15		

**Total Metals by ICPMS - Batch B151418**

<b>Blank (B151418-BLK1)</b>										
Mercury	ND ug/L	0.000900	0.000900						09/28/15 :10/01/15	

**LCS (B151418-BS1)**

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Jennifer Shackelford, Laboratory Coordinator QA/QC

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Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W151174</b>	Received: 09/25/15 12:01

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Total Metals by ICPMS - Batch B151418										
<b>LCS (B151418-BS1)</b>										
Mercury	0.00950	ug/L	0.000900	0.000900	0.0100		95% (85-125)		09/28/15 :10/01/15	
<b>Duplicate (B151418-DUP1) Source: W151169-01</b>										
Mercury	0.00141	ug/L	0.00100	0.00100		0.00128		10 (20)	09/28/15 :10/01/15	
<b>Matrix Spike (B151418-MS1) Source: W151169-01</b>										
Mercury	0.0142	ug/L	0.00100	0.00100	0.0111	0.00128	116% (70-130)		09/28/15 :10/01/15	

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**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Semivolatile Organic Compounds by GCMS - Batch B151437										
<b>Blank (B151437-BLK1)</b>										
Acenaphthene	ND	ug/L	1.0						09/30/15 :10/06/15	
Acenaphthylene	ND	ug/L	1.0						09/30/15 :10/06/15	
Anthracene	ND	ug/L	1.0						09/30/15 :10/06/15	
Benzo(a)anthracene	ND	ug/L	1.0						09/30/15 :10/06/15	
Benzo(a)pyrene	ND	ug/L	1.0						09/30/15 :10/06/15	
Benzo(b)fluoranthene	ND	ug/L	1.0						09/30/15 :10/06/15	
Benzo(g,h,i)perylene	ND	ug/L	1.0						09/30/15 :10/06/15	
Benzo(k)fluoranthene	ND	ug/L	1.0						09/30/15 :10/06/15	
4-Bromophenylphenyl ether	ND	ug/L	1.0						09/30/15 :10/06/15	
Butyl benzyl phthalate	ND	ug/L	1.0						09/30/15 :10/06/15	
4-Chloro-3-methylphenol	ND	ug/L	1.0						09/30/15 :10/06/15	
4-Chloroaniline	ND	ug/L	1.0						09/30/15 :10/06/15	
Bis(2-chloroethoxy) methane	ND	ug/L	1.0						09/30/15 :10/06/15	
Bis(2-chloroethyl) ether	ND	ug/L	1.0						09/30/15 :10/06/15	
Bis(2-chloroisopropyl) ether	ND	ug/L	1.0						09/30/15 :10/06/15	
2-Chloronaphthalene	ND	ug/L	1.0						09/30/15 :10/06/15	
2-Chlorophenol	ND	ug/L	1.0						09/30/15 :10/06/15	
4-Chlorophenylphenyl ether	ND	ug/L	1.0						09/30/15 :10/06/15	
Chrysene	ND	ug/L	1.0						09/30/15 :10/06/15	
Di-n-butyl phthalate	ND	ug/L	1.0						09/30/15 :10/06/15	
Di-n-octyl phthalate	ND	ug/L	1.0						09/30/15 :10/06/15	
Dibenzo(a,h)anthracene	ND	ug/L	1.0						09/30/15 :10/06/15	
Dibenzofuran	ND	ug/L	1.0						09/30/15 :10/06/15	
1,2-Dichlorobenzene	ND	ug/L	1.0						09/30/15 :10/06/15	
1,3-Dichlorobenzene	ND	ug/L	1.0						09/30/15 :10/06/15	
1,4-Dichlorobenzene	ND	ug/L	1.0						09/30/15 :10/06/15	L1
3,3'-Dichlorobenzidine	ND	ug/L	1.0						09/30/15 :10/06/15	
2,4-Dichlorophenol	ND	ug/L	1.0						09/30/15 :10/06/15	
Diethyl phthalate	ND	ug/L	1.0						09/30/15 :10/06/15	
2,4-Dimethylphenol	ND	ug/L	2.0						09/30/15 :10/06/15	
Dimethyl phthalate	ND	ug/L	1.0						09/30/15 :10/06/15	
4,6-Dinitro-2-methylphenol	ND	ug/L	2.0						09/30/15 :10/06/15	
2,4-Dinitrophenol	ND	ug/L	5.0						09/30/15 :10/06/15	
2,4-Dinitrotoluene	ND	ug/L	1.0						09/30/15 :10/06/15	
2,6-Dinitrotoluene	ND	ug/L	1.0						09/30/15 :10/06/15	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0						09/30/15 :10/06/15	
Fluoranthene	ND	ug/L	1.0						09/30/15 :10/06/15	
Fluorene	ND	ug/L	1.0						09/30/15 :10/06/15	
Hexachlorobenzene	ND	ug/L	1.0						09/30/15 :10/06/15	
Hexachlorobutadiene	ND	ug/L	1.0						09/30/15 :10/06/15	
Hexachlorocyclopentadiene	ND	ug/L	2.0						09/30/15 :10/06/15	

Reported: 10/23/15 14:48

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B151437

**Blank (B151437-BLK1)**

Hexachloroethane	ND	ug/L	1.0						09/30/15 :10/06/15	
Indeno(1,2,3-cd)pyrene	ND	ug/L	1.0						09/30/15 :10/06/15	
Isophorone	ND	ug/L	1.0						09/30/15 :10/06/15	
2-Methylnaphthalene	ND	ug/L	1.0						09/30/15 :10/06/15	
2-Methylphenol	ND	ug/L	2.0						09/30/15 :10/06/15	
3- & 4-Methylphenol	ND	ug/L	2.0						09/30/15 :10/06/15	
Naphthalene	ND	ug/L	1.0						09/30/15 :10/06/15	
2-Nitroaniline	ND	ug/L	2.0						09/30/15 :10/06/15	
3-Nitroaniline	ND	ug/L	2.0						09/30/15 :10/06/15	
4-Nitroaniline	ND	ug/L	2.0						09/30/15 :10/06/15	
Nitrobenzene	ND	ug/L	1.0						09/30/15 :10/06/15	
2-Nitrophenol	ND	ug/L	2.0						09/30/15 :10/06/15	
4-Nitrophenol	ND	ug/L	5.0						09/30/15 :10/06/15	
N-Nitrosodimethylamine	ND	ug/L	1.0						09/30/15 :10/06/15	
N-Nitrosodi-n-propylamine	ND	ug/L	1.0						09/30/15 :10/06/15	
N-Nitrosodiphenylamine	ND	ug/L	1.0						09/30/15 :10/06/15	
Pentachlorophenol	ND	ug/L	1.0						09/30/15 :10/06/15	
Phenanthrene	ND	ug/L	1.0						09/30/15 :10/06/15	
Phenol	ND	ug/L	1.0						09/30/15 :10/06/15	
Pyrene	ND	ug/L	1.0						09/30/15 :10/06/15	
2,3,4,6-Tetrachlorophenol	ND	ug/L	2.0						09/30/15 :10/06/15	
1,2,4-Trichlorobenzene	ND	ug/L	1.0						09/30/15 :10/06/15	
2,4,5-Trichlorophenol	ND	ug/L	2.0						09/30/15 :10/06/15	
2,4,6-Trichlorophenol	ND	ug/L	1.0						09/30/15 :10/06/15	

**Surrogate**

2-Fluorophenol	5.4	ug/L			6.06		90% (23-129)		09/30/15 :10/06/15	
Phenol-d6	4.8	ug/L			6.06		79% (9.7-130)		09/30/15 :10/06/15	
Nitrobenzene-d5	6.5	ug/L			6.06		107% (46-141)		09/30/15 :10/06/15	
2-Fluorobiphenyl	6.1	ug/L			6.06		100% (49-122)		09/30/15 :10/06/15	
2,4,6-Tribromophenol	5.6	ug/L			6.06		93% (30-159)		09/30/15 :10/06/15	
p-Terphenyl-d14	6.6	ug/L			6.06		108% (24-143)		09/30/15 :10/06/15	

**LCS (B151437-BS1)**

Acenaphthene	5.07	ug/L	1.0		6.06		84% (60-116)		09/30/15 :10/06/15	
Acenaphthylene	5.49	ug/L	1.0		6.06		91% (62-118)		09/30/15 :10/06/15	
Anthracene	5.72	ug/L	1.0		6.06		94% (30-132)		09/30/15 :10/06/15	
Benzo(a)anthracene	5.99	ug/L	1.0		6.06		99% (33-134)		09/30/15 :10/06/15	
Benzo(a)pyrene	5.47	ug/L	1.0		6.06		90% (29-129)		09/30/15 :10/06/15	
Benzo(b)fluoranthene	5.71	ug/L	1.0		6.06		94% (31-131)		09/30/15 :10/06/15	
Benzo(g,h,i)perylene	5.44	ug/L	1.0		6.06		90% (32-134)		09/30/15 :10/06/15	
Benzo(k)fluoranthene	5.47	ug/L	1.0		6.06		90% (29-128)		09/30/15 :10/06/15	
4-Bromophenylphenyl ether	5.45	ug/L	1.0		6.06		90% (51-122)		09/30/15 :10/06/15	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B151437

**LCS (B151437-BS1)**

Butyl benzyl phthalate	6.65	ug/L	1.0		6.06		110% (10-177)		09/30/15 :10/06/15	
4-Chloro-3-methylphenol	5.65	ug/L	1.0		6.06		93% (43-154)		09/30/15 :10/06/15	
4-Chloroaniline	6.42	ug/L	1.0		6.06		106% (5-137)		09/30/15 :10/06/15	V1
Bis(2-chloroethoxy) methane	6.89	ug/L	1.0		6.06		114% (57-129)		09/30/15 :10/06/15	V1
Bis(2-chloroethyl) ether	6.13	ug/L	1.0		6.06		101% (55-122)		09/30/15 :10/06/15	
Bis(2-chloroisopropyl) ether	6.42	ug/L	1.0		6.06		106% (47-130)		09/30/15 :10/06/15	
2-Chloronaphthalene	4.88	ug/L	1.0		6.06		81% (57-117)		09/30/15 :10/06/15	
2-Chlorophenol	6.21	ug/L	1.0		6.06		102% (33-139)		09/30/15 :10/06/15	
4-Chlorophenylphenyl ether	4.74	ug/L	1.0		6.06		78% (50-125)		09/30/15 :10/06/15	
Chrysene	5.74	ug/L	1.0		6.06		95% (33-132)		09/30/15 :10/06/15	
Di-n-butyl phthalate	6.83	ug/L	1.0		6.06		113% (40-140)		09/30/15 :10/06/15	
Di-n-octyl phthalate	6.56	ug/L	1.0		6.06		108% (20-160)		09/30/15 :10/06/15	
Dibenzo(a,h)anthracene	5.45	ug/L	1.0		6.06		90% (34-131)		09/30/15 :10/06/15	
Dibenzofuran	5.07	ug/L	1.0		6.06		84% (58-119)		09/30/15 :10/06/15	
1,2-Dichlorobenzene	4.23	ug/L	1.0		6.06		70% (61-115)		09/30/15 :10/06/15	
1,3-Dichlorobenzene	3.87	ug/L	1.0		6.06		64% (62-113)		09/30/15 :10/06/15	
1,4-Dichlorobenzene	3.87	ug/L	1.0		6.06		64% (64-111)		09/30/15 :10/06/15	L1
2,4-Dichlorophenol	5.63	ug/L	1.0		6.06		93% (54-137)		09/30/15 :10/06/15	
Diethyl phthalate	6.19	ug/L	1.0		6.06		102% (57-143)		09/30/15 :10/06/15	
2,4-Dimethylphenol	5.38	ug/L	2.0		6.06		89% (29-136)		09/30/15 :10/06/15	
Dimethyl phthalate	5.87	ug/L	1.0		6.06		97% (66-139)		09/30/15 :10/06/15	
4,6-Dinitro-2-methylphenol	5.38	ug/L	2.0		6.06		89% (1-168)		09/30/15 :10/06/15	
2,4-Dinitrophenol	29.5	ug/L	5.0		30.3		97% (1-205)		09/30/15 :10/06/15	
2,4-Dinitrotoluene	5.83	ug/L	1.0		6.06		96% (59-143)		09/30/15 :10/06/15	
2,6-Dinitrotoluene	5.54	ug/L	1.0		6.06		91% (61-138)		09/30/15 :10/06/15	
Bis(2-ethylhexyl) phthalate	7.04	ug/L	1.0		6.06		116% (47-130)		09/30/15 :10/06/15	
Fluoranthene	6.03	ug/L	1.0		6.06		100% (41-129)		09/30/15 :10/06/15	
Fluorene	5.25	ug/L	1.0		6.06		87% (56-123)		09/30/15 :10/06/15	
Hexachlorobenzene	5.45	ug/L	1.0		6.06		90% (44-128)		09/30/15 :10/06/15	
Hexachlorobutadiene	3.62	ug/L	1.0		6.06		60% (45-123)		09/30/15 :10/06/15	
Hexachlorocyclopentadiene	3.36	ug/L	2.0		6.06		55% (1-137)		09/30/15 :10/06/15	
Hexachloroethane	3.76	ug/L	1.0		6.06		62% (59-110)		09/30/15 :10/06/15	
Indeno(1,2,3-cd)pyrene	5.61	ug/L	1.0		6.06		93% (31-132)		09/30/15 :10/06/15	
Isophorone	7.72	ug/L	1.0		6.06		127% (61-131)		09/30/15 :10/06/15	V1
2-Methylnaphthalene	5.04	ug/L	1.0		6.06		83% (59-117)		09/30/15 :10/06/15	
2-Methylphenol	6.13	ug/L	2.0		6.06		101% (17-148)		09/30/15 :10/06/15	
3- & 4-Methylphenol	5.89	ug/L	2.0		6.06		97% (28-141)		09/30/15 :10/06/15	V1
Naphthalene	4.83	ug/L	1.0		6.06		80% (61-117)		09/30/15 :10/06/15	
2-Nitroaniline	5.84	ug/L	2.0		6.06		96% (60-143)		09/30/15 :10/06/15	
3-Nitroaniline	4.85	ug/L	2.0		6.06		80% (14-144)		09/30/15 :10/06/15	
4-Nitroaniline	5.08	ug/L	2.0		6.06		84% (22-143)		09/30/15 :10/06/15	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC

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Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B151437

**LCS (B151437-BS1)**

Nitrobenzene	6.21	ug/L	1.0		6.06		102% (51-143)		09/30/15 :10/06/15	
2-Nitrophenol	6.56	ug/L	2.0		6.06		108% (57-154)		09/30/15 :10/06/15	
4-Nitrophenol	11.8	ug/L	5.0		30.3		39% (1-105)		09/30/15 :10/06/15	
N-Nitrosodimethylamine	3.71	ug/L	1.0		6.06		61% (26-100)		09/30/15 :10/06/15	
N-Nitrosodi-n-propylamine	8.17	ug/L	1.0		6.06		135% (57-133)		09/30/15 :10/06/15	V1
N-Nitrosodiphenylamine	5.59	ug/L	1.0		6.06		92% (43-128)		09/30/15 :10/06/15	
Pentachlorophenol	4.81	ug/L	1.0		6.06		79% (36-150)		09/30/15 :10/06/15	
Phenanthrene	5.54	ug/L	1.0		6.06		91% (59-113)		09/30/15 :10/06/15	
Phenol	4.52	ug/L	1.0		6.06		75% (15-129)		09/30/15 :10/06/15	
Pyrene	6.05	ug/L	1.0		6.06		100% (42-129)		09/30/15 :10/06/15	
2,3,4,6-Tetrachlorophenol	4.16	ug/L	2.0		6.06		69% (56-138)		09/30/15 :10/06/15	
1,2,4-Trichlorobenzene	3.87	ug/L	1.0		6.06		64% (56-121)		09/30/15 :10/06/15	
2,4,5-Trichlorophenol	4.19	ug/L	2.0		6.06		69% (46-145)		09/30/15 :10/06/15	
2,4,6-Trichlorophenol	5.68	ug/L	1.0		6.06		94% (67-126)		09/30/15 :10/06/15	

**Surrogate**

2-Fluorophenol	5.3	ug/L			6.06		88% (23-129)		09/30/15 :10/06/15	
Phenol-d6	5.0	ug/L			6.06		83% (9.7-130)		09/30/15 :10/06/15	
Nitrobenzene-d5	6.3	ug/L			6.06		104% (46-141)		09/30/15 :10/06/15	
2-Fluorobiphenyl	5.1	ug/L			6.06		85% (49-122)		09/30/15 :10/06/15	
2,4,6-Tribromophenol	6.0	ug/L			6.06		100% (30-159)		09/30/15 :10/06/15	
p-Terphenyl-d14	6.2	ug/L			6.06		102% (24-143)		09/30/15 :10/06/15	

**Duplicate (B151437-DUP1)**

**Source: W151174-01**

Acenaphthene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Acenaphthylene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Anthracene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Benzo(a)anthracene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Benzo(a)pyrene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Benzo(b)fluoranthene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Benzo(g,h,i)perylene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Benzo(k)fluoranthene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
4-Bromophenylphenyl ether	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Butyl benzyl phthalate	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
4-Chloro-3-methylphenol	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
4-Chloroaniline	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	M4
Bis(2-chloroethoxy) methane	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Bis(2-chloroethyl) ether	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Bis(2-chloroisopropyl) ether	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
2-Chloronaphthalene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
2-Chlorophenol	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
4-Chlorophenylphenyl ether	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Chrysene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	

Reported: 10/23/15 14:48

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B151437

**Duplicate (B151437-DUP1)**

**Source: W151174-01**

Di-n-butyl phthalate	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Di-n-octyl phthalate	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Dibenzo(a,h)anthracene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Dibenzofuran	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
1,2-Dichlorobenzene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
1,3-Dichlorobenzene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
1,4-Dichlorobenzene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	L1
3,3'-Dichlorobenzidine	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
2,4-Dichlorophenol	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
2,6-Dichlorophenol	ND	ug/L	1.0			ND	(200)		09/30/15 :10/06/15	
Diethyl phthalate	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
2,4-Dimethylphenol	ND	ug/L	2.0			ND	(50)		09/30/15 :10/06/15	
Dimethyl phthalate	2.00	ug/L	1.0			1.94	3 (50)		09/30/15 :10/06/15	
4,6-Dinitro-2-methylphenol	ND	ug/L	2.0			ND	(50)		09/30/15 :10/06/15	
2,4-Dinitrophenol	ND	ug/L	5.0			ND	(50)		09/30/15 :10/06/15	
2,4-Dinitrotoluene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
2,6-Dinitrotoluene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Bis(2-ethylhexyl) phthalate	2.34	ug/L	1.0			2.33	0.2 (50)		09/30/15 :10/06/15	
Fluoranthene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Fluorene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Hexachlorobenzene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Hexachlorobutadiene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Hexachlorocyclopentadiene	ND	ug/L	2.0			ND	(50)		09/30/15 :10/06/15	
Hexachloroethane	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Indeno(1,2,3-cd)pyrene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Isophorone	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
2-Methylnaphthalene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
2-Methylphenol	ND	ug/L	2.0			ND	(50)		09/30/15 :10/06/15	
3- & 4-Methylphenol	ND	ug/L	2.0			ND	(50)		09/30/15 :10/06/15	
Naphthalene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
2-Nitroaniline	ND	ug/L	2.0			ND	(50)		09/30/15 :10/06/15	
3-Nitroaniline	ND	ug/L	2.0			ND	(50)		09/30/15 :10/06/15	M4
4-Nitroaniline	ND	ug/L	2.0			ND	(50)		09/30/15 :10/06/15	M4
Nitrobenzene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
2-Nitrophenol	ND	ug/L	2.0			ND	(50)		09/30/15 :10/06/15	
4-Nitrophenol	ND	ug/L	5.0			ND	(50)		09/30/15 :10/06/15	
N-Nitrosodimethylamine	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
N-Nitrosodi-n-propylamine	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
N-Nitrosodiphenylamine	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Pentachlorophenol	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	
Phenanthrene	ND	ug/L	1.0			ND	(50)		09/30/15 :10/06/15	

Reported: 10/23/15 14:48

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B151437

**Duplicate (B151437-DUP1)**

**Source: W151174-01**

Phenol	1.12	ug/L	1.0			1.33		18 (50)	09/30/15 :10/06/15	
Pyrene	ND	ug/L	1.0			ND		(50)	09/30/15 :10/06/15	
2,3,4,6-Tetrachlorophenol	ND	ug/L	2.0			ND		(50)	09/30/15 :10/06/15	
1,2,4-Trichlorobenzene	ND	ug/L	1.0			ND		(50)	09/30/15 :10/06/15	
2,4,5-Trichlorophenol	ND	ug/L	2.0			ND		(50)	09/30/15 :10/06/15	
2,4,6-Trichlorophenol	ND	ug/L	1.0			ND		(50)	09/30/15 :10/06/15	
<b>Surrogate</b>										
2-Fluorophenol	5.6	ug/L			6.06		92% (23-129)		09/30/15 :10/06/15	
Phenol-d6	4.7	ug/L			6.06		78% (9.7-130)		09/30/15 :10/06/15	
Nitrobenzene-d5	6.3	ug/L			6.06		104% (46-141)		09/30/15 :10/06/15	
2-Fluorobiphenyl	5.5	ug/L			6.06		90% (49-122)		09/30/15 :10/06/15	
2,4,6-Tribromophenol	6.7	ug/L			6.06		110% (30-159)		09/30/15 :10/06/15	
p-Terphenyl-d14	6.6	ug/L			6.06		109% (24-143)		09/30/15 :10/06/15	

**Matrix Spike (B151437-MS1)**

**Source: W151174-01**

Acenaphthene	5.45	ug/L	1.0		6.06	ND	90% (60-116)		09/30/15 :10/06/15	
Acenaphthylene	5.84	ug/L	1.0		6.06	ND	96% (62-118)		09/30/15 :10/06/15	
Anthracene	6.04	ug/L	1.0		6.06	ND	100% (30-132)		09/30/15 :10/06/15	
Benzo(a)anthracene	6.29	ug/L	1.0		6.06	ND	104% (33-134)		09/30/15 :10/06/15	
Benzo(a)pyrene	5.55	ug/L	1.0		6.06	ND	92% (29-129)		09/30/15 :10/06/15	
Benzo(b)fluoranthene	5.48	ug/L	1.0		6.06	ND	90% (31-131)		09/30/15 :10/06/15	
Benzo(g,h,i)perylene	5.27	ug/L	1.0		6.06	ND	87% (32-134)		09/30/15 :10/06/15	
Benzo(k)fluoranthene	5.46	ug/L	1.0		6.06	ND	90% (29-128)		09/30/15 :10/06/15	
4-Bromophenylphenyl ether	5.95	ug/L	1.0		6.06	ND	98% (51-122)		09/30/15 :10/06/15	
Butyl benzyl phthalate	7.03	ug/L	1.0		6.06	ND	116% (10-177)		09/30/15 :10/06/15	
4-Chloro-3-methylphenol	6.47	ug/L	1.0		6.06	ND	107% (43-154)		09/30/15 :10/06/15	
4-Chloroaniline	0.277	ug/L	0.20		6.06	ND	5% (5-137)		09/30/15 :10/06/15	M4, V1
Bis(2-chloroethoxy) methane	6.54	ug/L	1.0		6.06	ND	108% (57-129)		09/30/15 :10/06/15	V1
Bis(2-chloroethyl) ether	5.77	ug/L	1.0		6.06	ND	95% (55-122)		09/30/15 :10/06/15	
Bis(2-chloroisopropyl) ether	6.00	ug/L	1.0		6.06	ND	99% (47-130)		09/30/15 :10/06/15	
2-Chloronaphthalene	5.42	ug/L	1.0		6.06	ND	89% (57-117)		09/30/15 :10/06/15	
2-Chlorophenol	6.00	ug/L	1.0		6.06	ND	99% (33-139)		09/30/15 :10/06/15	
4-Chlorophenylphenyl ether	5.40	ug/L	1.0		6.06	ND	89% (50-125)		09/30/15 :10/06/15	
Chrysene	5.87	ug/L	1.0		6.06	ND	97% (33-132)		09/30/15 :10/06/15	
Di-n-butyl phthalate	7.92	ug/L	1.0		6.06	ND	131% (40-140)		09/30/15 :10/06/15	
Di-n-octyl phthalate	5.46	ug/L	1.0		6.06	ND	90% (20-160)		09/30/15 :10/06/15	
Dibenzo(a,h)anthracene	5.17	ug/L	1.0		6.06	ND	85% (34-131)		09/30/15 :10/06/15	
Dibenzofuran	5.48	ug/L	1.0		6.06	ND	90% (58-119)		09/30/15 :10/06/15	
1,2-Dichlorobenzene	5.11	ug/L	1.0		6.06	ND	84% (61-115)		09/30/15 :10/06/15	
1,3-Dichlorobenzene	5.07	ug/L	1.0		6.06	ND	84% (62-113)		09/30/15 :10/06/15	
1,4-Dichlorobenzene	5.08	ug/L	1.0		6.06	ND	84% (64-111)		09/30/15 :10/06/15	L1
2,4-Dichlorophenol	5.92	ug/L	1.0		6.06	ND	98% (54-137)		09/30/15 :10/06/15	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B151437

**Matrix Spike (B151437-MS1)**

**Source: W151174-01**

Diethyl phthalate	6.55	ug/L	1.0		6.06	ND	108% (57-143)		09/30/15 :10/06/15	
2,4-Dimethylphenol	6.38	ug/L	2.0		6.06	ND	105% (29-136)		09/30/15 :10/06/15	
Dimethyl phthalate	8.11	ug/L	1.0		6.06	1.94	102% (66-139)		09/30/15 :10/06/15	
4,6-Dinitro-2-methylphenol	7.37	ug/L	2.0		6.06	ND	122% (1-168)		09/30/15 :10/06/15	
2,4-Dinitrophenol	43.4	ug/L	5.0		30.3	ND	143% (1-205)		09/30/15 :10/06/15	
2,4-Dinitrotoluene	6.02	ug/L	1.0		6.06	ND	99% (59-143)		09/30/15 :10/06/15	
2,6-Dinitrotoluene	6.06	ug/L	1.0		6.06	ND	100% (61-138)		09/30/15 :10/06/15	
Bis(2-ethylhexyl) phthalate	8.97	ug/L	1.0		6.06	2.33	109% (47-130)		09/30/15 :10/06/15	
Fluoranthene	6.70	ug/L	1.0		6.06	ND	111% (41-129)		09/30/15 :10/06/15	
Fluorene	5.56	ug/L	1.0		6.06	ND	92% (56-123)		09/30/15 :10/06/15	
Hexachlorobenzene	5.40	ug/L	1.0		6.06	ND	89% (44-128)		09/30/15 :10/06/15	
Hexachlorobutadiene	4.89	ug/L	1.0		6.06	ND	81% (45-132)		09/30/15 :10/06/15	
Hexachlorocyclopentadiene	4.58	ug/L	2.0		6.06	ND	76% (1-137)		09/30/15 :10/06/15	
Hexachloroethane	5.01	ug/L	1.0		6.06	ND	83% (59-110)		09/30/15 :10/06/15	
Indeno(1,2,3-cd)pyrene	5.28	ug/L	1.0		6.06	ND	87% (31-132)		09/30/15 :10/06/15	
Isophorone	7.62	ug/L	1.0		6.06	ND	126% (61-131)		09/30/15 :10/06/15	V1
2-Methylnaphthalene	5.54	ug/L	1.0		6.06	ND	91% (59-117)		09/30/15 :10/06/15	
2-Methylphenol	6.18	ug/L	2.0		6.06	ND	102% (17-148)		09/30/15 :10/06/15	
3- & 4-Methylphenol	6.24	ug/L	2.0		6.06	ND	103% (28-141)		09/30/15 :10/06/15	V1
Naphthalene	5.34	ug/L	1.0		6.06	ND	88% (61-117)		09/30/15 :10/06/15	
2-Nitroaniline	6.80	ug/L	2.0		6.06	ND	112% (60-143)		09/30/15 :10/06/15	
3-Nitroaniline	ND	ug/L	2.0		6.06	ND	% (14-144)		09/30/15 :10/06/15	M4
4-Nitroaniline	ND	ug/L	2.0		6.06	ND	% (22-143)		09/30/15 :10/06/15	M4
Nitrobenzene	6.45	ug/L	1.0		6.06	ND	106% (51-143)		09/30/15 :10/06/15	
2-Nitrophenol	6.99	ug/L	2.0		6.06	ND	115% (57-154)		09/30/15 :10/06/15	
4-Nitrophenol	22.0	ug/L	5.0		30.3	ND	73% (1-105)		09/30/15 :10/06/15	
N-Nitrosodimethylamine	3.67	ug/L	1.0		6.06	ND	60% (26-100)		09/30/15 :10/06/15	
N-Nitrosodi-n-propylamine	7.66	ug/L	1.0		6.06	ND	126% (57-133)		09/30/15 :10/06/15	V1
N-Nitrosodiphenylamine	5.89	ug/L	1.0		6.06	ND	97% (43-128)		09/30/15 :10/06/15	
Pentachlorophenol	8.81	ug/L	1.0		6.06	ND	145% (36-150)		09/30/15 :10/06/15	
Phenanthrene	5.93	ug/L	1.0		6.06	ND	98% (59-113)		09/30/15 :10/06/15	
Phenol	6.38	ug/L	1.0		6.06	1.33	83% (15-129)		09/30/15 :10/06/15	
Pyrene	6.74	ug/L	1.0		6.06	ND	111% (42-129)		09/30/15 :10/06/15	
2,3,4,6-Tetrachlorophenol	5.78	ug/L	2.0		6.06	ND	95% (56-138)		09/30/15 :10/06/15	
1,2,4-Trichlorobenzene	5.02	ug/L	1.0		6.06	ND	83% (56-121)		09/30/15 :10/06/15	
2,4,5-Trichlorophenol	5.89	ug/L	2.0		6.06	ND	97% (46-145)		09/30/15 :10/06/15	
2,4,6-Trichlorophenol	6.27	ug/L	1.0		6.06	ND	103% (67-126)		09/30/15 :10/06/15	
<b>Surrogate</b>										
2-Fluorophenol	5.7	ug/L			6.06		94% (23-129)		09/30/15 :10/06/15	
Phenol-d6	5.2	ug/L			6.06		86% (9.7-130)		09/30/15 :10/06/15	
Nitrobenzene-d5	6.4	ug/L			6.06		105% (46-141)		09/30/15 :10/06/15	

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**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B151437

**Matrix Spike (B151437-MS1) Source: W151174-01**

**Surrogate**

2-Fluorobiphenyl	5.6 ug/L				6.06		92% (49-122)		09/30/15 :10/06/15	
2,4,6-Tribromophenol	7.1 ug/L				6.06		117% (30-159)		09/30/15 :10/06/15	
p-Terphenyl-d14	6.9 ug/L				6.06		113% (24-143)		09/30/15 :10/06/15	

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**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15I436**

**Blank (B15I436-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					09/30/15 :10/01/15	
Acenaphthylene	ND	ug/L	0.020	0.020					09/30/15 :10/01/15	
Anthracene	ND	ug/L	0.020	0.020					09/30/15 :10/01/15	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					09/30/15 :10/01/15	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					09/30/15 :10/01/15	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					09/30/15 :10/01/15	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					09/30/15 :10/01/15	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					09/30/15 :10/01/15	
Chrysene	ND	ug/L	0.010	0.010					09/30/15 :10/01/15	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					09/30/15 :10/01/15	
Fluoranthene	ND	ug/L	0.010	0.010					09/30/15 :10/01/15	
Fluorene	ND	ug/L	0.020	0.020					09/30/15 :10/01/15	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					09/30/15 :10/01/15	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					09/30/15 :10/01/15	L1
2-Methylnaphthalene	ND	ug/L	0.040	0.040					09/30/15 :10/01/15	L1
Naphthalene	ND	ug/L	0.040	0.040					09/30/15 :10/01/15	
Phenanthrene	ND	ug/L	0.020	0.020					09/30/15 :10/01/15	
Pyrene	ND	ug/L	0.010	0.010					09/30/15 :10/01/15	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					09/30/15 :10/01/15	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					09/30/15 :10/01/15	
Diethyl phthalate	ND	ug/L	1.0	0.50					09/30/15 :10/01/15	
Dimethyl phthalate	ND	ug/L	1.0	0.50					09/30/15 :10/01/15	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					09/30/15 :10/01/15	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					09/30/15 :10/01/15	

**Surrogate**

2-Methylnaphthalene-d10	0.12	ug/L			0.229		51% (60.4-153)		09/30/15 :10/01/15	SU1
Fluoranthene-d10	0.21	ug/L			0.229		94% (69-149)		09/30/15 :10/01/15	

**LCS (B15I436-BS1)**

Acenaphthene	0.229	ug/L	0.020	0.020	0.229		100% (58.8-155)		09/30/15 :10/01/15	
Acenaphthylene	0.233	ug/L	0.020	0.020	0.229		102% (64-155)		09/30/15 :10/01/15	
Anthracene	0.213	ug/L	0.020	0.020	0.229		93% (76.2-129)		09/30/15 :10/01/15	
Benzo(a)anthracene	0.217	ug/L	0.010	0.010	0.229		95% (72.9-138)		09/30/15 :10/01/15	
Benzo(a)pyrene	0.219	ug/L	0.010	0.010	0.229		96% (75.5-137)		09/30/15 :10/01/15	
Benzo(b)fluoranthene	0.223	ug/L	0.010	0.010	0.229		97% (59.9-160)		09/30/15 :10/01/15	
Benzo(g,h,i)perylene	0.210	ug/L	0.010	0.010	0.229		92% (70.1-134)		09/30/15 :10/01/15	
Benzo(k)fluoranthene	0.217	ug/L	0.010	0.010	0.229		95% (61.1-157)		09/30/15 :10/01/15	
Chrysene	0.229	ug/L	0.010	0.010	0.229		100% (76.7-146)		09/30/15 :10/01/15	
Dibenzo(a,h)anthracene	0.212	ug/L	0.010	0.010	0.229		93% (63.9-140)		09/30/15 :10/01/15	
Fluoranthene	0.229	ug/L	0.010	0.010	0.229		100% (77.5-134)		09/30/15 :10/01/15	
Fluorene	0.210	ug/L	0.020	0.020	0.229		92% (61.2-157)		09/30/15 :10/01/15	

Reported: 10/23/15 14:48

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15I436**

**LCS (B15I436-BS1)**

Indeno(1,2,3-cd)pyrene	0.214	ug/L	0.010	0.010	0.229		94% (68.4-135)		09/30/15 :10/01/15	
1-Methylnaphthalene	0.157	ug/L	0.040	0.040	0.229		69% (79.6-158)		09/30/15 :10/01/15	L1
2-Methylnaphthalene	0.140	ug/L	0.040	0.040	0.229		61% (76-161)		09/30/15 :10/01/15	L1
Naphthalene	0.210	ug/L	0.040	0.040	0.229		92% (60.6-164)		09/30/15 :10/01/15	
Phenanthrene	0.223	ug/L	0.020	0.020	0.229		98% (77.4-140)		09/30/15 :10/01/15	
Pyrene	0.227	ug/L	0.010	0.010	0.229		99% (81.1-141)		09/30/15 :10/01/15	
Butyl benzyl phthalate	2.11	ug/L	1.0	0.50	2.29		92% (54.7-176)		09/30/15 :10/01/15	
Di-n-butyl phthalate	2.45	ug/L	1.0	0.50	2.29		107% (74.3-149)		09/30/15 :10/01/15	
Diethyl phthalate	2.30	ug/L	1.0	0.50	2.29		101% (75.5-173)		09/30/15 :10/01/15	
Dimethyl phthalate	2.28	ug/L	1.0	0.50	2.29		100% (81.6-148)		09/30/15 :10/01/15	
Di-n-octyl phthalate	1.79	ug/L	1.0	0.50	2.29		78% (60.2-155)		09/30/15 :10/01/15	
Bis(2-ethylhexyl) phthalate	1.80	ug/L	1.0	0.50	2.29		79% (64.4-162)		09/30/15 :10/01/15	

**Surrogate**

2-Methylnaphthalene-d10	0.13	ug/L			0.229		55% (60.4-153)		09/30/15 :10/01/15	SU1
Fluoranthene-d10	0.23	ug/L			0.229		100% (69-149)		09/30/15 :10/01/15	

**Matrix Spike (B15I436-MS1)**

**Source: W15I174-01**

Acenaphthene	0.631	ug/L	0.020	0.020	0.571	0.0349	104% (58.8-155)		09/30/15 :10/01/15	
Acenaphthylene	0.621	ug/L	0.020	0.020	0.571	0.0229	105% (64-155)		09/30/15 :10/01/15	
Anthracene	0.600	ug/L	0.020	0.020	0.571	0.0280	100% (76.2-129)		09/30/15 :10/01/15	
Benzo(a)anthracene	0.523	ug/L	0.010	0.010	0.571	0.0189	88% (72.9-138)		09/30/15 :10/01/15	
Benzo(a)pyrene	0.491	ug/L	0.010	0.010	0.571	0.0240	82% (75.5-137)		09/30/15 :10/01/15	
Benzo(b)fluoranthene	0.511	ug/L	0.010	0.010	0.571	0.0446	82% (59.9-160)		09/30/15 :10/01/15	
Benzo(g,h,i)perylene	0.465	ug/L	0.010	0.010	0.571	0.0634	70% (70.1-134)		09/30/15 :10/01/15	
Benzo(k)fluoranthene	0.466	ug/L	0.010	0.010	0.571	0.0126	79% (61.1-157)		09/30/15 :10/01/15	
Chrysene	0.591	ug/L	0.010	0.010	0.571	0.0434	96% (76.7-146)		09/30/15 :10/01/15	
Dibenzo(a,h)anthracene	0.437	ug/L	0.010	0.010	0.571	ND	77% (63.9-140)		09/30/15 :10/01/15	
Fluoranthene	0.720	ug/L	0.010	0.010	0.571	0.117	106% (77.5-134)		09/30/15 :10/01/15	
Fluorene	0.574	ug/L	0.020	0.020	0.571	0.0257	96% (61.2-157)		09/30/15 :10/01/15	
Indeno(1,2,3-cd)pyrene	0.439	ug/L	0.010	0.010	0.571	0.0229	73% (68.4-135)		09/30/15 :10/01/15	
Naphthalene	0.622	ug/L	0.040	0.040	0.571	ND	109% (60.6-164)		09/30/15 :10/01/15	
Phenanthrene	0.670	ug/L	0.020	0.020	0.571	0.106	99% (77.4-140)		09/30/15 :10/01/15	
Pyrene	0.767	ug/L	0.010	0.010	0.571	0.155	107% (81.1-141)		09/30/15 :10/01/15	
Butyl benzyl phthalate	5.39	ug/L	1.0	0.50	5.71	ND	94% (54.7-176)		09/30/15 :10/01/15	
Di-n-butyl phthalate	6.40	ug/L	1.0	0.50	5.71	ND	112% (74.3-149)		09/30/15 :10/01/15	
Diethyl phthalate	6.53	ug/L	1.0	0.50	5.71	ND	114% (75.5-173)		09/30/15 :10/01/15	
Dimethyl phthalate	8.07	ug/L	1.0	0.50	5.71	1.93	107% (81.6-148)		09/30/15 :10/01/15	
Di-n-octyl phthalate	4.44	ug/L	1.0	0.50	5.71	ND	78% (60.2-155)		09/30/15 :10/01/15	
Bis(2-ethylhexyl) phthalate	6.01	ug/L	1.0	0.50	5.71	1.83	73% (64.4-162)		09/30/15 :10/01/15	

**Surrogate**

2-Methylnaphthalene-d10	0.17	ug/L			0.229		72% (60.4-153)		09/30/15 :10/01/15	
Fluoranthene-d10	0.24	ug/L			0.229		107% (69-149)		09/30/15 :10/01/15	

Reported: 10/23/15 14:48

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15I436**

**Matrix Spike Dup (B15I436-MSD1)**

**Source: W15I174-01**

Acenaphthene	0.626	ug/L	0.020	0.020	0.571	0.0349	104% (58.8-155)	0.7 (50)	09/30/15 :10/01/15	
Acenaphthylene	0.607	ug/L	0.020	0.020	0.571	0.0229	102% (64-155)	2 (50)	09/30/15 :10/01/15	
Anthracene	0.573	ug/L	0.020	0.020	0.571	0.0280	95% (76.2-129)	5 (50)	09/30/15 :10/01/15	
Benzo(a)anthracene	0.495	ug/L	0.010	0.010	0.571	0.0189	83% (72.9-138)	6 (50)	09/30/15 :10/01/15	
Benzo(a)pyrene	0.458	ug/L	0.010	0.010	0.571	0.0240	76% (75.5-137)	7 (50)	09/30/15 :10/01/15	
Benzo(b)fluoranthene	0.469	ug/L	0.010	0.010	0.571	0.0446	74% (59.9-160)	9 (50)	09/30/15 :10/01/15	
Benzo(g,h,i)perylene	0.432	ug/L	0.010	0.010	0.571	0.0634	64% (70.1-134)	7 (50)	09/30/15 :10/01/15	M4
Benzo(k)fluoranthene	0.432	ug/L	0.010	0.010	0.571	0.0126	73% (61.1-157)	8 (50)	09/30/15 :10/01/15	
Chrysene	0.559	ug/L	0.010	0.010	0.571	0.0434	90% (76.7-146)	6 (50)	09/30/15 :10/01/15	
Dibenzo(a,h)anthracene	0.398	ug/L	0.010	0.010	0.571	ND	70% (63.9-140)	9 (50)	09/30/15 :10/01/15	
Fluoranthene	0.684	ug/L	0.010	0.010	0.571	0.117	99% (77.5-134)	5 (50)	09/30/15 :10/01/15	
Fluorene	0.556	ug/L	0.020	0.020	0.571	0.0257	93% (61.2-157)	3 (50)	09/30/15 :10/01/15	
Indeno(1,2,3-cd)pyrene	0.402	ug/L	0.010	0.010	0.571	0.0229	66% (68.4-135)	9 (50)	09/30/15 :10/01/15	M4
Naphthalene	0.619	ug/L	0.040	0.040	0.571	ND	108% (60.6-164)	0.6 (50)	09/30/15 :10/01/15	
Phenanthrene	0.645	ug/L	0.020	0.020	0.571	0.106	94% (77.4-140)	4 (50)	09/30/15 :10/01/15	
Pyrene	0.733	ug/L	0.010	0.010	0.571	0.155	101% (81.1-141)	4 (50)	09/30/15 :10/01/15	
Butyl benzyl phthalate	5.03	ug/L	1.0	0.50	5.71	ND	88% (54.7-176)	7 (50)	09/30/15 :10/01/15	
Di-n-butyl phthalate	6.07	ug/L	1.0	0.50	5.71	ND	106% (74.3-149)	5 (50)	09/30/15 :10/01/15	
Diethyl phthalate	6.41	ug/L	1.0	0.50	5.71	ND	112% (75.5-173)	2 (50)	09/30/15 :10/01/15	
Dimethyl phthalate	8.08	ug/L	1.0	0.50	5.71	1.93	108% (81.6-148)	0.1 (50)	09/30/15 :10/01/15	
Di-n-octyl phthalate	4.09	ug/L	1.0	0.50	5.71	ND	72% (60.2-155)	8 (50)	09/30/15 :10/01/15	
Bis(2-ethylhexyl) phthalate	5.62	ug/L	1.0	0.50	5.71	1.83	66% (64.4-162)	7 (50)	09/30/15 :10/01/15	
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.15	ug/L				0.229	66% (60.4-153)		09/30/15 :10/01/15	
Fluoranthene-d10	0.23	ug/L				0.229	102% (69-149)		09/30/15 :10/01/15	

Reported: 10/23/15 14:48

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W151174**

**Client: Director's Office**  
**Received: 09/25/15 12:01**

**Polychlorinated Biphenyls (PCBs) - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**PCB Aroclors by GC-ECD - Batch B151424**

**Blank (B151424-BLK1)**

Aroclor 1016/1242	ND	ug/L	0.0500	0.0500					09/29/15 :09/30/15	
Aroclor 1221	ND	ug/L	0.100	0.100					09/29/15 :09/30/15	
Aroclor 1232	ND	ug/L	0.0500	0.0500					09/29/15 :09/30/15	
Aroclor 1248	ND	ug/L	0.0500	0.0500					09/29/15 :09/30/15	
Aroclor 1254	ND	ug/L	0.0500	0.0500					09/29/15 :09/30/15	
Aroclor 1260	ND	ug/L	0.0500	0.0500					09/29/15 :09/30/15	
<b>Surrogate</b>										
Tetrachloro-m-xylene	0.0202	ug/L			0.0500		40% (32.8-105)		09/29/15 :09/30/15	
Decachlorobiphenyl	0.0503	ug/L			0.0500		101% (29-133)		09/29/15 :09/30/15	

**LCS (B151424-BS1)**

Aroclor 1016/1242	0.3774	ug/L	0.0500	0.0500	0.500		75% (45.3-101)		09/29/15 :09/30/15	
Aroclor 1260	0.5286	ug/L	0.0500	0.0500	0.500		106% (57.8-118)		09/29/15 :09/30/15	
<b>Surrogate</b>										
Tetrachloro-m-xylene	0.0180	ug/L			0.0500		36% (32.8-105)		09/29/15 :09/30/15	
Decachlorobiphenyl	0.0513	ug/L			0.0500		103% (29-133)		09/29/15 :09/30/15	

**Matrix Spike (B151424-MS1)**

**Source: W151124-01**

Aroclor 1016/1242	1.111	ug/L	0.200	0.200	0.500	ND	222% (45.3-101)		09/29/15 :09/30/15	AR0, M11
Aroclor 1260	0.5358	ug/L	0.200	0.200	0.500	ND	107% (57.8-118)		09/29/15 :09/30/15	
<b>Surrogate</b>										
Tetrachloro-m-xylene	0.0339	ug/L			0.0500		68% (32.8-105)		09/29/15 :09/30/15	
Decachlorobiphenyl	0.0500	ug/L			0.0500		100% (29-133)		09/29/15 :09/30/15	

Reported: 10/23/15 14:48

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*Jennifer Shackelford*

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ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W151174**

Client: Director's Office  
Received: 09/25/15 12:01

**Qualifiers**

- AR0 Quantitation affected by non-Aroclor peaks.
- L1 Recovery for this analyte in the laboratory control sample was outside the acceptance range (low). Sample results may be low estimates.
- M11 Matrix spike recovery for this analyte was high; the analyte was not detected in the sample and results are not affected.
- M4 Based on low matrix spike recovery, the sample result may be a low estimate due to matrix interference.
- SU1 Recovery for one or more surrogate compounds was outside the acceptance range (low). Sample results may be low estimates.
- V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.

**Definitions**

- |        |   |     |  |
|--------|---|-----|--|
| DET    | Analyte Detected                          | ND  | Analyte Not Detected at or above the reporting limit |
| MRL    | Method Reporting Limit                    | MDL | Method Detection Limit                               |
| NR     | Not Reportable                            | dry | Sample results reported on a dry weight basis        |
| % Rec. | Percent Recovery                          | RPD | Relative Percent Difference                          |
| *      | This analyte is not certified under NELAP |     |  |

Reported: 10/23/15 14:48

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Jennifer Shackelford, Laboratory Coordinator QA/QC



**WPCL Cooler Receipt Form**

Work Order Number: W151174

Cooler Receipt Form Filled Out By: NJ

Project: Portland Harbor

Sample transport: Samples received on ice

Courier \_\_\_\_\_

Directly from field \_\_\_\_\_

Temperature (°C) 16°C

	Yes	No	NA
Is the COC present and signed?	✓		
Are sample bottles intact?	✓		
Do the COC and sample labels match?	✓		
Are the appropriate containers used?	✓		
Are samples appropriately preserved?	✓		
Do VOA vials have Headspace?			✓
Are samples received within holding times?	✓		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	1501053	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
4-25-15	12:20	NJ	W151174-01,02	F	1	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

October 14, 2015

**Analytical Report for Service Request No: K1510784**

Jennifer Shackelford  
Portland, City of  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W151174**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory September 28, 2015  
For your reference, these analyses have been assigned our service request number **K1510784**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
Idaho DHW	<a href="http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx">http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L14-50
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Michigan DEQ	<a href="http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html">http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html</a>	9949
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wisconsin DNR	<a href="http://dnr.wi.gov/">http://dnr.wi.gov/</a>	998386840
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS ENVIRONMENTAL

**Client:** Portland, City of  
**Project:** Portland Harbor/ W151174  
**Sample Matrix:** Water

**Service Request No.:** K1510784  
**Date Received:** 09/28/15

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

#### Sample Receipt

Two water samples were received for analysis at ALS Environmental on 09/28/15. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### Organochlorine Pesticides by EPA Method 8081

##### **Second Source Exceptions:**

The analysis of Chlorinated Pesticides by EPA 8081 requires the use of dual column confirmation. When the Initial Calibration Verification (ICV) criteria are met for both columns, the higher of the two sample results is generally reported. The primary evaluation criteria were not met on the confirmation column for Endrin Aldehyde. The ICV results are reported from the acceptable column. The data quality is not affected. No further corrective action was necessary.

##### **Calibration Verification Exceptions:**

The analysis of Chlorinated Pesticides by EPA 8081 requires the use of dual column confirmation. When the Continuing Calibration Verification (CCV) criteria is met for both columns, the higher of the two sample results is generally reported. The primary evaluation criteria were not met on the confirmation column for 4,4'-DDT and Methoxychlor. The results are reported from the column with an acceptable CCV. The data quality is not affected. No further corrective action was necessary.

The upper control criterion was exceeded for beta-BHC in the Continuing Calibration Verification (CCV). The field samples analyzed in this sequence did not contain the analyte in question. Since the apparent problem indicated a potential high bias, the data quality was not affected. No further corrective action was required.

##### **Matrix Spike Recovery Exceptions:**

Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD for these samples.

Approved by \_\_\_\_\_



**Lab Control Sample Exceptions:**

Due to contamination in the Solid-Phase Extractor, the upper control criterion was exceeded for most analyte in Laboratory Control Sample (LCS) KWG1509340-1. The contamination appears to have only affected the LCS recoveries and the analytes in question were not detected in the associated field samples. The error associated with elevated recovery equates to a high bias. The sample data is not significantly affected. No further corrective action was appropriate.

**Relative Percent Difference Exceptions:**

The Relative Percent Difference (RPD) for most analytes in the replicate Laboratory Control Sample (LCS) analyses (KWG1509340-1 and KWG1509340-2) was outside control criteria. LCS KWG1509340-1 was contaminated due to the extraction of a sample with high concentrations of pesticides prior to the LCS on the same extractor unit. Since the apparent problem indicated a potential high bias, the data quality was not affected. Recovery in the DLCS met control criteria. No further corrective action was required.

**Elevated Detection Limits:**

The reporting limit is elevated for all analytes in both field samples. The sample extract was diluted prior to instrumental analysis due to relatively high levels of non-target background components. Clean-up of the extract was performed within the scope of the method, but did not eliminate enough of the background components to prevent dilution. A semiquantitative screen was performed prior to final analysis. The results of the screening indicated the need to perform a dilution. The results are flagged to indicate the matrix interference.

The reporting limit is elevated further for several analytes in both field samples. The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compounds at the reporting limit. The results are flagged to indicate the matrix interference.

**Calibration Range Exceedence:**

The Laboratory Control Sample (LCS) recoveries of most analytes were above the calibration range because of contamination. As a result, accurate quantitation was not possible. The associated field sample did not contain any target analytes. No further corrective action was required.

No other anomalies associated with the analysis of these samples were observed.

Approved by \_\_\_\_\_





# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

SUBCONTRACT ORDER  
 City of Portland Water Pollution Control Lab  
**W15I174**

K1510784

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

Columbia Analytical Services  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

WPCL Project Name  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>
<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush _ day(s)

Analysis	Due	Expires	Laboratory ID	Comments
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<b>Sample ID: W15I174-01</b>	<b>Water</b>	<b>Sampled: 09/25/15 10:14</b>
Out-Pesticides Chlor LL (CAS)	10/09/15 17:00	10/02/15 10:14
<i>Containers Supplied:</i> G amber 1L (C)		

<b>Sample ID: W15I174-02</b>	<b>Water</b>	<b>Sampled: 09/25/15 10:14</b>
Out-Pesticides Chlor LL (CAS)	10/09/15 17:00	10/02/15 10:14
<i>Containers Supplied:</i> G amber 1L (C)		

Released By	Date	Received By	Date
[Signature]	9/28/15	ALS	9:50
Released By	Date	Received By	Date
[Signature]	9/28/15	[Signature]	1240



PC H2

### Cooler Receipt and Preservation Form

Client / Project: City of PDX Service Request **K15** 10784

Received: 9/28/15 Opened: 9/28/15 By: [Signature] Unloaded: 9/28/15 By: [Signature]

- 1. Samples were received via?  Mail  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- 2. Samples were received in: (circle)  Cooler  Box  Envelope  Other \_\_\_\_\_ NA
- 3. Were custody seals on coolers? NA  Y  N If yes, how many and where? \_\_\_\_\_  
If present, were custody seals intact? Y  N  If present, were they signed and dated? Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
17.8	17.9	—	—	10.1	365	NA		NA	

- 4. Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves \_\_\_\_\_
- 5. Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
- 6. Did all bottles arrive in good condition (unbroken)? Indicate in the table below. NA  Y  N
- 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
- 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA  Y  N
- 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
- 10. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below. NA  Y  N
- 11. Were VOA vials received without headspace? Indicate in the table below. NA  Y  N
- 12. Was C12/Res negative? NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# Organochlorine Pesticides

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W151174  
**Sample Matrix:** Water

**Service Request:** K1510784  
**Date Collected:** 09/25/2015  
**Date Received:** 09/28/2015

**Organochlorine Pesticides**

**Sample Name:** W151174-01  
**Lab Code:** K1510784-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	Ui	2.5	2.5	2	09/29/15	10/06/15	KWG1509340	*
beta-BHC	ND	U	2.1	0.96	2	09/29/15	10/06/15	KWG1509340	
gamma-BHC (Lindane)	ND	Ui	15	15	2	09/29/15	10/06/15	KWG1509340	*
delta-BHC	ND	Ui	27	27	2	09/29/15	10/06/15	KWG1509340	*
Heptachlor	ND	Ui	4.6	4.6	2	09/29/15	10/06/15	KWG1509340	*
Aldrin	ND	Ui	5.5	5.5	2	09/29/15	10/06/15	KWG1509340	
Heptachlor Epoxide	ND	U	2.1	1.5	2	09/29/15	10/06/15	KWG1509340	*
gamma-Chlordane†	ND	U	2.1	0.43	2	09/29/15	10/06/15	KWG1509340	*
Endosulfan I	ND	U	2.1	0.31	2	09/29/15	10/06/15	KWG1509340	*
alpha-Chlordane	ND	Ui	2.1	1.4	2	09/29/15	10/06/15	KWG1509340	*
Dieldrin	ND	U	2.1	0.47	2	09/29/15	10/06/15	KWG1509340	*
4,4'-DDE	ND	U	2.1	0.23	2	09/29/15	10/06/15	KWG1509340	*
Endrin	ND	U	2.1	0.37	2	09/29/15	10/06/15	KWG1509340	*
Endosulfan II	ND	U	2.1	0.41	2	09/29/15	10/06/15	KWG1509340	
4,4'-DDD	ND	U	2.1	0.58	2	09/29/15	10/06/15	KWG1509340	*
Endrin Aldehyde	ND	U	2.1	0.45	2	09/29/15	10/06/15	KWG1509340	*
Endosulfan Sulfate	ND	U	2.1	1.8	2	09/29/15	10/06/15	KWG1509340	*
4,4'-DDT	ND	U	2.1	0.62	2	09/29/15	10/06/15	KWG1509340	
Endrin Ketone	ND	U	2.1	0.58	2	09/29/15	10/06/15	KWG1509340	*
Methoxychlor	ND	U	2.1	0.45	2	09/29/15	10/06/15	KWG1509340	*
Toxaphene	ND	U	110	39	2	09/29/15	10/06/15	KWG1509340	

\* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	43	20-106	10/06/15	Acceptable
Decachlorobiphenyl	48	19-127	10/06/15	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W151174  
**Sample Matrix:** Water

**Service Request:** K1510784  
**Date Collected:** 09/25/2015  
**Date Received:** 09/28/2015

**Organochlorine Pesticides**

**Sample Name:** W151174-02  
**Lab Code:** K1510784-002  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	Ui	2.0	2.0	2	09/29/15	10/06/15	KWG1509340	*
beta-BHC	ND	U	2.0	0.94	2	09/29/15	10/06/15	KWG1509340	
gamma-BHC (Lindane)	ND	Ui	13	13	2	09/29/15	10/06/15	KWG1509340	*
delta-BHC	ND	Ui	24	24	2	09/29/15	10/06/15	KWG1509340	*
Heptachlor	ND	Ui	3.8	3.8	2	09/29/15	10/06/15	KWG1509340	*
Aldrin	ND	Ui	2.0	1.7	2	09/29/15	10/06/15	KWG1509340	
Heptachlor Epoxide	ND	U	2.0	1.4	2	09/29/15	10/06/15	KWG1509340	*
gamma-Chlordane†	ND	U	2.0	0.42	2	09/29/15	10/06/15	KWG1509340	*
Endosulfan I	ND	U	2.0	0.30	2	09/29/15	10/06/15	KWG1509340	*
alpha-Chlordane	ND	U	2.0	0.34	2	09/29/15	10/06/15	KWG1509340	*
Dieldrin	ND	U	2.0	0.46	2	09/29/15	10/06/15	KWG1509340	*
4,4'-DDE	ND	U	2.0	0.22	2	09/29/15	10/06/15	KWG1509340	*
Endrin	ND	U	2.0	0.36	2	09/29/15	10/06/15	KWG1509340	*
Endosulfan II	ND	U	2.0	0.40	2	09/29/15	10/06/15	KWG1509340	
4,4'-DDD	ND	U	2.0	0.56	2	09/29/15	10/06/15	KWG1509340	*
Endrin Aldehyde	ND	Ui	5.5	5.5	2	09/29/15	10/06/15	KWG1509340	*
Endosulfan Sulfate	ND	U	2.0	1.7	2	09/29/15	10/06/15	KWG1509340	*
4,4'-DDT	ND	Ui	2.2	2.2	2	09/29/15	10/06/15	KWG1509340	
Endrin Ketone	ND	U	2.0	0.56	2	09/29/15	10/06/15	KWG1509340	*
Methoxychlor	ND	Ui	2.0	1.4	2	09/29/15	10/06/15	KWG1509340	*
Toxaphene	ND	U	98	38	2	09/29/15	10/06/15	KWG1509340	

\* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	39	20-106	10/06/15	Acceptable
Decachlorobiphenyl	49	19-127	10/06/15	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W151174  
**Sample Matrix:** Water

**Service Request:** K1510784  
**Date Collected:** NA  
**Date Received:** NA

**Organochlorine Pesticides**

**Sample Name:** Method Blank  
**Lab Code:** KWG1509340-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	0.98	0.19	1	09/29/15	10/06/15	KWG1509340	*
beta-BHC	ND	U	0.98	0.47	1	09/29/15	10/06/15	KWG1509340	
gamma-BHC (Lindane)	ND	U	0.98	0.22	1	09/29/15	10/06/15	KWG1509340	*
delta-BHC	ND	U	0.98	0.20	1	09/29/15	10/06/15	KWG1509340	*
Heptachlor	ND	U	0.98	0.13	1	09/29/15	10/06/15	KWG1509340	*
Aldrin	ND	U	0.98	0.20	1	09/29/15	10/06/15	KWG1509340	
Heptachlor Epoxide	ND	U	0.98	0.69	1	09/29/15	10/06/15	KWG1509340	*
gamma-Chlordane†	ND	U	0.98	0.21	1	09/29/15	10/06/15	KWG1509340	*
Endosulfan I	ND	U	0.98	0.15	1	09/29/15	10/06/15	KWG1509340	*
alpha-Chlordane	ND	U	0.98	0.17	1	09/29/15	10/06/15	KWG1509340	*
Dieldrin	ND	U	0.98	0.23	1	09/29/15	10/06/15	KWG1509340	*
4,4'-DDE	ND	U	0.98	0.11	1	09/29/15	10/06/15	KWG1509340	*
Endrin	ND	U	0.98	0.18	1	09/29/15	10/06/15	KWG1509340	*
Endosulfan II	ND	U	0.98	0.20	1	09/29/15	10/06/15	KWG1509340	
4,4'-DDD	ND	U	0.98	0.28	1	09/29/15	10/06/15	KWG1509340	*
Endrin Aldehyde	ND	U	0.98	0.22	1	09/29/15	10/06/15	KWG1509340	*
Endosulfan Sulfate	ND	U	0.98	0.84	1	09/29/15	10/06/15	KWG1509340	*
4,4'-DDT	ND	U	0.98	0.30	1	09/29/15	10/06/15	KWG1509340	
Endrin Ketone	ND	U	0.98	0.28	1	09/29/15	10/06/15	KWG1509340	*
Methoxychlor	ND	U	0.98	0.22	1	09/29/15	10/06/15	KWG1509340	*
Toxaphene	ND	U	49	19	1	09/29/15	10/06/15	KWG1509340	

\* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	87	20-106	10/06/15	Acceptable
Decachlorobiphenyl	85	19-127	10/06/15	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

**Comments:** \_\_\_\_\_

**Client:** Portland, City of  
**Project:** Portland Harbor/W151174  
**Sample Matrix:** Water

**Service Request:** K1510784

**Surrogate Recovery Summary  
 Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>	<u>Sur2</u>
W151174-01	K1510784-001	43 D	48 D
W151174-02	K1510784-002	39 D	49 D
Method Blank	KWG1509340-5	87	85
Lab Control Sample	KWG1509340-1	88	101
Duplicate Lab Control Sample	KWG1509340-2	86	87

**Surrogate Recovery Control Limits (%)**

---

Sur1 = Tetrachloro-m-xylene	20-106
Sur2 = Decachlorobiphenyl	19-127

---

Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.

**Client:** Portland, City of  
**Project:** Portland Harbor/W151174  
**Sample Matrix:** Water

**Service Request:** K1510784  
**Date Extracted:** 09/29/2015  
**Date Analyzed:** 10/06/2015

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1509340

Analyte Name	Lab Control Sample KWG1509340-1 Lab Control Spike			Duplicate Lab Control Sample KWG1509340-2 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
alpha-BHC	18.1	10.0	181 *	10.4	10.0	104	36-122	55 *	30
beta-BHC	12.4	10.0	124	10.1	10.0	101	42-125	21	30
gamma-BHC (Lindane)	13.0	10.0	130 *	11.2	10.0	112	44-117	15	30
delta-BHC	15.0	10.0	150 *	11.2	10.0	112	48-123	29	30
Heptachlor	12.4	10.0	124 *	10.1	10.0	101	40-115	20	30
Aldrin	8.96	10.0	90	9.47	10.0	95	10-102	5	30
Heptachlor Epoxide	15.3	10.0	153 *	10.3	10.0	103	49-109	39 *	30
gamma-Chlordane	13.8	10.0	138 *	9.01	10.0	90	47-113	42 *	30
Endosulfan I	14.2	10.0	142 *	9.14	10.0	91	35-115	44 *	30
alpha-Chlordane	11.8	10.0	118 *	10.1	10.0	101	45-115	16	30
Dieldrin	21.2E	10.0	212 *	9.80	10.0	98	50-115	74 *	30
4,4'-DDE	15.8	10.0	158 *	10.6	10.0	106	41-116	39 *	30
Endrin	14.1	10.0	141 *	10.6	10.0	106	48-126	28	30
Endosulfan II	10.0	10.0	100	9.48	10.0	95	28-128	6	30
4,4'-DDD	18.7	10.0	187 *	10.1	10.0	101	33-132	60 *	30
Endrin Aldehyde	11.4	10.0	114 *	9.01	10.0	90	27-104	24	30
Endosulfan Sulfate	15.1	10.0	151 *	9.42	10.0	94	38-118	46 *	30
4,4'-DDT	14.1	10.0	141	10.6	10.0	106	42-143	29	30
Endrin Ketone	15.0	10.0	150 *	8.27	10.0	83	30-124	58 *	30
Methoxychlor	24.5E	10.0	245 *	10.4	10.0	104	43-143	81 *	30
Toxaphene	312	400	78	304	400	76	36-137	3	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Seattle  
5755 8th Street East  
Tacoma, WA 98424  
Tel: (253)922-2310

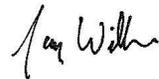
TestAmerica Job ID: 580-53707-1

TestAmerica Sample Delivery Group: W151174  
Client Project/Site: Portland Harbor

For:

City of Portland  
Water Pollution Laboratory  
6543 N. Burlington Ave  
Portland, Oregon 97203

Attn: Jennifer Shackelford



Authorized for release by:  
10/23/2015 1:58:11 PM

Jay Willms, Project Manager I  
(503)906-9238  
[jay.willms@testamericainc.com](mailto:jay.willms@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: City of Portland  
Project/Site: Portland Harbor

TestAmerica Job ID: 580-53707-1  
SDG: W151174

---

**Job ID: 580-53707-1**

---

**Laboratory: TestAmerica Seattle**

---

## Narrative

---

### Receipt

The samples were received on 9/28/2015 1:25 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.8° C.

### Subcontract non-Sister

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

### Subcontract Work

Methods City of Portland EDD, PCB Congeners 209: These methods were subcontracted to Pace Laboratories, Minneapolis. The subcontract laboratory certifications are different from that of the facility issuing the final report.

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# Definitions/Glossary

Client: City of Portland  
Project/Site: Portland Harbor

TestAmerica Job ID: 580-53707-1  
SDG: W151174

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
±	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Certification Summary

Client: City of Portland  
Project/Site: Portland Harbor

TestAmerica Job ID: 580-53707-1  
SDG: W151174

## Laboratory: TestAmerica Seattle

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska (UST)	State Program	10	UST-022	03-02-16
California	State Program	9	2901	01-31-17
L-A-B	DoD ELAP		L2236	01-19-16
L-A-B	ISO/IEC 17025		L2236	01-19-16
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-06-16
US Fish & Wildlife	Federal		LE058448-0	02-28-16
USDA	Federal		P330-14-00126	04-08-17
Washington	State Program	10	C553	02-17-16



# Sample Summary

Client: City of Portland  
Project/Site: Portland Harbor

TestAmerica Job ID: 580-53707-1  
SDG: W151174

---

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-53707-1	W151174-01	Water	09/25/15 10:14	09/28/15 13:25
580-53707-2	W151174-02	Water	09/25/15 10:14	09/28/15 13:25

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Pace Analytical Services, Inc.  
1700 Elm Street  
Minneapolis, MN 55414  
Phone: 612.607.1700  
Fax: 612.607.6444



**Report Prepared for:**

Jay Willms  
Test America  
9405 SW Nimbus Ave.  
Beaverton OR 97008

**Report Information:**

**Pace Project #: 10324376**  
**Sample Receipt Date: 09/30/2015**  
**Client Project #: Portland Harbor 25000370**  
**Client Sub PO #: N/A**  
**State Cert #: MN200001-005**

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Carolynne Trout, your Pace Project Manager.

**This report has been reviewed by:**

October 21, 2015

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

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The results relate only to the samples included in this report.

**Report Prepared Date:**

October 21, 2015



## **DISCUSSION**

This report presents the results from the analyses performed on two samples submitted by a representative of Test America - Portland. The samples were analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the volume of sample extracted.

The isotopically-labeled PCB internal standards in the sample extracts were recovered at 49-90%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the field samples.

Laboratory spike samples were also prepared with the sample batch using water that had been fortified with native standards. The results show that the spiked native compounds were recovered at 93-117%, with relative percent differences of 0.0-8.8%. These results were within the target ranges for this method. Matrix spikes were not prepared with the sample batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia	9952C
Maryland	322	Wisconsin	999407970
Michigan	9909	Wyoming	8TMS-Q
Minnesota	027-053-137		

## REPORT OF LABORATORY ANALYSIS

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# Appendix A

## Sample Management



**Sample Condition Upon Receipt**

Client Name: Test America

Project #: **WO# : 10324376**



Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  Speedee  Other: \_\_\_\_\_  
 Tracking Number: 6458 4314 6240

Custody Seal on Cooler/Box Present?  Yes  No      Seals Intact?  Yes  No      Optional: Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_

Packing Material:  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_      Temp Blank?  Yes  No

Thermometer Used:  B88A9130516413  B88A912167504  B88A0143310098      Type of Ice:  Wet  Blue  None  Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.0      Cooler Temp Corrected (°C): 0.1      Biological Tissue Frozen?  Yes  No  N/A  
 Temp should be above freezing to 6°C      Correction Factor: +0.1      Date and Initials of Person Examining Contents: Bm 9/30/15

USDA Regulated Soil (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)?  Yes  No  
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
 If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WTS</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**

Field Data Required?  Yes  No

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Comments/Resolution: \_\_\_\_\_

Project Manager Review: [Signature] Date: 10/1/15

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

## REPORT OF LABORATORY ANALYSIS

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# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - Test America

Client's Sample ID	W15I74-01 (580-53707-1)		
Lab Sample ID	10324376001		
Filename	P151017B_12		
Injected By	BAL		
Total Amount Extracted	977 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	09/25/2015 10:14
ICAL ID	P151017B02	Received	09/30/2015 10:00
CCal Filename(s)	P151017B_01	Extracted	10/13/2015 13:50
Method Blank ID	BLANK-47297	Analyzed	10/18/2015 06:35

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.677	3.01	2.0	1.10	55
13C-4-MoCB	3	11.277	2.91	2.0	1.15	57
13C-2,2'-DiCB	4	11.540	1.49	2.0	0.983	49
13C-4,4'-DiCB	15	18.331	1.61	2.0	1.27	64
13C-2,2',6-TrCB	19	15.145	1.05	2.0	1.16	58
13C-3,4,4'-TrCB	37	25.935	1.04	2.0	1.63	81
13C-2,2',6,6'-TeCB	54	18.590	0.79	2.0	1.28	64
13C-3,4,4',5-TeCB	81	32.983	0.78	2.0	1.68	84
13C-3,3',4,4'-TeCB	77	33.570	0.80	2.0	1.55	78
13C-2,2',4,6,6'-PeCB	104	24.560	1.68	2.0	1.23	61
13C-2,3,3',4,4'-PeCB	105	37.147	1.61	2.0	1.64	82
13C-2,3,4,4',5-PeCB	114	36.476	1.65	2.0	1.66	83
13C-2,3',4,4',5-PeCB	118	35.923	1.66	2.0	1.68	84
13C-2,3',4,4',5'-PeCB	123	35.587	1.56	2.0	1.70	85
13C-3,3',4,4',5-PeCB	126	40.333	1.65	2.0	1.62	81
13C-2,2',4,4',6,6'-HxCB	155	30.518	1.29	2.0	1.34	67
13C-HxCB (156/157)	156/157	43.356	1.26	4.0	2.82	71
13C-2,3',4,4',5,5'-HxCB	167	42.182	1.28	2.0	1.47	74
13C-3,3',4,4',5,5'-HxCB	169	46.676	1.30	2.0	1.33	67
13C-2,2',3,4',5,6,6'-HpCB	188	36.392	1.04	2.0	1.76	88
13C-2,3,3',4,4',5,5'-HpCB	189	49.194	1.07	2.0	1.69	85
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.864	0.88	2.0	1.79	90
13C-2,3,3',4,4',5,5',6-OxCB	205	51.780	0.90	2.0	1.50	75
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.569	0.82	2.0	1.33	66
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	48.633	0.80	2.0	1.58	79
13C--DeCB	209	55.272	0.72	2.0	1.25	62
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.625	1.17	2.0	1.68	84
13C-2,3,3',5,5'-PeCB	111	33.553	1.56	2.0	1.57	79
13C-2,2',3,3',5,5',6-HpCB	178	39.528	1.06	2.0	1.56	78
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.863	1.62	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.571	0.78	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.770	1.55	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.092	1.26	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.285	0.92	2.0	NA	NA

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W15I74-01 (580-53707-1)  
 Lab Sample ID 10324376001  
 Filename P151017B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.256
2		---	---	ND	---	0.256
3		---	---	ND	---	0.256
4		---	---	ND	---	0.256
5		---	---	ND	---	0.256
6		---	---	ND	---	0.256
7		---	---	ND	---	0.256
8		---	---	ND	---	0.256
9		---	---	ND	---	0.256
10		---	---	ND	---	0.256
11		---	---	ND	---	2.51
12	12/13	---	---	ND	---	0.512
13	12/13	---	---	ND	---	0.512
14		---	---	ND	---	0.256
15		---	---	ND	---	0.338
16		---	---	ND	---	0.256
17		---	---	ND	---	0.256
18	18/30	---	---	ND	---	0.512
19		---	---	ND	---	0.256
20	20/28	---	---	ND	---	1.32
21	21/33	---	---	ND	---	1.38
22		---	---	ND	---	0.972
23		---	---	ND	---	0.256
24		---	---	ND	---	0.256
25		---	---	ND	---	0.256
26	26/29	---	---	ND	---	0.512
27		---	---	ND	---	0.256
28	20/28	---	---	ND	---	1.32
29	26/29	---	---	ND	---	0.512
30	18/30	---	---	ND	---	0.512
31		---	---	ND	---	1.33
32		---	---	ND	---	0.256
33	21/33	---	---	ND	---	1.38
34		---	---	ND	---	0.256
35		---	---	ND	---	0.256
36		---	---	ND	---	0.256
37		---	---	ND	---	0.542
38		---	---	ND	---	0.256
39		---	---	ND	---	0.256
40	40/41/71	---	---	ND	---	1.54
41	40/41/71	---	---	ND	---	1.54
42		---	---	ND	---	0.512
43	43/73	---	---	ND	---	0.512
44	44/47/65	---	---	ND	---	1.54
45	45/51	---	---	ND	---	1.02
46		---	---	ND	---	0.512
47	44/47/65	---	---	ND	---	1.54
48		---	---	ND	---	0.512

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W15I74-01 (580-53707-1)  
Lab Sample ID 10324376001  
Filename P151017B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.02
50	50/53	---	---	ND	---	1.02
51	45/51	---	---	ND	---	1.02
52		---	---	ND	---	1.58
53	50/53	---	---	ND	---	1.02
54		---	---	ND	---	0.512
55		---	---	ND	---	0.512
56		---	---	ND	---	0.512
57		---	---	ND	---	0.512
58		---	---	ND	---	0.512
59	59/62/75	---	---	ND	---	1.54
60		---	---	ND	---	0.512
61	61/70/74/76	---	---	ND	---	2.05
62	59/62/75	---	---	ND	---	1.54
63		---	---	ND	---	0.512
64		---	---	ND	---	0.512
65	44/47/65	---	---	ND	---	1.54
66		---	---	ND	---	0.860
67		---	---	ND	---	0.512
68		---	---	ND	---	0.512
69	49/69	---	---	ND	---	1.02
70	61/70/74/76	---	---	ND	---	2.05
71	40/41/71	---	---	ND	---	1.54
72		---	---	ND	---	0.512
73	43/73	---	---	ND	---	0.512
74	61/70/74/76	---	---	ND	---	2.05
75	59/62/75	---	---	ND	---	1.54
76	61/70/74/76	---	---	ND	---	2.05
77		---	---	ND	---	0.512
78		---	---	ND	---	0.512
79		---	---	ND	---	0.512
80		---	---	ND	---	0.512
81		---	---	ND	---	0.512
82		---	---	ND	---	0.512
83		---	---	ND	---	0.512
84		---	---	ND	---	0.512
85	85/116/117	---	---	ND	---	1.54
86	86/87/97/108/119/125	---	---	ND	---	3.07
87	86/87/97/108/119/125	---	---	ND	---	3.07
88	88/91	---	---	ND	---	1.02
89		---	---	ND	---	0.512
90	90/101/113	---	---	ND	---	1.54
91	88/91	---	---	ND	---	1.02
92		---	---	ND	---	0.512
93	93/98/100/102	---	---	ND	---	2.05
94		---	---	ND	---	0.512
95		---	---	ND	---	0.972
96		---	---	ND	---	0.512

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
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ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W15I74-01 (580-53707-1)  
Lab Sample ID 10324376001  
Filename P151017B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.07
98	93/98/100/102	---	---	ND	---	2.05
99		---	---	ND	---	0.512
100	93/98/100/102	---	---	ND	---	2.05
101	90/101/113	---	---	ND	---	1.54
102	93/98/100/102	---	---	ND	---	2.05
103		---	---	ND	---	0.512
104		---	---	ND	---	0.512
105		---	---	ND	---	0.512
106		---	---	ND	---	0.512
107	107/124	---	---	ND	---	1.02
108	86/87/97/108/119/125	---	---	ND	---	3.07
109		---	---	ND	---	0.512
110	110/115	---	---	ND	---	1.02
111		---	---	ND	---	0.512
112		---	---	ND	---	0.512
113	90/101/113	---	---	ND	---	1.54
114		---	---	ND	---	0.512
115	110/115	---	---	ND	---	1.02
116	85/116/117	---	---	ND	---	1.54
117	85/116/117	---	---	ND	---	1.54
118		---	---	ND	---	0.655
119	86/87/97/108/119/125	---	---	ND	---	3.07
120		---	---	ND	---	0.512
121		---	---	ND	---	0.512
122		---	---	ND	---	0.512
123		---	---	ND	---	0.512
124	107/124	---	---	ND	---	1.02
125	86/87/97/108/119/125	---	---	ND	---	3.07
126		---	---	ND	---	0.512
127		---	---	ND	---	0.512
128	128/166	---	---	ND	---	1.02
129	129/138/163	---	---	ND	---	1.54
130		---	---	ND	---	0.512
131		---	---	ND	---	0.512
132		---	---	ND	---	0.512
133		---	---	ND	---	0.512
134	134/143	---	---	ND	---	1.02
135	135/151	---	---	ND	---	1.02
136		---	---	ND	---	0.512
137		---	---	ND	---	0.512
138	129/138/163	---	---	ND	---	1.54
139	139/140	---	---	ND	---	1.02
140	139/140	---	---	ND	---	1.02
141		---	---	ND	---	0.512
142		---	---	ND	---	0.512
143	134/143	---	---	ND	---	1.02
144		---	---	ND	---	0.512

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W15I74-01 (580-53707-1)  
Lab Sample ID 10324376001  
Filename P151017B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.512
146		---	---	ND	---	0.512
147	147/149	---	---	ND	---	1.02
148		---	---	ND	---	0.512
149	147/149	---	---	ND	---	1.02
150		---	---	ND	---	0.512
151	135/151	---	---	ND	---	1.02
152		---	---	ND	---	0.512
153	153/168	---	---	ND	---	1.02
154		---	---	ND	---	0.512
155		---	---	ND	---	0.512
156	156/157	---	---	ND	---	1.02
157	156/157	---	---	ND	---	1.02
158		---	---	ND	---	0.512
159		---	---	ND	---	0.512
160		---	---	ND	---	0.512
161		---	---	ND	---	0.512
162		---	---	ND	---	0.512
163	129/138/163	---	---	ND	---	1.54
164		---	---	ND	---	0.512
165		---	---	ND	---	0.512
166	128/166	---	---	ND	---	1.02
167		---	---	ND	---	0.512
168	153/168	---	---	ND	---	1.02
169		---	---	ND	---	0.512
170		---	---	ND	---	0.512
171	171/173	---	---	ND	---	1.02
172		---	---	ND	---	0.512
173	171/173	---	---	ND	---	1.02
174		---	---	ND	---	0.512
175		---	---	ND	---	0.512
176		---	---	ND	---	0.512
177		---	---	ND	---	0.512
178		---	---	ND	---	0.512
179		---	---	ND	---	0.512
180	180/193	---	---	ND	---	1.02
181		---	---	ND	---	0.512
182		---	---	ND	---	0.512
183	183/185	---	---	ND	---	1.02
184		---	---	ND	---	0.512
185	183/185	---	---	ND	---	1.02
186		---	---	ND	---	0.512
187		---	---	ND	---	0.512
188		---	---	ND	---	0.512
189		---	---	ND	---	0.512
190		---	---	ND	---	0.512
191		---	---	ND	---	0.512
192		---	---	ND	---	0.512

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W15I74-01 (580-53707-1)  
 Lab Sample ID 10324376001  
 Filename P151017B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.02
194		---	---	ND	---	0.768
195		---	---	ND	---	0.768
196		---	---	ND	---	0.768
197	197/200	---	---	ND	---	1.54
198	198/199	---	---	ND	---	1.54
199	198/199	---	---	ND	---	1.54
200	197/200	---	---	ND	---	1.54
201		---	---	ND	---	0.768
202		---	---	ND	---	0.768
203		---	---	ND	---	0.768
204		---	---	ND	---	0.768
205		---	---	ND	---	0.768
206		---	---	ND	---	0.768
207		---	---	ND	---	0.768
208		---	---	ND	---	0.768
209		---	---	ND	---	0.768



Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
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### Method 1668A Polychlorobiphenyl Sample Analysis Results

Client Sample ID           W15I74-01 (580-53707-1)  
Lab Sample ID             10324376001  
Filename                    P151017B\_12

Congener Group	Concentration ng/L
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl Sample Analysis Results**

Client - Test America

Client's Sample ID	W15I74-02 (580-53707-2)		
Lab Sample ID	10324376002		
Filename	P151017B_13		
Injected By	BAL		
Total Amount Extracted	976 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	09/25/2015 10:14
ICAL ID	P151017B02	Received	09/30/2015 10:00
CCal Filename(s)	P151017B_01	Extracted	10/13/2015 13:50
Method Blank ID	BLANK-47297	Analyzed	10/18/2015 07:33

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.689	3.20	2.0	1.14	57
13C-4-MoCB	3	11.301	3.26	2.0	1.23	61
13C-2,2'-DiCB	4	11.552	1.58	2.0	1.08	54
13C-4,4'-DiCB	15	18.344	1.59	2.0	1.30	65
13C-2,2',6-TrCB	19	15.133	1.09	2.0	1.25	62
13C-3,4,4'-TrCB	37	25.951	1.07	2.0	1.56	78
13C-2,2',6,6'-TeCB	54	18.608	0.80	2.0	1.27	64
13C-3,4,4',5-TeCB	81	33.015	0.75	2.0	1.66	83
13C-3,3',4,4'-TeCB	77	33.585	0.78	2.0	1.59	79
13C-2,2',4,6,6'-PeCB	104	24.576	1.64	2.0	1.20	60
13C-2,3,3',4,4'-PeCB	105	37.145	1.63	2.0	1.57	79
13C-2,3,4,4',5-PeCB	114	36.491	1.60	2.0	1.63	82
13C-2,3',4,4',5-PeCB	118	35.954	1.68	2.0	1.66	83
13C-2,3',4,4',5'-PeCB	123	35.602	1.58	2.0	1.65	82
13C-3,3',4,4',5-PeCB	126	40.330	1.58	2.0	1.61	81
13C-2,2',4,4',6,6'-HxCB	155	30.534	1.30	2.0	1.26	63
13C-HxCB (156/157)	156/157	43.387	1.25	4.0	2.88	72
13C-2,3',4,4',5,5'-HxCB	167	42.196	1.30	2.0	1.53	76
13C-3,3',4,4',5,5'-HxCB	169	46.690	1.26	2.0	1.34	67
13C-2,2',3,4',5,6,6'-HpCB	188	36.407	1.03	2.0	1.66	83
13C-2,3,3',4,4',5,5'-HpCB	189	49.208	1.03	2.0	1.59	79
13C-2,2',3,3',5,5',6,6'-OcCB	202	41.878	0.92	2.0	1.73	86
13C-2,3,3',4,4',5,5',6-OcCB	205	51.794	0.88	2.0	1.46	73
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.604	0.81	2.0	1.31	65
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	48.647	0.80	2.0	1.50	75
13C--DeCB	209	55.285	0.71	2.0	1.38	69
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.642	1.04	2.0	1.63	82
13C-2,3,3',5,5'-PeCB	111	33.568	1.62	2.0	1.46	73
13C-2,2',3,3',5,5',6-HpCB	178	39.542	1.06	2.0	1.52	76
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.875	1.60	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.587	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.785	1.59	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.106	1.31	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OcCB	194	51.298	0.91	2.0	NA	NA

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W15I74-02 (580-53707-2)  
Lab Sample ID 10324376002  
Filename P151017B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.256
2		---	---	ND	---	0.256
3		---	---	ND	---	0.256
4		---	---	ND	---	0.256
5		---	---	ND	---	0.256
6		---	---	ND	---	0.256
7		---	---	ND	---	0.256
8		---	---	ND	---	0.256
9		---	---	ND	---	0.256
10		---	---	ND	---	0.256
11		---	---	ND	---	2.51
12	12/13	---	---	ND	---	0.513
13	12/13	---	---	ND	---	0.513
14		---	---	ND	---	0.256
15		---	---	ND	---	0.338
16		---	---	ND	---	0.256
17		---	---	ND	---	0.256
18	18/30	---	---	ND	---	0.513
19		---	---	ND	---	0.256
20	20/28	---	---	ND	---	1.32
21	21/33	---	---	ND	---	1.38
22		---	---	ND	---	0.974
23		---	---	ND	---	0.256
24		---	---	ND	---	0.256
25		---	---	ND	---	0.256
26	26/29	---	---	ND	---	0.513
27		---	---	ND	---	0.256
28	20/28	---	---	ND	---	1.32
29	26/29	---	---	ND	---	0.513
30	18/30	---	---	ND	---	0.513
31		---	---	ND	---	1.33
32		---	---	ND	---	0.256
33	21/33	---	---	ND	---	1.38
34		---	---	ND	---	0.256
35		---	---	ND	---	0.256
36		---	---	ND	---	0.256
37		---	---	ND	---	0.543
38		---	---	ND	---	0.256
39		---	---	ND	---	0.256
40	40/41/71	---	---	ND	---	1.54
41	40/41/71	---	---	ND	---	1.54
42		---	---	ND	---	0.513
43	43/73	---	---	ND	---	0.513
44	44/47/65	---	---	ND	---	1.54
45	45/51	---	---	ND	---	1.03
46		---	---	ND	---	0.513
47	44/47/65	---	---	ND	---	1.54
48		---	---	ND	---	0.513

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W15I74-02 (580-53707-2)  
Lab Sample ID 10324376002  
Filename P151017B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.03
50	50/53	---	---	ND	---	1.03
51	45/51	---	---	ND	---	1.03
52		---	---	ND	---	1.58
53	50/53	---	---	ND	---	1.03
54		---	---	ND	---	0.513
55		---	---	ND	---	0.513
56		---	---	ND	---	0.513
57		---	---	ND	---	0.513
58		---	---	ND	---	0.513
59	59/62/75	---	---	ND	---	1.54
60		---	---	ND	---	0.513
61	61/70/74/76	---	---	ND	---	2.05
62	59/62/75	---	---	ND	---	1.54
63		---	---	ND	---	0.513
64		---	---	ND	---	0.513
65	44/47/65	---	---	ND	---	1.54
66		---	---	ND	---	0.861
67		---	---	ND	---	0.513
68		---	---	ND	---	0.513
69	49/69	---	---	ND	---	1.03
70	61/70/74/76	---	---	ND	---	2.05
71	40/41/71	---	---	ND	---	1.54
72		---	---	ND	---	0.513
73	43/73	---	---	ND	---	0.513
74	61/70/74/76	---	---	ND	---	2.05
75	59/62/75	---	---	ND	---	1.54
76	61/70/74/76	---	---	ND	---	2.05
77		---	---	ND	---	0.513
78		---	---	ND	---	0.513
79		---	---	ND	---	0.513
80		---	---	ND	---	0.513
81		---	---	ND	---	0.513
82		---	---	ND	---	0.513
83		---	---	ND	---	0.513
84		---	---	ND	---	0.513
85	85/116/117	---	---	ND	---	1.54
86	86/87/97/108/119/125	---	---	ND	---	3.08
87	86/87/97/108/119/125	---	---	ND	---	3.08
88	88/91	---	---	ND	---	1.03
89		---	---	ND	---	0.513
90	90/101/113	---	---	ND	---	1.54
91	88/91	---	---	ND	---	1.03
92		---	---	ND	---	0.513
93	93/98/100/102	---	---	ND	---	2.05
94		---	---	ND	---	0.513
95		---	---	ND	---	0.974
96		---	---	ND	---	0.513

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W15I74-02 (580-53707-2)  
Lab Sample ID 10324376002  
Filename P151017B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.08
98	93/98/100/102	---	---	ND	---	2.05
99		---	---	ND	---	0.513
100	93/98/100/102	---	---	ND	---	2.05
101	90/101/113	---	---	ND	---	1.54
102	93/98/100/102	---	---	ND	---	2.05
103		---	---	ND	---	0.513
104		---	---	ND	---	0.513
105		---	---	ND	---	0.513
106		---	---	ND	---	0.513
107	107/124	---	---	ND	---	1.03
108	86/87/97/108/119/125	---	---	ND	---	3.08
109		---	---	ND	---	0.513
110	110/115	---	---	ND	---	1.03
111		---	---	ND	---	0.513
112		---	---	ND	---	0.513
113	90/101/113	---	---	ND	---	1.54
114		---	---	ND	---	0.513
115	110/115	---	---	ND	---	1.03
116	85/116/117	---	---	ND	---	1.54
117	85/116/117	---	---	ND	---	1.54
118		---	---	ND	---	0.656
119	86/87/97/108/119/125	---	---	ND	---	3.08
120		---	---	ND	---	0.513
121		---	---	ND	---	0.513
122		---	---	ND	---	0.513
123		---	---	ND	---	0.513
124	107/124	---	---	ND	---	1.03
125	86/87/97/108/119/125	---	---	ND	---	3.08
126		---	---	ND	---	0.513
127		---	---	ND	---	0.513
128	128/166	---	---	ND	---	1.03
129	129/138/163	---	---	ND	---	1.54
130		---	---	ND	---	0.513
131		---	---	ND	---	0.513
132		---	---	ND	---	0.513
133		---	---	ND	---	0.513
134	134/143	---	---	ND	---	1.03
135	135/151	---	---	ND	---	1.03
136		---	---	ND	---	0.513
137		---	---	ND	---	0.513
138	129/138/163	---	---	ND	---	1.54
139	139/140	---	---	ND	---	1.03
140	139/140	---	---	ND	---	1.03
141		---	---	ND	---	0.513
142		---	---	ND	---	0.513
143	134/143	---	---	ND	---	1.03
144		---	---	ND	---	0.513

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
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R = Recovery outside of Method 1668A control limits  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W15I74-02 (580-53707-2)  
Lab Sample ID 10324376002  
Filename P151017B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.513
146		---	---	ND	---	0.513
147	147/149	---	---	ND	---	1.03
148		---	---	ND	---	0.513
149	147/149	---	---	ND	---	1.03
150		---	---	ND	---	0.513
151	135/151	---	---	ND	---	1.03
152		---	---	ND	---	0.513
153	153/168	---	---	ND	---	1.03
154		---	---	ND	---	0.513
155		---	---	ND	---	0.513
156	156/157	---	---	ND	---	1.03
157	156/157	---	---	ND	---	1.03
158		---	---	ND	---	0.513
159		---	---	ND	---	0.513
160		---	---	ND	---	0.513
161		---	---	ND	---	0.513
162		---	---	ND	---	0.513
163	129/138/163	---	---	ND	---	1.54
164		---	---	ND	---	0.513
165		---	---	ND	---	0.513
166	128/166	---	---	ND	---	1.03
167		---	---	ND	---	0.513
168	153/168	---	---	ND	---	1.03
169		---	---	ND	---	0.513
170		---	---	ND	---	0.513
171	171/173	---	---	ND	---	1.03
172		---	---	ND	---	0.513
173	171/173	---	---	ND	---	1.03
174		---	---	ND	---	0.513
175		---	---	ND	---	0.513
176		---	---	ND	---	0.513
177		---	---	ND	---	0.513
178		---	---	ND	---	0.513
179		---	---	ND	---	0.513
180	180/193	---	---	ND	---	1.03
181		---	---	ND	---	0.513
182		---	---	ND	---	0.513
183	183/185	---	---	ND	---	1.03
184		---	---	ND	---	0.513
185	183/185	---	---	ND	---	1.03
186		---	---	ND	---	0.513
187		---	---	ND	---	0.513
188		---	---	ND	---	0.513
189		---	---	ND	---	0.513
190		---	---	ND	---	0.513
191		---	---	ND	---	0.513
192		---	---	ND	---	0.513

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
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R = Recovery outside of Method 1668A control limits  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W15I74-02 (580-53707-2)  
Lab Sample ID 10324376002  
Filename P151017B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.03
194		---	---	ND	---	0.769
195		---	---	ND	---	0.769
196		---	---	ND	---	0.769
197	197/200	---	---	ND	---	1.54
198	198/199	---	---	ND	---	1.54
199	198/199	---	---	ND	---	1.54
200	197/200	---	---	ND	---	1.54
201		---	---	ND	---	0.769
202		---	---	ND	---	0.769
203		---	---	ND	---	0.769
204		---	---	ND	---	0.769
205		---	---	ND	---	0.769
206		---	---	ND	---	0.769
207		---	---	ND	---	0.769
208		---	---	ND	---	0.769
209		---	---	ND	---	0.769



Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           W15I74-02 (580-53707-2)  
Lab Sample ID             10324376002  
Filename                    P151017B\_13

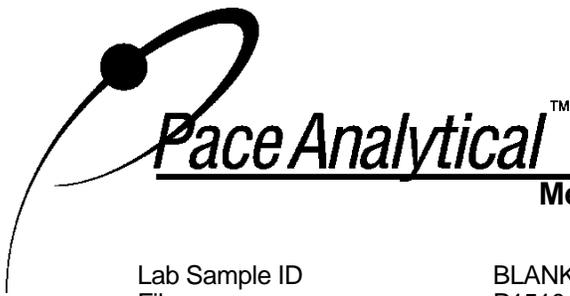
Congener Group	Concentration ng/L
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected



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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-47297	Matrix	Water
Filename	P151017A_09	Extracted	10/13/2015 13:50
Injected By	BAL	Analyzed	10/17/2015 13:54
Total Amount Extracted	996 mL	Dilution	5
ICAL ID	P151017A02		
CCal Filename(s)	P151017A_01		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.677	3.19	2.0	1.28	64
13C-4-MoCB	3	11.276	3.28	2.0	1.32	66
13C-2,2'-DiCB	4	11.528	1.55	2.0	1.22	61
13C-4,4'-DiCB	15	18.307	1.61	2.0	1.44	72
13C-2,2',6-TrCB	19	15.120	1.01	2.0	1.32	66
13C-3,4,4'-TrCB	37	25.918	1.06	2.0	1.56	78
13C-2,2',6,6'-TeCB	54	18.573	0.83	2.0	1.40	70
13C-3,4,4',5-TeCB	81	32.983	0.81	2.0	1.70	85
13C-3,3',4,4'-TeCB	77	33.553	0.77	2.0	1.66	83
13C-2,2',4,6,6'-PeCB	104	24.526	1.60	2.0	1.26	63
13C-2,3,3',4,4'-PeCB	105	37.113	1.64	2.0	1.77	88
13C-2,3,4,4',5-PeCB	114	36.443	1.57	2.0	1.76	88
13C-2,3',4,4',5-PeCB	118	35.906	1.59	2.0	1.77	88
13C-2,3',4,4',5'-PeCB	123	35.570	1.63	2.0	1.80	90
13C-3,3',4,4',5-PeCB	126	40.299	1.59	2.0	1.70	85
13C-2,2',4,4',6,6'-HxCB	155	30.484	1.25	2.0	1.33	67
13C-HxCB (156/157)	156/157	43.323	1.32	4.0	3.18	79
13C-2,3',4,4',5,5'-HxCB	167	42.149	1.27	2.0	1.64	82
13C-3,3',4,4',5,5'-HxCB	169	46.643	1.30	2.0	1.54	77
13C-2,2',3,4',5,6,6'-HpCB	188	36.359	1.06	2.0	1.59	79
13C-2,3,3',4,4',5,5'-HpCB	189	49.173	1.01	2.0	1.75	87
13C-2,2',3,3',5,5',6,6'-OoCB	202	41.831	0.89	2.0	1.75	88
13C-2,3,3',4,4',5,5',6-OoCB	205	51.738	0.90	2.0	1.74	87
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.527	0.81	2.0	1.57	78
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	48.612	0.78	2.0	1.64	82
13C-DeCB	209	55.229	0.71	2.0	1.80	90
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.592	1.02	2.0	1.64	82
13C-2,3,3',5,5'-PeCB	111	33.536	1.64	2.0	1.54	77
13C-2,2',3,3',5,5',6-HpCB	178	39.494	1.06	2.0	1.58	79
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.838	1.59	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.537	0.79	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.736	1.57	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.058	1.24	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	51.242	0.89	2.0	NA	NA

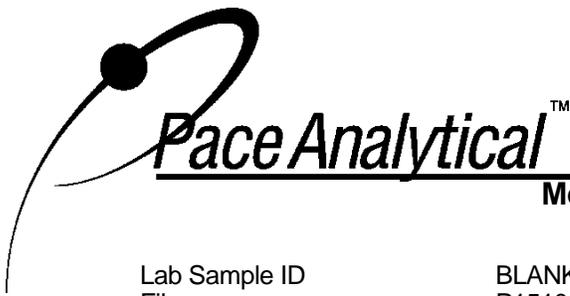
Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-47297  
 Filename P151017A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.251
2		---	---	ND	---	0.251
3		---	---	ND	---	0.251
4		---	---	ND	---	0.251
5		---	---	ND	---	0.251
6		---	---	ND	---	0.251
7		---	---	ND	---	0.251
8		---	---	ND	---	0.251
9		---	---	ND	---	0.251
10		---	---	ND	---	0.251
11		---	---	ND	---	2.46
12	12/13	---	---	ND	---	0.502
13	12/13	---	---	ND	---	0.502
14		---	---	ND	---	0.251
15		---	---	ND	---	0.251
16		---	---	ND	---	0.251
17		---	---	ND	---	0.251
18	18/30	---	---	ND	---	0.502
19		---	---	ND	---	0.251
20	20/28	---	---	ND	---	1.30
21	21/33	---	---	ND	---	1.36
22		---	---	ND	---	0.954
23		---	---	ND	---	0.251
24		---	---	ND	---	0.251
25		---	---	ND	---	0.251
26	26/29	---	---	ND	---	0.502
27		---	---	ND	---	0.251
28	20/28	---	---	ND	---	1.30
29	26/29	---	---	ND	---	0.502
30	18/30	---	---	ND	---	0.502
31		---	---	ND	---	1.31
32		---	---	ND	---	0.251
33	21/33	---	---	ND	---	1.36
34		---	---	ND	---	0.251
35		---	---	ND	---	0.251
36		---	---	ND	---	0.251
37		---	---	ND	---	0.532
38		---	---	ND	---	0.251
39		---	---	ND	---	0.251
40	40/41/71	---	---	ND	---	1.51
41	40/41/71	---	---	ND	---	1.51
42		---	---	ND	---	0.502
43	43/73	---	---	ND	---	0.502
44	44/47/65	---	---	ND	---	1.51
45	45/51	---	---	ND	---	1.00

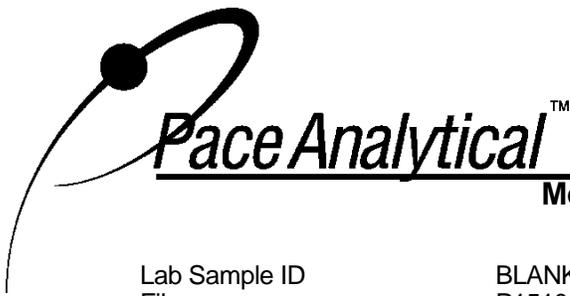
Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-47297  
Filename P151017A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		---	---	ND	---	0.502
47	44/47/65	---	---	ND	---	1.51
48		---	---	ND	---	0.502
49	49/69	---	---	ND	---	1.00
50	50/53	---	---	ND	---	1.00
51	45/51	---	---	ND	---	1.00
52		---	---	ND	---	1.55
53	50/53	---	---	ND	---	1.00
54		---	---	ND	---	0.502
55		---	---	ND	---	0.502
56		---	---	ND	---	0.502
57		---	---	ND	---	0.502
58		---	---	ND	---	0.502
59	59/62/75	---	---	ND	---	1.51
60		---	---	ND	---	0.502
61	61/70/74/76	---	---	ND	---	2.01
62	59/62/75	---	---	ND	---	1.51
63		---	---	ND	---	0.502
64		---	---	ND	---	0.502
65	44/47/65	---	---	ND	---	1.51
66		---	---	ND	---	0.843
67		---	---	ND	---	0.502
68		---	---	ND	---	0.502
69	49/69	---	---	ND	---	1.00
70	61/70/74/76	---	---	ND	---	2.01
71	40/41/71	---	---	ND	---	1.51
72		---	---	ND	---	0.502
73	43/73	---	---	ND	---	0.502
74	61/70/74/76	---	---	ND	---	2.01
75	59/62/75	---	---	ND	---	1.51
76	61/70/74/76	---	---	ND	---	2.01
77		---	---	ND	---	0.502
78		---	---	ND	---	0.502
79		---	---	ND	---	0.502
80		---	---	ND	---	0.502
81		---	---	ND	---	0.502
82		---	---	ND	---	0.502
83		---	---	ND	---	0.502
84		---	---	ND	---	0.502
85	85/116/117	---	---	ND	---	1.51
86	86/87/97/108/119/125	---	---	ND	---	3.01
87	86/87/97/108/119/125	---	---	ND	---	3.01
88	88/91	---	---	ND	---	1.00
89		---	---	ND	---	0.502
90	90/101/113	---	---	ND	---	1.51

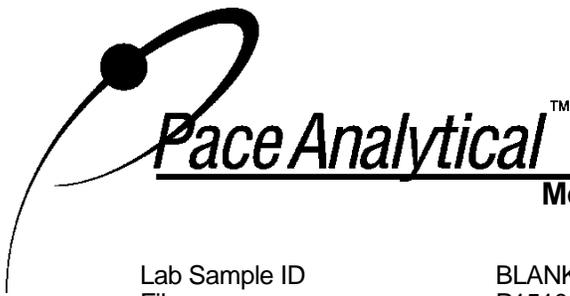
Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-47297  
Filename P151017A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	---	---	ND	---	1.00
92		---	---	ND	---	0.502
93	93/98/100/102	---	---	ND	---	2.01
94		---	---	ND	---	0.502
95		---	---	ND	---	0.954
96		---	---	ND	---	0.502
97	86/87/97/108/119/125	---	---	ND	---	3.01
98	93/98/100/102	---	---	ND	---	2.01
99		---	---	ND	---	0.502
100	93/98/100/102	---	---	ND	---	2.01
101	90/101/113	---	---	ND	---	1.51
102	93/98/100/102	---	---	ND	---	2.01
103		---	---	ND	---	0.502
104		---	---	ND	---	0.502
105		---	---	ND	---	0.502
106		---	---	ND	---	0.502
107	107/124	---	---	ND	---	1.00
108	86/87/97/108/119/125	---	---	ND	---	3.01
109		---	---	ND	---	0.502
110	110/115	---	---	ND	---	1.00
111		---	---	ND	---	0.502
112		---	---	ND	---	0.502
113	90/101/113	---	---	ND	---	1.51
114		---	---	ND	---	0.502
115	110/115	---	---	ND	---	1.00
116	85/116/117	---	---	ND	---	1.51
117	85/116/117	---	---	ND	---	1.51
118		---	---	ND	---	0.643
119	86/87/97/108/119/125	---	---	ND	---	3.01
120		---	---	ND	---	0.502
121		---	---	ND	---	0.502
122		---	---	ND	---	0.502
123		---	---	ND	---	0.502
124	107/124	---	---	ND	---	1.00
125	86/87/97/108/119/125	---	---	ND	---	3.01
126		---	---	ND	---	0.502
127		---	---	ND	---	0.502
128	128/166	---	---	ND	---	1.00
129	129/138/163	---	---	ND	---	1.51
130		---	---	ND	---	0.502
131		---	---	ND	---	0.502
132		---	---	ND	---	0.502
133		---	---	ND	---	0.502
134	134/143	---	---	ND	---	1.00
135	135/151	---	---	ND	---	1.00

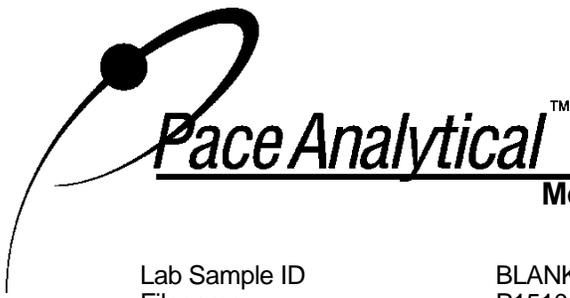
Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-47297  
 Filename P151017A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		---	---	ND	---	0.502
137		---	---	ND	---	0.502
138	129/138/163	---	---	ND	---	1.51
139	139/140	---	---	ND	---	1.00
140	139/140	---	---	ND	---	1.00
141		---	---	ND	---	0.502
142		---	---	ND	---	0.502
143	134/143	---	---	ND	---	1.00
144		---	---	ND	---	0.502
145		---	---	ND	---	0.502
146		---	---	ND	---	0.502
147	147/149	---	---	ND	---	1.00
148		---	---	ND	---	0.502
149	147/149	---	---	ND	---	1.00
150		---	---	ND	---	0.502
151	135/151	---	---	ND	---	1.00
152		---	---	ND	---	0.502
153	153/168	---	---	ND	---	1.00
154		---	---	ND	---	0.502
155		---	---	ND	---	0.502
156	156/157	---	---	ND	---	1.00
157	156/157	---	---	ND	---	1.00
158		---	---	ND	---	0.502
159		---	---	ND	---	0.502
160		---	---	ND	---	0.502
161		---	---	ND	---	0.502
162		---	---	ND	---	0.502
163	129/138/163	---	---	ND	---	1.51
164		---	---	ND	---	0.502
165		---	---	ND	---	0.502
166	128/166	---	---	ND	---	1.00
167		---	---	ND	---	0.502
168	153/168	---	---	ND	---	1.00
169		---	---	ND	---	0.502
170		---	---	ND	---	0.502
171	171/173	---	---	ND	---	1.00
172		---	---	ND	---	0.502
173	171/173	---	---	ND	---	1.00
174		---	---	ND	---	0.502
175		---	---	ND	---	0.502
176		---	---	ND	---	0.502
177		---	---	ND	---	0.502
178		---	---	ND	---	0.502
179		---	---	ND	---	0.502
180	180/193	---	---	ND	---	1.00

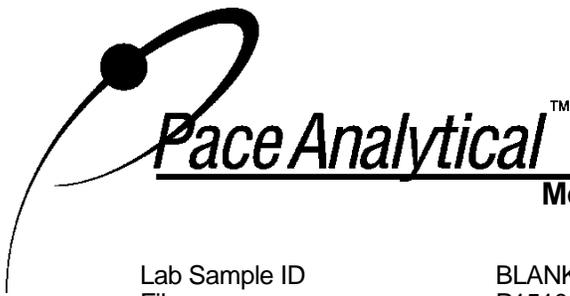
Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-47297  
 Filename P151017A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		---	---	ND	---	0.502
182		---	---	ND	---	0.502
183	183/185	---	---	ND	---	1.00
184		---	---	ND	---	0.502
185	183/185	---	---	ND	---	1.00
186		---	---	ND	---	0.502
187		---	---	ND	---	0.502
188		---	---	ND	---	0.502
189		---	---	ND	---	0.502
190		---	---	ND	---	0.502
191		---	---	ND	---	0.502
192		---	---	ND	---	0.502
193	180/193	---	---	ND	---	1.00
194		---	---	ND	---	0.753
195		---	---	ND	---	0.753
196		---	---	ND	---	0.753
197	197/200	---	---	ND	---	1.51
198	198/199	---	---	ND	---	1.51
199	198/199	---	---	ND	---	1.51
200	197/200	---	---	ND	---	1.51
201		---	---	ND	---	0.753
202		---	---	ND	---	0.753
203		---	---	ND	---	0.753
204		---	---	ND	---	0.753
205		---	---	ND	---	0.753
206		---	---	ND	---	0.753
207		---	---	ND	---	0.753
208		---	---	ND	---	0.753
209		---	---	ND	---	0.753



Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID           CBLKFC  
Lab Sample ID            BLANK-47297  
Filename                    P151017A\_09

Congener Group	Concentration ng/L
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected



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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCS-47298	Matrix	Water
Filename	P151016A_13	Dilution	5
Total Amount Extracted	1050 mL	Extracted	10/13/2015 13:50
ICAL ID	P151016A08	Analyzed	10/16/2015 22:12
CCal Filename(s)	P151016A_07	Injected By	CVS
Method Blank ID	BLANK-47297		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.06	106	2.0	1.12	56
3	1.0	0.964	96	2.0	1.21	61
4	1.0	1.03	103	2.0	1.10	55
15	1.0	1.01	101	2.0	1.25	62
19	1.0	1.01	101	2.0	1.18	59
37	1.0	0.981	98	2.0	1.43	71
54	1.0	1.08	108	2.0	1.14	57
81	1.0	1.04	104	2.0	1.47	74
77	1.0	1.05	105	2.0	1.43	71
104	1.0	1.10	110	2.0	1.17	59
105	1.0	1.06	106	2.0	1.48	74
114	1.0	1.07	107	2.0	1.50	75
118	1.0	1.05	105	2.0	1.55	77
123	1.0	0.988	99	2.0	1.55	78
126	1.0	1.03	103	2.0	1.52	76
155	1.0	0.972	97	2.0	1.29	64
156/157	2.0	2.03	101	4.0	2.82	70
167	1.0	1.05	105	2.0	1.46	73
169	1.0	0.995	100	2.0	1.39	70
188	1.0	1.05	105	2.0	1.47	74
189	1.0	1.05	105	2.0	1.59	79
202	1.0	1.03	103	2.0	1.64	82
205	1.0	0.979	98	2.0	1.54	77
206	1.0	1.14	114	2.0	1.36	68
208	1.0	1.05	105	2.0	1.59	80
209	1.0	0.929	93	2.0	1.51	76

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

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### Method 1668A Polychlorobiphenyls Laboratory Control Spike Analysis Results

Lab Sample ID	LCSD-47299	Matrix	Water
Filename	P151016A_14	Dilution	5
Total Amount Extracted	1040 mL	Extracted	10/13/2015 13:50
ICAL ID	P151016A08	Analyzed	10/16/2015 23:11
CCal Filename(s)	P151016A_07	Injected By	CVS
Method Blank ID	BLANK-47297		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.05	105	2.0	1.28	64
3	1.0	1.06	106	2.0	1.29	64
4	1.0	1.04	104	2.0	1.24	62
15	1.0	1.06	106	2.0	1.42	71
19	1.0	1.02	102	2.0	1.32	66
37	1.0	1.07	107	2.0	1.57	78
54	1.0	1.02	102	2.0	1.40	70
81	1.0	1.03	103	2.0	1.78	89
77	1.0	1.03	103	2.0	1.70	85
104	1.0	1.04	104	2.0	1.33	67
105	1.0	1.04	104	2.0	1.66	83
114	1.0	1.00	100	2.0	1.67	84
118	1.0	1.02	102	2.0	1.68	84
123	1.0	0.994	99	2.0	1.70	85
126	1.0	1.08	108	2.0	1.66	83
155	1.0	0.972	97	2.0	1.57	78
156/157	2.0	2.07	104	4.0	3.32	83
167	1.0	1.03	103	2.0	1.69	85
169	1.0	1.04	104	2.0	1.58	79
188	1.0	1.09	109	2.0	1.77	89
189	1.0	1.02	102	2.0	1.90	95
202	1.0	0.985	99	2.0	1.97	99
205	1.0	1.02	102	2.0	1.76	88
206	1.0	1.17	117	2.0	1.61	81
208	1.0	1.04	104	2.0	1.75	88
209	1.0	0.977	98	2.0	1.78	89

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client Test America

Spike 1 ID LCS-47298  
Spike 1 Filename P151016A\_13

Spike 2 ID LCSD-47299  
Spike 2 Filename P151016A\_14

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	106	105	0.9
4-MoCB	3	96	106	9.9
2,2'-DiCB	4	103	104	1.0
4,4'-DiCB	15	101	106	4.8
2,2',6-TrCB	19	101	102	1.0
3,4,4'-TrCB	37	98	107	8.8
2,2',6,6'-TeCB	54	108	102	5.7
3,3',4,4'-TeCB	77	105	103	1.9
3,4,4',5'-TeCB	81	104	103	1.0
2,2',4,6,6'-PeCB	104	110	104	5.6
2,3,3',4,4'-PeCB	105	106	104	1.9
2,3,4,4',5'-PeCB	114	107	100	6.8
2,3',4,4',5'-PeCB	118	105	102	2.9
2,3',4,4',5'-PeCB	123	99	99	0.0
3,3',4,4',5'-PeCB	126	103	108	4.7
2,2',4,4',6,6'-HxCB (156/157)	155 156/157	97 101	97 104	0.0 2.9
2,3',4,4',5,5'-HxCB	167	105	103	1.9
3,3',4,4',5,5'-HxCB	169	100	104	3.9
2,2',3,4',5,6,6'-HpCB	188	105	109	3.7
2,3,3',4,4',5,5'-HpCB	189	105	102	2.9
2,2',3,3',5,5',6,6'-OcCB	202	103	99	4.0
2,3,3',4,4',5,5',6-OcCB	205	98	102	4.0
2,2',3,3',4,4',5,5',6-NoCB	206	114	117	2.6
2,2',3,3',4,4',5,5',6,6'-NoCB	208	105	104	1.0
Decachlorobiphenyl	209	93	98	5.2

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

**REPORT OF LABORATORY ANALYSIS**

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**SUBCONTRACT ORDER**  
**City of Portland Water Pollution Control Lab**  
**W151174**

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle using P.O.# 30001516

**RECEIVING LABORATORY:**

TestAmerica  
 9405 SW Nimbus Ave  
 Beaverton, OR 97008  
 Phone : (503) 906-9200  
 Fax: (503) 906-9210



580-53707 Chain of Custody

**WPCL Project Name**  
**Portland Harbor**

**TURNAROUND REQUEST**

- Standard
- Rush \_ day(s)

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W151174-01</b>	<b>Water</b>	<b>Sampled:09/25/15 10:14</b>		
Out-PCB Congeners 209 (Pace)	10/09/15 17:00	03/23/16 10:14		
<i>Containers Supplied:</i> G amber 1L (B)				
<b>Sample ID: W151174-02</b>	<b>Water</b>	<b>Sampled:09/25/15 10:14</b>		
Out-PCB Congeners 209 (Pace)	10/09/15 17:00	03/23/16 10:14		
<i>Containers Supplied:</i> G amber 1L (B)				

*Please send  
to PACE*

*2.8  
IR/P-L*

<i>[Signature]</i>	9-28-15	<i>[Signature]</i>	9/28/15 1212
Released By	Date	Received By	Date
<i>[Signature]</i>	9/28/15 1325	<i>[Signature]</i>	9/28/15 @1325
Released By	Date	Received By	Date



# Login Sample Receipt Checklist

Client: City of Portland

Job Number: 580-53707-1

SDG Number: W15I174

**Login Number: 53707**

**List Number: 1**

**Creator: Svabik-Seror, Philip M**

**List Source: TestAmerica Seattle**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	





55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

## Laboratory Data QA/QC Review Outfall Basin 17

**To:** File  
**From:** Andrew Davidson, GSI  
**Date:** November 10, 2015

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during a source control investigation sampling event conducted by the City of Portland (City). One stormwater sample (W15J074-01) was collected in Outfall Basin 17 on October 10, 2015 and submitted for analyses.

The laboratory analyses for this source control program sample were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Total Field Conductivity – FO SOP 1.03a
  - Field pH – FO SOP 1.01a
  - Field temperature – FO SOP 1.05a
  - Total Suspended Solids -- SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCLSOP M-10
  - Semivolatile Organic Compounds (SVOCs) – EPA 8270
  - Polynuclear Aromatic Hydrocarbons (PAHs) and phthalates – EPA 8270 - SIM
  - Polychlorinated Biphenyl (PCB) Aroclors – EPA 8082
- ALS Environmental (under subcontract to WPCL)
  - Organochlorine Pesticides – EPA 8081B
- Pace Analytical (under subcontract to Test America)
  - PCB Congeners – EPA 1668A

The WPCL summary report and the subcontracted laboratories' data reports for all analyses associated with this sampling event are attached for review.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and available:

- Chain-of-custody for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method blanks and/or field decontamination blanks
- Internal standard recoveries within laboratory control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike/matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control/duplicate laboratory control (LC/DLC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the WPCL report and subcontracted laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures appear to have been adequate indicating that sample integrity was maintained throughout the sample collection and delivery process.

## **Analysis Holding Times**

The samples were extracted and analyzed within the acceptable method-specific holding times for all analyses.

## **Method Blanks**

Method blanks were processed during the following analyses: total suspended solids, total metals, total mercury, SVOCs, PAHs and phthalates, PCB Aroclors, organochlorine pesticides, and PCB congeners. No analytes were detected in any of the blank samples processed.

## **Field Decontamination Blanks**

Field decontamination blanks were not collected during this sampling event.

## Internal Standard Recoveries

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. Labeled internal standard recoveries were within method-specified target ranges for the stormwater sample, the method blank, and the LC/DLC samples. Pace reports that the data were automatically corrected for variation in recovery and accurate values were obtained.

## Surrogate Recoveries

Surrogate recoveries were processed during the laboratory analyses of SVOCs, PAHs and phthalates, PCB Aroclors, and organochlorine pesticides. All surrogate compound recoveries were within method-specified control limits.

## Matrix Spike/Matrix Spike Duplicate

MS samples were processed during the laboratory analysis of total metals, mercury, SVOCs, and PAHs and phthalates. MSD samples were processed during the analysis of PAHs and phthalates. MS/MSD recoveries and RPDs were within acceptance limits for all spiked analytes with the following exceptions:

- Recovery of the compounds benzo(a)pyrene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, di-n-octyl phthalate, and bis(2-ethylhexyl)phthalate were below acceptance criteria in the MS/MSD samples processed during the analysis of PAHs and phthalates. Benzo(g,h,i)perylene was detected in sample W15J074-01, and the associated value is flagged “J” to indicate that the sample result may be a low estimate. Benzo(a)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, di-n-octyl phthalate, and bis(2-ethylhexyl)phthalate were not detected in sample W15J074-01. These non-detects are flagged “UJ” to indicate that while the analyte was not detected above the reported sample quantitation limit, the reported quantitation limit is approximate and may be inaccurate or imprecise.

In the analysis of organochlorine pesticides by ALS Environmental, insufficient volume was received to perform a MS/MSD for the stormwater sample. ALS reports that LCS/DLCS was analyzed and reported in lieu of the MS/MSD for these samples.

## Laboratory Control Samples/Duplicate Laboratory Control Samples

LC samples were processed during the analyses of TSS, total metals, mercury, SVOCs, PAHs and phthalates, PCB Aroclors, organochlorine pesticides, and PCB congeners. DLC samples were processed during the analyses of PCB Aroclors, pesticides, and PCB congeners. LC/DLC recoveries and RPDs were within laboratory control limits with the following exceptions:

- Recovery of naphthalene was above laboratory control criteria in the LC sample processed during the analysis of PAHs and phthalates. However, naphthalene was not detected in the associated field sample, and the data are not further qualified.

- Recoveries of Aroclor 1260 were above laboratory control criteria in one set of LC/DLC samples processed during the analysis of PCB Aroclors. However, Aroclor 1260 was not detected in the associated field sample, and the data are not further qualified.

## Duplicate Samples

Duplicate samples were processed during the analyses of TSS, total metals, mercury, and SVOCs. All RPDs were within acceptance criteria.

## Additional Information

- In the evaluation of SVOCs, the continuing calibration verification (CCV) recoveries were outside control criteria for several analytes in the field and QC samples. Sample results for which the CCV criteria were low (hexachlorocyclopentadiene and 4-nitroaniline) are flagged “UJ” to indicate that the reported quantitation limit is approximate and may be inaccurate or imprecise.
- In the evaluation of pesticides, the initial calibration verification (ICV) criterion was not met on the confirmation column for Endrin Aldehyde. ALS reports that the results were reported from the column with an acceptable ICV, and the data quality was not affected. The CCV criteria were not met on the primary column for Methoxychlor. ALS reports that the results were reported from the column with an acceptable CCV, and no further corrective action is necessary. The upper control criterion was exceeded for several analytes in the CCV, but the analytes were not detected in the field sample. No further corrective action was taken.
- ALS reports that the reporting limit is elevated for several analytes in the pesticide analysis due to non-target background components. Sample results for which ALS indicates additional elevation of the reporting limit (flagged Ui in the subcontracted report) are flagged “UJ” to indicate that the reported quantitation limit is approximate and may be inaccurate or imprecise.



City of Portland  
**Water Pollution Control Laboratory**

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November 09, 2015

Linda Scheffler  
Director's Office

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Work Order  
**W15J074**

Project  
**Portland Harbor**

Received  
10/10/15 14:58

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

*Jennifer Shackelford*

Jennifer Shackelford  
Laboratory Coordinator QA/QC





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**LABORATORY ANALYSIS REPORT**

Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W15J074</b>	Project Mgr: Linda Scheffler
Received: 10/10/15 14:58	
Submitted By: Field Operations	

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
17_16SW	W15J074-01	Stormwater	Grab	10/10/15 14:18	10/10/15 14:18	

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**17\_16SW : W15J074-01**

**Field Parameters**

Conductivity*	240 umhos/cm			1	B15J144	10/10/15	10/10/15	FO SOP 1.03a	
pH*	7.0 pH Units			1	B15J144	10/10/15 14:18	10/10/15	FO SOP 1.01a	
Temperature*	18.5 °C			1	B15J144	10/10/15 14:18	10/10/15	FO SOP 1.05a	

**General Chemistry**

Total suspended solids	21 mg/L	2	2		B15J147	10/12/15	10/12/15	SM 2540D	
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**Total Metals**

Total Metals by ICPMS									
Arsenic	2.25 ug/L	0.100	0.100	1	B15J164	10/13/15	10/14/15	EPA 200.8	
Cadmium	ND ug/L	0.100	0.100	1	B15J164	10/13/15	10/14/15	EPA 200.8	
Chromium	1.11 ug/L	0.200	0.200	1	B15J164	10/13/15	10/14/15	EPA 200.8	
Copper	6.10 ug/L	0.200	0.200	1	B15J164	10/13/15	10/14/15	EPA 200.8	
Lead	1.71 ug/L	0.100	0.100	1	B15J164	10/13/15	10/14/15	EPA 200.8	
Mercury	0.00487 ug/L	0.00100	0.00100	1	B15J182	10/14/15	10/15/15	WPCLSOP M-10	
Nickel	1.59 ug/L	0.200	0.200	1	B15J164	10/13/15	10/14/15	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B15J164	10/13/15	10/14/15	EPA 200.8	
Zinc	27.5 ug/L	0.500	0.500	1	B15J164	10/13/15	10/14/15	EPA 200.8	

Reported: 11/09/15 09:53

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics**

Semivolatile Organic Compounds by GCMS

Acenaphthene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Acenaphthylene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Anthracene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Benzo(a)anthracene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Benzo(a)pyrene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Benzo(b)fluoranthene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Benzo(g,h,i)perylene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Benzo(k)fluoranthene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
4-Bromophenylphenyl ether	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Butyl benzyl phthalate	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
4-Chloro-3-methylphenol	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
4-Chloroaniline	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Bis(2-chloroethoxy) methane	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Bis(2-chloroethyl) ether	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Bis(2-chloroisopropyl) ether	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2-Chloronaphthalene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2-Chlorophenol	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
4-Chlorophenylphenyl ether	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Chrysene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Di-n-butyl phthalate	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Di-n-octyl phthalate	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Dibenzo(a,h)anthracene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Dibenzofuran	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
1,2-Dichlorobenzene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
1,3-Dichlorobenzene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
1,4-Dichlorobenzene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
3,3'-Dichlorobenzidine	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2,4-Dichlorophenol	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Diethyl phthalate	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2,4-Dimethylphenol	ND ug/L	2.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Dimethyl phthalate	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
4,6-Dinitro-2-methylphenol	ND ug/L	2.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2,4-Dinitrophenol	ND ug/L	5.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2,4-Dinitrotoluene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2,6-Dinitrotoluene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Bis(2-ethylhexyl) phthalate	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Fluoranthene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Fluorene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Hexachlorobenzene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Hexachlorobutadiene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Hexachlorocyclopentadiene	ND ug/L	2.0		1	B15J211	10/15/15	10/20/15	EPA 8270	V3
Hexachloroethane	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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Water Pollution Control Laboratory**

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**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics**

Semivolatile Organic Compounds by GCMS

Indeno(1,2,3-cd)pyrene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Isophorone	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2-Methylnaphthalene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2-Methylphenol	ND ug/L	2.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
3- & 4-Methylphenol	ND ug/L	2.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Naphthalene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2-Nitroaniline	ND ug/L	2.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
3-Nitroaniline	ND ug/L	2.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
4-Nitroaniline	ND ug/L	2.0		1	B15J211	10/15/15	10/20/15	EPA 8270	V3
Nitrobenzene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2-Nitrophenol	ND ug/L	2.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
4-Nitrophenol	ND ug/L	5.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
N-Nitrosodimethylamine*	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
N-Nitrosodi-n-propylamine	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
N-Nitrosodiphenylamine	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Pentachlorophenol	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Phenanthrene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Phenol	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
Pyrene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2,3,4,6-Tetrachlorophenol	ND ug/L	2.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
1,2,4-Trichlorobenzene	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2,4,5-Trichlorophenol	ND ug/L	2.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
2,4,6-Trichlorophenol	ND ug/L	1.0		1	B15J211	10/15/15	10/20/15	EPA 8270	
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Fluorophenol	5.6 ug/L	6.06	92%	23-129	B15J211	10/15/15	10/20/15	EPA 8270	
Phenol-d6	4.5 ug/L	6.06	75%	9.7-130	B15J211	10/15/15	10/20/15	EPA 8270	
Nitrobenzene-d5	5.3 ug/L	6.06	88%	46-141	B15J211	10/15/15	10/20/15	EPA 8270	
2-Fluorobiphenyl	5.1 ug/L	6.06	84%	49-122	B15J211	10/15/15	10/20/15	EPA 8270	
2,4,6-Tribromophenol	5.7 ug/L	6.06	94%	30-159	B15J211	10/15/15	10/20/15	EPA 8270	
p-Terphenyl-d14	5.7 ug/L	6.06	93%	24-143	B15J211	10/15/15	10/20/15	EPA 8270	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

**Polynuclear Aromatics & Phthalates by GCMS-SIM**

Acenaphthene	0.049 ug/L	0.020	0.020	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Acenaphthylene	ND ug/L	0.020	0.020	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Anthracene	0.039 ug/L	0.020	0.020	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Benzo(a)anthracene	ND ug/L	0.010	0.010	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Benzo(a)pyrene	ND ug/L	0.010	0.010	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	M4
Benzo(b)fluoranthene	ND ug/L	0.010	0.010	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.013 ug/L	0.010	0.010	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	M4
Benzo(k)fluoranthene	ND ug/L	0.010	0.010	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Chrysene	ND ug/L	0.010	0.010	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND ug/L	0.010	0.010	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	M4
Fluoranthene	0.031 ug/L	0.010	0.010	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Fluorene	0.025 ug/L	0.020	0.020	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND ug/L	0.010	0.010	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	M4
1-Methylnaphthalene	0.048 ug/L	0.040	0.040	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
2-Methylnaphthalene	ND ug/L	0.040	0.040	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Naphthalene	ND ug/L	0.040	0.040	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Phenanthrene	0.046 ug/L	0.020	0.020	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Pyrene	0.048 ug/L	0.010	0.010	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Butyl benzyl phthalate	ND ug/L	1.0	0.50	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Di-n-butyl phthalate	ND ug/L	1.0	0.50	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Diethyl phthalate	ND ug/L	1.0	0.50	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Dimethyl phthalate	ND ug/L	1.0	0.50	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Di-n-octyl phthalate	ND ug/L	1.0	0.50	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	M4
Bis(2-ethylhexyl) phthalate	ND ug/L	1.0	0.50	1	B15J179	10/14/15	10/15/15	EPA 8270-SIM	M4
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.20 ug/L	0.229	87%	60.4-153	B15J179	10/14/15	10/15/15	EPA 8270-SIM	
Fluoranthene-d10	0.22 ug/L	0.229	96%	69-149	B15J179	10/14/15	10/15/15	EPA 8270-SIM	

**Polychlorinated Biphenyls (PCBs)**

**PCB Aroclors by GC-ECD**

Aroclor 1016/1242	ND ug/L	0.0251	0.0251	1	B15J180	10/14/15	10/14/15	EPA 8082	
Aroclor 1221	ND ug/L	0.0503	0.0503	1	B15J180	10/14/15	10/14/15	EPA 8082	
Aroclor 1232	ND ug/L	0.0251	0.0251	1	B15J180	10/14/15	10/14/15	EPA 8082	
Aroclor 1248	ND ug/L	0.0251	0.0251	1	B15J180	10/14/15	10/14/15	EPA 8082	
Aroclor 1254	ND ug/L	0.0251	0.0251	1	B15J180	10/14/15	10/14/15	EPA 8082	
Aroclor 1260	ND ug/L	0.0251	0.0251	1	B15J180	10/14/15	10/14/15	EPA 8082	
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
Tetrachloro-m-xylene	0.0315 ug/L	0.0503	63%	32.8-105	B15J180	10/14/15	10/14/15	EPA 8082	
Decachlorobiphenyl	0.0475 ug/L	0.0503	94%	29-133	B15J180	10/14/15	10/14/15	EPA 8082	

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**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B15J147</b>										
<b>Blank (B15J147-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					10/12/15 : 10/12/15	
<b>LCS (B15J147-BS1)</b>										
Total suspended solids	97	mg/L			100		97% (90-110)		10/12/15 : 10/12/15	
<b>Duplicate (B15J147-DUP1) Source: W15J074-01</b>										
Total suspended solids	21	mg/L	2	2		21		0 (20)	10/12/15 : 10/12/15	
<b>Duplicate (B15J147-DUP2) Source: W15J079-01</b>										
Total suspended solids	320	mg/L	2	2		314		2 (20)	10/12/15 : 10/12/15	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B15J164</b>										
<b>Blank (B15J164-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					10/13/15 : 10/14/15	
Cadmium	ND	ug/L	0.100	0.100					10/13/15 : 10/14/15	
Chromium	ND	ug/L	0.200	0.200					10/13/15 : 10/14/15	
Copper	ND	ug/L	0.200	0.200					10/13/15 : 10/14/15	
Lead	ND	ug/L	0.100	0.100					10/13/15 : 10/14/15	
Nickel	ND	ug/L	0.200	0.200					10/13/15 : 10/14/15	
Silver	ND	ug/L	0.100	0.100					10/13/15 : 10/14/15	
Zinc	ND	ug/L	0.500	0.500					10/13/15 : 10/14/15	
<b>LCS (B15J164-BS1)</b>										
Arsenic	10.3	ug/L	0.100	0.100	10.0		103% (85-115)		10/13/15 : 10/14/15	
Cadmium	10.2	ug/L	0.100	0.100	10.0		102% (85-115)		10/13/15 : 10/14/15	
Chromium	10.1	ug/L	0.200	0.200	10.0		101% (85-115)		10/13/15 : 10/14/15	
Copper	10.2	ug/L	0.200	0.200	10.0		102% (85-115)		10/13/15 : 10/14/15	
Lead	10.2	ug/L	0.100	0.100	10.0		102% (85-115)		10/13/15 : 10/14/15	
Nickel	10.1	ug/L	0.200	0.200	10.0		101% (85-115)		10/13/15 : 10/14/15	
Silver	10.9	ug/L	0.100	0.100	10.0		109% (85-115)		10/13/15 : 10/14/15	
Zinc	49.5	ug/L	0.500	0.500	50.0		99% (85-115)		10/13/15 : 10/14/15	
<b>Duplicate (B15J164-DUP1) Source: W15J076-03</b>										
Arsenic	1.22	ug/L	0.100	0.100		1.20		2 (20)	10/13/15 : 10/14/15	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	10/13/15 : 10/14/15	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

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**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B15J164**

**Duplicate (B15J164-DUP1)**

**Source: W15J076-03**

Chromium	1.08	ug/L	0.200	0.200		1.07		0.5 (20)	10/13/15 :10/14/15	
Copper	8.13	ug/L	0.200	0.200		8.00		2 (20)	10/13/15 :10/14/15	
Lead	0.602	ug/L	0.100	0.100		0.590		2 (20)	10/13/15 :10/14/15	
Nickel	4.46	ug/L	0.200	0.200		4.44		0.3 (20)	10/13/15 :10/14/15	
Silver	0.177	ug/L	0.100	0.100		0.170		5 (20)	10/13/15 :10/14/15	
Zinc	33.7	ug/L	0.500	0.500		33.4		0.7 (20)	10/13/15 :10/14/15	

**Matrix Spike (B15J164-MS1)**

**Source: W15J076-03**

Arsenic	22.7	ug/L	0.300	0.300	20.0	1.20	107% (70-130)		10/13/15 :10/14/15	
Cadmium	20.0	ug/L	0.300	0.300	20.0	ND	100% (70-130)		10/13/15 :10/14/15	
Chromium	21.5	ug/L	0.600	0.600	20.0	1.07	102% (70-130)		10/13/15 :10/14/15	
Copper	28.5	ug/L	0.600	0.600	20.0	8.00	103% (70-130)		10/13/15 :10/14/15	
Lead	21.6	ug/L	0.300	0.300	20.0	0.590	105% (70-130)		10/13/15 :10/14/15	
Nickel	24.8	ug/L	0.600	0.600	20.0	4.44	102% (70-130)		10/13/15 :10/14/15	
Silver	20.5	ug/L	0.300	0.300	20.0	0.170	102% (70-130)		10/13/15 :10/14/15	
Zinc	135	ug/L	1.50	1.50	100	33.4	101% (70-130)		10/13/15 :10/14/15	

**Total Metals by ICPMS - Batch B15J182**

**Blank (B15J182-BLK1)**

Mercury	ND	ug/L	0.000900	0.000900					10/14/15 :10/15/15	
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**LCS (B15J182-BS1)**

Mercury	0.0104	ug/L	0.000900	0.000900	0.0100		104% (85-125)		10/14/15 :10/15/15	
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**Duplicate (B15J182-DUP1)**

**Source: W15J076-03**

Mercury	0.00631	ug/L	0.00100	0.00100		0.00630		0.02 (20)	10/14/15 :10/15/15	
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**Matrix Spike (B15J182-MS1)**

**Source: W15J076-03**

Mercury	0.0179	ug/L	0.00100	0.00100	0.0111	0.00630	104% (70-130)		10/14/15 :10/15/15	
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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Semivolatile Organic Compounds by GCMS - Batch B15J211</b>										
<b>Blank (B15J211-BLK1)</b>										
Acenaphthene	ND	ug/L	1.0						10/15/15 :10/20/15	
Acenaphthylene	ND	ug/L	1.0						10/15/15 :10/20/15	
Anthracene	ND	ug/L	1.0						10/15/15 :10/20/15	
Benzo(a)anthracene	ND	ug/L	1.0						10/15/15 :10/20/15	
Benzo(a)pyrene	ND	ug/L	1.0						10/15/15 :10/20/15	
Benzo(b)fluoranthene	ND	ug/L	1.0						10/15/15 :10/20/15	
Benzo(g,h,i)perylene	ND	ug/L	1.0						10/15/15 :10/20/15	
Benzo(k)fluoranthene	ND	ug/L	1.0						10/15/15 :10/20/15	
4-Bromophenylphenyl ether	ND	ug/L	1.0						10/15/15 :10/20/15	
Butyl benzyl phthalate	ND	ug/L	1.0						10/15/15 :10/20/15	
4-Chloro-3-methylphenol	ND	ug/L	1.0						10/15/15 :10/20/15	
4-Chloroaniline	ND	ug/L	1.0						10/15/15 :10/20/15	
Bis(2-chloroethoxy) methane	ND	ug/L	1.0						10/15/15 :10/20/15	
Bis(2-chloroethyl) ether	ND	ug/L	1.0						10/15/15 :10/20/15	
Bis(2-chloroisopropyl) ether	ND	ug/L	1.0						10/15/15 :10/20/15	
2-Chloronaphthalene	ND	ug/L	1.0						10/15/15 :10/20/15	
2-Chlorophenol	ND	ug/L	1.0						10/15/15 :10/20/15	
4-Chlorophenylphenyl ether	ND	ug/L	1.0						10/15/15 :10/20/15	
Chrysene	ND	ug/L	1.0						10/15/15 :10/20/15	
Di-n-butyl phthalate	ND	ug/L	1.0						10/15/15 :10/20/15	
Di-n-octyl phthalate	ND	ug/L	1.0						10/15/15 :10/20/15	
Dibenzo(a,h)anthracene	ND	ug/L	1.0						10/15/15 :10/20/15	
Dibenzofuran	ND	ug/L	1.0						10/15/15 :10/20/15	
1,2-Dichlorobenzene	ND	ug/L	1.0						10/15/15 :10/20/15	
1,3-Dichlorobenzene	ND	ug/L	1.0						10/15/15 :10/20/15	
1,4-Dichlorobenzene	ND	ug/L	1.0						10/15/15 :10/20/15	
3,3'-Dichlorobenzidine	ND	ug/L	1.0						10/15/15 :10/20/15	
2,4-Dichlorophenol	ND	ug/L	1.0						10/15/15 :10/20/15	
Diethyl phthalate	ND	ug/L	1.0						10/15/15 :10/20/15	
2,4-Dimethylphenol	ND	ug/L	2.0						10/15/15 :10/20/15	
Dimethyl phthalate	ND	ug/L	1.0						10/15/15 :10/20/15	
4,6-Dinitro-2-methylphenol	ND	ug/L	2.0						10/15/15 :10/20/15	
2,4-Dinitrophenol	ND	ug/L	5.0						10/15/15 :10/20/15	
2,4-Dinitrotoluene	ND	ug/L	1.0						10/15/15 :10/20/15	
2,6-Dinitrotoluene	ND	ug/L	1.0						10/15/15 :10/20/15	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0						10/15/15 :10/20/15	
Fluoranthene	ND	ug/L	1.0						10/15/15 :10/20/15	
Fluorene	ND	ug/L	1.0						10/15/15 :10/20/15	
Hexachlorobenzene	ND	ug/L	1.0						10/15/15 :10/20/15	
Hexachlorobutadiene	ND	ug/L	1.0						10/15/15 :10/20/15	
Hexachlorocyclopentadiene	ND	ug/L	2.0						10/15/15 :10/20/15	V3

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**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
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**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B15J211

**Blank (B15J211-BLK1)**

Hexachloroethane	ND	ug/L	1.0						10/15/15 :10/20/15	
Indeno(1,2,3-cd)pyrene	ND	ug/L	1.0						10/15/15 :10/20/15	
Isophorone	ND	ug/L	1.0						10/15/15 :10/20/15	
2-Methylnaphthalene	ND	ug/L	1.0						10/15/15 :10/20/15	
2-Methylphenol	ND	ug/L	2.0						10/15/15 :10/20/15	
3- & 4-Methylphenol	ND	ug/L	2.0						10/15/15 :10/20/15	
Naphthalene	ND	ug/L	1.0						10/15/15 :10/20/15	
2-Nitroaniline	ND	ug/L	2.0						10/15/15 :10/20/15	
3-Nitroaniline	ND	ug/L	2.0						10/15/15 :10/20/15	
4-Nitroaniline	ND	ug/L	2.0						10/15/15 :10/20/15	V3
Nitrobenzene	ND	ug/L	1.0						10/15/15 :10/20/15	
2-Nitrophenol	ND	ug/L	2.0						10/15/15 :10/20/15	
4-Nitrophenol	ND	ug/L	5.0						10/15/15 :10/20/15	
N-Nitrosodimethylamine	ND	ug/L	1.0						10/15/15 :10/20/15	
N-Nitrosodi-n-propylamine	ND	ug/L	1.0						10/15/15 :10/20/15	
N-Nitrosodiphenylamine	ND	ug/L	1.0						10/15/15 :10/20/15	
Pentachlorophenol	ND	ug/L	1.0						10/15/15 :10/20/15	
Phenanthrene	ND	ug/L	1.0						10/15/15 :10/20/15	
Phenol	ND	ug/L	1.0						10/15/15 :10/20/15	
Pyrene	ND	ug/L	1.0						10/15/15 :10/20/15	
2,3,4,6-Tetrachlorophenol	ND	ug/L	2.0						10/15/15 :10/20/15	
1,2,4-Trichlorobenzene	ND	ug/L	1.0						10/15/15 :10/20/15	
2,4,5-Trichlorophenol	ND	ug/L	2.0						10/15/15 :10/20/15	
2,4,6-Trichlorophenol	ND	ug/L	1.0						10/15/15 :10/20/15	

**Surrogate**

2-Fluorophenol	5.6	ug/L			6.06		93% (23-129)		10/15/15 :10/20/15	
Phenol-d6	4.5	ug/L			6.06		75% (9.7-130)		10/15/15 :10/20/15	
Nitrobenzene-d5	6.2	ug/L			6.06		103% (46-141)		10/15/15 :10/20/15	
2-Fluorobiphenyl	6.0	ug/L			6.06		99% (49-122)		10/15/15 :10/20/15	
2,4,6-Tribromophenol	5.4	ug/L			6.06		89% (30-159)		10/15/15 :10/20/15	
p-Terphenyl-d14	6.2	ug/L			6.06		102% (24-143)		10/15/15 :10/20/15	

**LCS (B15J211-BS1)**

Acenaphthene	5.26	ug/L	1.0		6.06		87% (60-116)		10/15/15 :10/20/15	
Acenaphthylene	5.55	ug/L	1.0		6.06		92% (62-118)		10/15/15 :10/20/15	
Anthracene	5.53	ug/L	1.0		6.06		91% (30-132)		10/15/15 :10/20/15	
Benzo(a)anthracene	5.84	ug/L	1.0		6.06		96% (33-134)		10/15/15 :10/20/15	
Benzo(a)pyrene	5.74	ug/L	1.0		6.06		95% (29-129)		10/15/15 :10/20/15	
Benzo(b)fluoranthene	5.90	ug/L	1.0		6.06		97% (31-131)		10/15/15 :10/20/15	
Benzo(g,h,i)perylene	5.77	ug/L	1.0		6.06		95% (32-134)		10/15/15 :10/20/15	
Benzo(k)fluoranthene	5.59	ug/L	1.0		6.06		92% (29-128)		10/15/15 :10/20/15	
4-Bromophenylphenyl ether	5.45	ug/L	1.0		6.06		90% (51-122)		10/15/15 :10/20/15	

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**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Semivolatile Organic Compounds by GCMS - Batch B15J211										
<b>LCS (B15J211-BS1)</b>										
Butyl benzyl phthalate	5.57	ug/L	1.0		6.06		92% (10-177)		10/15/15 :10/20/15	
4-Chloro-3-methylphenol	5.90	ug/L	1.0		6.06		97% (43-154)		10/15/15 :10/20/15	V1
4-Chloroaniline	6.72	ug/L	1.0		6.06		111% (5-137)		10/15/15 :10/20/15	V1
Bis(2-chloroethoxy) methane	6.75	ug/L	1.0		6.06		111% (57-129)		10/15/15 :10/20/15	V1
Bis(2-chloroethyl) ether	5.61	ug/L	1.0		6.06		93% (55-122)		10/15/15 :10/20/15	
Bis(2-chloroisopropyl) ether	5.56	ug/L	1.0		6.06		92% (47-130)		10/15/15 :10/20/15	
2-Chloronaphthalene	4.96	ug/L	1.0		6.06		82% (57-117)		10/15/15 :10/20/15	
2-Chlorophenol	5.75	ug/L	1.0		6.06		95% (33-139)		10/15/15 :10/20/15	
4-Chlorophenylphenyl ether	5.09	ug/L	1.0		6.06		84% (50-125)		10/15/15 :10/20/15	
Chrysene	5.82	ug/L	1.0		6.06		96% (33-132)		10/15/15 :10/20/15	
Di-n-butyl phthalate	6.53	ug/L	1.0		6.06		108% (40-140)		10/15/15 :10/20/15	
Di-n-octyl phthalate	5.10	ug/L	1.0		6.06		84% (20-160)		10/15/15 :10/20/15	
Dibenzo(a,h)anthracene	5.59	ug/L	1.0		6.06		92% (34-131)		10/15/15 :10/20/15	
Dibenzofuran	5.22	ug/L	1.0		6.06		86% (58-119)		10/15/15 :10/20/15	
1,2-Dichlorobenzene	4.21	ug/L	1.0		6.06		69% (61-115)		10/15/15 :10/20/15	
1,3-Dichlorobenzene	3.99	ug/L	1.0		6.06		66% (62-113)		10/15/15 :10/20/15	
1,4-Dichlorobenzene	4.09	ug/L	1.0		6.06		68% (64-111)		10/15/15 :10/20/15	
2,4-Dichlorophenol	5.98	ug/L	1.0		6.06		99% (54-137)		10/15/15 :10/20/15	
Diethyl phthalate	6.05	ug/L	1.0		6.06		100% (57-143)		10/15/15 :10/20/15	
2,4-Dimethylphenol	6.13	ug/L	2.0		6.06		101% (29-136)		10/15/15 :10/20/15	
Dimethyl phthalate	6.04	ug/L	1.0		6.06		100% (66-139)		10/15/15 :10/20/15	
4,6-Dinitro-2-methylphenol	4.48	ug/L	2.0		6.06		74% (1-168)		10/15/15 :10/20/15	
2,4-Dinitrophenol	21.2	ug/L	5.0		30.3		70% (1-205)		10/15/15 :10/20/15	
2,4-Dinitrotoluene	5.56	ug/L	1.0		6.06		92% (59-143)		10/15/15 :10/20/15	
2,6-Dinitrotoluene	5.51	ug/L	1.0		6.06		91% (61-138)		10/15/15 :10/20/15	
Bis(2-ethylhexyl) phthalate	5.59	ug/L	1.0		6.06		92% (47-130)		10/15/15 :10/20/15	
Fluoranthene	6.21	ug/L	1.0		6.06		102% (41-129)		10/15/15 :10/20/15	
Fluorene	5.32	ug/L	1.0		6.06		88% (56-123)		10/15/15 :10/20/15	
Hexachlorobenzene	5.40	ug/L	1.0		6.06		89% (44-128)		10/15/15 :10/20/15	
Hexachlorobutadiene	3.71	ug/L	1.0		6.06		61% (45-123)		10/15/15 :10/20/15	
Hexachlorocyclopentadiene	2.43	ug/L	2.0		6.06		40% (1-137)		10/15/15 :10/20/15	V3
Hexachloroethane	3.60	ug/L	1.0		6.06		59% (59-110)		10/15/15 :10/20/15	
Indeno(1,2,3-cd)pyrene	5.69	ug/L	1.0		6.06		94% (31-132)		10/15/15 :10/20/15	
Isophorone	7.30	ug/L	1.0		6.06		120% (61-131)		10/15/15 :10/20/15	V1
2-Methylnaphthalene	5.27	ug/L	1.0		6.06		87% (59-117)		10/15/15 :10/20/15	
2-Methylphenol	5.21	ug/L	2.0		6.06		86% (17-148)		10/15/15 :10/20/15	
3- & 4-Methylphenol	5.13	ug/L	2.0		6.06		85% (28-141)		10/15/15 :10/20/15	
Naphthalene	5.07	ug/L	1.0		6.06		84% (61-117)		10/15/15 :10/20/15	
2-Nitroaniline	5.59	ug/L	2.0		6.06		92% (60-143)		10/15/15 :10/20/15	
3-Nitroaniline	4.69	ug/L	2.0		6.06		77% (14-144)		10/15/15 :10/20/15	
4-Nitroaniline	4.63	ug/L	2.0		6.06		76% (22-143)		10/15/15 :10/20/15	V3

Reported: 11/09/15 09:53

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B15J211

**LCS (B15J211-BS1)**

Nitrobenzene	6.15	ug/L	1.0		6.06		101% (51-143)		10/15/15 :10/20/15	
2-Nitrophenol	6.07	ug/L	2.0		6.06		100% (57-154)		10/15/15 :10/20/15	
4-Nitrophenol	12.4	ug/L	5.0		30.3		41% (1-105)		10/15/15 :10/20/15	
N-Nitrosodimethylamine	3.29	ug/L	1.0		6.06		54% (26-100)		10/15/15 :10/20/15	
N-Nitrosodi-n-propylamine	6.15	ug/L	1.0		6.06		101% (57-133)		10/15/15 :10/20/15	V1
N-Nitrosodiphenylamine	5.77	ug/L	1.0		6.06		95% (43-128)		10/15/15 :10/20/15	
Pentachlorophenol	5.52	ug/L	1.0		6.06		91% (36-150)		10/15/15 :10/20/15	
Phenanthrene	5.59	ug/L	1.0		6.06		92% (59-113)		10/15/15 :10/20/15	
Phenol	4.26	ug/L	1.0		6.06		70% (15-129)		10/15/15 :10/20/15	
Pyrene	6.32	ug/L	1.0		6.06		104% (42-129)		10/15/15 :10/20/15	
2,3,4,6-Tetrachlorophenol	4.28	ug/L	2.0		6.06		71% (56-138)		10/15/15 :10/20/15	
1,2,4-Trichlorobenzene	4.11	ug/L	1.0		6.06		68% (56-121)		10/15/15 :10/20/15	
2,4,5-Trichlorophenol	4.62	ug/L	2.0		6.06		76% (46-145)		10/15/15 :10/20/15	
2,4,6-Trichlorophenol	5.76	ug/L	1.0		6.06		95% (67-126)		10/15/15 :10/20/15	

**Surrogate**

2-Fluorophenol	5.5	ug/L			6.06		90% (23-129)		10/15/15 :10/20/15	
Phenol-d6	4.3	ug/L			6.06		70% (9.7-130)		10/15/15 :10/20/15	
Nitrobenzene-d5	6.2	ug/L			6.06		102% (46-141)		10/15/15 :10/20/15	
2-Fluorobiphenyl	4.9	ug/L			6.06		81% (49-122)		10/15/15 :10/20/15	
2,4,6-Tribromophenol	6.0	ug/L			6.06		99% (30-159)		10/15/15 :10/20/15	
p-Terphenyl-d14	6.5	ug/L			6.06		108% (24-143)		10/15/15 :10/20/15	

**Duplicate (B15J211-DUP1)**

**Source: W15J074-01**

Acenaphthene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Acenaphthylene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Anthracene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Benzo(a)anthracene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Benzo(a)pyrene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Benzo(b)fluoranthene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Benzo(g,h,i)perylene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Benzo(k)fluoranthene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
4-Bromophenylphenyl ether	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Butyl benzyl phthalate	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
4-Chloro-3-methylphenol	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
4-Chloroaniline	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Bis(2-chloroethoxy) methane	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Bis(2-chloroethyl) ether	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Bis(2-chloroisopropyl) ether	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
2-Chloronaphthalene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
2-Chlorophenol	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
4-Chlorophenylphenyl ether	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Chrysene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Semivolatile Organic Compounds by GCMS - Batch B15J211										
<b>Duplicate (B15J211-DUP1) Source: W15J074-01</b>										
Di-n-butyl phthalate	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Di-n-octyl phthalate	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Dibenzo(a,h)anthracene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Dibenzofuran	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
1,2-Dichlorobenzene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
1,3-Dichlorobenzene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
1,4-Dichlorobenzene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
3,3'-Dichlorobenzidine	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
2,4-Dichlorophenol	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
2,6-Dichlorophenol	ND	ug/L	1.0			ND	(200)		10/15/15 :10/20/15	
Diethyl phthalate	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
2,4-Dimethylphenol	ND	ug/L	2.0			ND	(50)		10/15/15 :10/20/15	
Dimethyl phthalate	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
4,6-Dinitro-2-methylphenol	ND	ug/L	2.0			ND	(50)		10/15/15 :10/20/15	
2,4-Dinitrophenol	ND	ug/L	5.0			ND	(50)		10/15/15 :10/20/15	
2,4-Dinitrotoluene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
2,6-Dinitrotoluene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Fluoranthene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Fluorene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Hexachlorobenzene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Hexachlorobutadiene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Hexachlorocyclopentadiene	ND	ug/L	2.0			ND	(50)		10/15/15 :10/20/15	V3
Hexachloroethane	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Indeno(1,2,3-cd)pyrene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Isophorone	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
2-Methylnaphthalene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
2-Methylphenol	ND	ug/L	2.0			ND	(50)		10/15/15 :10/20/15	
3- & 4-Methylphenol	ND	ug/L	2.0			ND	(50)		10/15/15 :10/20/15	
Naphthalene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
2-Nitroaniline	ND	ug/L	2.0			ND	(50)		10/15/15 :10/20/15	
3-Nitroaniline	ND	ug/L	2.0			ND	(50)		10/15/15 :10/20/15	
4-Nitroaniline	ND	ug/L	2.0			ND	(50)		10/15/15 :10/20/15	V3
Nitrobenzene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
2-Nitrophenol	ND	ug/L	2.0			ND	(50)		10/15/15 :10/20/15	
4-Nitrophenol	ND	ug/L	5.0			ND	(50)		10/15/15 :10/20/15	
N-Nitrosodimethylamine	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
N-Nitrosodi-n-propylamine	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
N-Nitrosodiphenylamine	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Pentachlorophenol	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	
Phenanthrene	ND	ug/L	1.0			ND	(50)		10/15/15 :10/20/15	

Reported: 11/09/15 09:53

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Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B15J211

**Duplicate (B15J211-DUP1)**

**Source: W15J074-01**

Phenol	ND	ug/L	1.0			ND		(50)	10/15/15 : 10/20/15	
Pyrene	ND	ug/L	1.0			ND		(50)	10/15/15 : 10/20/15	
2,3,4,6-Tetrachlorophenol	ND	ug/L	2.0			ND		(50)	10/15/15 : 10/20/15	
1,2,4-Trichlorobenzene	ND	ug/L	1.0			ND		(50)	10/15/15 : 10/20/15	
2,4,5-Trichlorophenol	ND	ug/L	2.0			ND		(50)	10/15/15 : 10/20/15	
2,4,6-Trichlorophenol	ND	ug/L	1.0			ND		(50)	10/15/15 : 10/20/15	

**Surrogate**

2-Fluorophenol	6.0	ug/L			6.06		100%	(23-129)	10/15/15 : 10/20/15	
Phenol-d6	4.5	ug/L			6.06		74%	(9.7-130)	10/15/15 : 10/20/15	
Nitrobenzene-d5	6.3	ug/L			6.06		104%	(46-141)	10/15/15 : 10/20/15	
2-Fluorobiphenyl	5.4	ug/L			6.06		89%	(49-122)	10/15/15 : 10/20/15	
2,4,6-Tribromophenol	6.2	ug/L			6.06		103%	(30-159)	10/15/15 : 10/20/15	
p-Terphenyl-d14	6.1	ug/L			6.06		100%	(24-143)	10/15/15 : 10/20/15	

**Matrix Spike (B15J211-MS1)**

**Source: W15J074-01**

Acenaphthene	5.19	ug/L	1.0		6.06	ND	86%	(60-116)	10/15/15 : 10/20/15	
Acenaphthylene	5.38	ug/L	1.0		6.06	ND	89%	(62-118)	10/15/15 : 10/20/15	
Anthracene	5.57	ug/L	1.0		6.06	ND	92%	(30-132)	10/15/15 : 10/20/15	
Benzo(a)anthracene	5.58	ug/L	1.0		6.06	ND	92%	(33-134)	10/15/15 : 10/20/15	
Benzo(a)pyrene	5.32	ug/L	1.0		6.06	ND	88%	(29-129)	10/15/15 : 10/20/15	
Benzo(b)fluoranthene	5.24	ug/L	1.0		6.06	ND	86%	(31-131)	10/15/15 : 10/20/15	
Benzo(g,h,i)perylene	5.24	ug/L	1.0		6.06	ND	86%	(32-134)	10/15/15 : 10/20/15	
Benzo(k)fluoranthene	5.13	ug/L	1.0		6.06	ND	85%	(29-128)	10/15/15 : 10/20/15	
4-Bromophenylphenyl ether	5.56	ug/L	1.0		6.06	ND	92%	(51-122)	10/15/15 : 10/20/15	
Butyl benzyl phthalate	5.96	ug/L	1.0		6.06	ND	98%	(10-177)	10/15/15 : 10/20/15	
4-Chloro-3-methylphenol	5.74	ug/L	1.0		6.06	ND	95%	(43-154)	10/15/15 : 10/20/15	V1
4-Chloroaniline	3.50	ug/L	1.0		6.06	ND	58%	(5-137)	10/15/15 : 10/20/15	V1
Bis(2-chloroethoxy) methane	6.60	ug/L	1.0		6.06	ND	109%	(57-129)	10/15/15 : 10/20/15	V1
Bis(2-chloroethyl) ether	5.63	ug/L	1.0		6.06	ND	93%	(55-122)	10/15/15 : 10/20/15	
Bis(2-chloroisopropyl) ether	5.56	ug/L	1.0		6.06	ND	92%	(47-130)	10/15/15 : 10/20/15	
2-Chloronaphthalene	4.91	ug/L	1.0		6.06	ND	81%	(57-117)	10/15/15 : 10/20/15	
2-Chlorophenol	5.82	ug/L	1.0		6.06	ND	96%	(33-139)	10/15/15 : 10/20/15	
4-Chlorophenylphenyl ether	4.88	ug/L	1.0		6.06	ND	80%	(50-125)	10/15/15 : 10/20/15	
Chrysene	5.38	ug/L	1.0		6.06	ND	89%	(33-132)	10/15/15 : 10/20/15	
Di-n-butyl phthalate	6.49	ug/L	1.0		6.06	ND	107%	(40-140)	10/15/15 : 10/20/15	
Di-n-octyl phthalate	5.43	ug/L	1.0		6.06	ND	90%	(20-160)	10/15/15 : 10/20/15	
Dibenzo(a,h)anthracene	5.10	ug/L	1.0		6.06	ND	84%	(34-131)	10/15/15 : 10/20/15	
Dibenzofuran	5.07	ug/L	1.0		6.06	ND	84%	(58-119)	10/15/15 : 10/20/15	
1,2-Dichlorobenzene	4.60	ug/L	1.0		6.06	ND	76%	(61-115)	10/15/15 : 10/20/15	
1,3-Dichlorobenzene	4.52	ug/L	1.0		6.06	ND	75%	(62-113)	10/15/15 : 10/20/15	
1,4-Dichlorobenzene	4.60	ug/L	1.0		6.06	ND	76%	(64-111)	10/15/15 : 10/20/15	
2,4-Dichlorophenol	5.83	ug/L	1.0		6.06	ND	96%	(54-137)	10/15/15 : 10/20/15	

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**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B15J211

**Matrix Spike (B15J211-MS1)**

**Source: W15J074-01**

Diethyl phthalate	5.64	ug/L	1.0		6.06	ND	93% (57-143)		10/15/15 :10/20/15	
2,4-Dimethylphenol	5.88	ug/L	2.0		6.06	ND	97% (29-136)		10/15/15 :10/20/15	
Dimethyl phthalate	6.12	ug/L	1.0		6.06	ND	101% (66-139)		10/15/15 :10/20/15	
4,6-Dinitro-2-methylphenol	5.05	ug/L	2.0		6.06	ND	83% (1-168)		10/15/15 :10/20/15	
2,4-Dinitrophenol	31.8	ug/L	5.0		30.3	ND	105% (1-205)		10/15/15 :10/20/15	
2,4-Dinitrotoluene	5.39	ug/L	1.0		6.06	ND	89% (59-143)		10/15/15 :10/20/15	
2,6-Dinitrotoluene	5.46	ug/L	1.0		6.06	ND	90% (61-138)		10/15/15 :10/20/15	
Bis(2-ethylhexyl) phthalate	6.39	ug/L	1.0		6.06	ND	105% (47-130)		10/15/15 :10/20/15	
Fluoranthene	5.86	ug/L	1.0		6.06	ND	97% (41-129)		10/15/15 :10/20/15	
Fluorene	5.06	ug/L	1.0		6.06	ND	83% (56-123)		10/15/15 :10/20/15	
Hexachlorobenzene	5.07	ug/L	1.0		6.06	ND	84% (44-128)		10/15/15 :10/20/15	
Hexachlorobutadiene	4.00	ug/L	1.0		6.06	ND	66% (45-132)		10/15/15 :10/20/15	
Hexachlorocyclopentadiene	3.30	ug/L	2.0		6.06	ND	54% (1-137)		10/15/15 :10/20/15	V3
Hexachloroethane	4.32	ug/L	1.0		6.06	ND	71% (59-110)		10/15/15 :10/20/15	
Indeno(1,2,3-cd)pyrene	5.18	ug/L	1.0		6.06	ND	85% (31-132)		10/15/15 :10/20/15	
Isophorone	7.19	ug/L	1.0		6.06	ND	119% (61-131)		10/15/15 :10/20/15	V1
2-Methylnaphthalene	5.35	ug/L	1.0		6.06	ND	88% (59-117)		10/15/15 :10/20/15	
2-Methylphenol	5.57	ug/L	2.0		6.06	ND	92% (17-148)		10/15/15 :10/20/15	
3- & 4-Methylphenol	5.44	ug/L	2.0		6.06	ND	90% (28-141)		10/15/15 :10/20/15	
Naphthalene	5.05	ug/L	1.0		6.06	ND	83% (61-117)		10/15/15 :10/20/15	
2-Nitroaniline	5.80	ug/L	2.0		6.06	ND	96% (60-143)		10/15/15 :10/20/15	
3-Nitroaniline	3.10	ug/L	2.0		6.06	ND	51% (14-144)		10/15/15 :10/20/15	
4-Nitroaniline	3.67	ug/L	2.0		6.06	ND	61% (22-143)		10/15/15 :10/20/15	V3
Nitrobenzene	6.11	ug/L	1.0		6.06	ND	101% (51-143)		10/15/15 :10/20/15	
2-Nitrophenol	6.37	ug/L	2.0		6.06	ND	105% (57-154)		10/15/15 :10/20/15	
4-Nitrophenol	17.5	ug/L	5.0		30.3	ND	58% (1-105)		10/15/15 :10/20/15	
N-Nitrosodimethylamine	3.56	ug/L	1.0		6.06	ND	59% (26-100)		10/15/15 :10/20/15	
N-Nitrosodi-n-propylamine	6.37	ug/L	1.0		6.06	ND	105% (57-133)		10/15/15 :10/20/15	V1
N-Nitrosodiphenylamine	5.68	ug/L	1.0		6.06	ND	94% (43-128)		10/15/15 :10/20/15	
Pentachlorophenol	6.69	ug/L	1.0		6.06	ND	110% (36-150)		10/15/15 :10/20/15	
Phenanthrene	5.46	ug/L	1.0		6.06	ND	90% (59-113)		10/15/15 :10/20/15	
Phenol	5.08	ug/L	1.0		6.06	ND	84% (15-129)		10/15/15 :10/20/15	
Pyrene	6.05	ug/L	1.0		6.06	ND	100% (42-129)		10/15/15 :10/20/15	
2,3,4,6-Tetrachlorophenol	4.54	ug/L	2.0		6.06	ND	75% (56-138)		10/15/15 :10/20/15	
1,2,4-Trichlorobenzene	4.39	ug/L	1.0		6.06	ND	72% (56-121)		10/15/15 :10/20/15	
2,4,5-Trichlorophenol	4.68	ug/L	2.0		6.06	ND	77% (46-145)		10/15/15 :10/20/15	
2,4,6-Trichlorophenol	6.30	ug/L	1.0		6.06	ND	104% (67-126)		10/15/15 :10/20/15	
<b>Surrogate</b>										
2-Fluorophenol	6.3	ug/L			6.06		104% (23-129)		10/15/15 :10/20/15	
Phenol-d6	4.8	ug/L			6.06		78% (9.7-130)		10/15/15 :10/20/15	
Nitrobenzene-d5	6.3	ug/L			6.06		105% (46-141)		10/15/15 :10/20/15	

Reported: 11/09/15 09:53

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W15J074**

Client: Director's Office  
Received: 10/10/15 14:58

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B15J211

**Matrix Spike (B15J211-MS1)** **Source: W15J074-01**

**Surrogate**

2-Fluorobiphenyl	5.1 ug/L				6.06		85% (49-122)		10/15/15 :10/20/15	
2,4,6-Tribromophenol	6.7 ug/L				6.06		110% (30-159)		10/15/15 :10/20/15	
p-Terphenyl-d14	6.2 ug/L				6.06		102% (24-143)		10/15/15 :10/20/15	

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**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15J179**

**Blank (B15J179-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					10/14/15 : 10/15/15	
Acenaphthylene	ND	ug/L	0.020	0.020					10/14/15 : 10/15/15	
Anthracene	ND	ug/L	0.020	0.020					10/14/15 : 10/15/15	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					10/14/15 : 10/15/15	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					10/14/15 : 10/15/15	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					10/14/15 : 10/15/15	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					10/14/15 : 10/15/15	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					10/14/15 : 10/15/15	
Chrysene	ND	ug/L	0.010	0.010					10/14/15 : 10/15/15	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					10/14/15 : 10/15/15	
Fluoranthene	ND	ug/L	0.010	0.010					10/14/15 : 10/15/15	
Fluorene	ND	ug/L	0.020	0.020					10/14/15 : 10/15/15	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					10/14/15 : 10/15/15	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					10/14/15 : 10/15/15	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					10/14/15 : 10/15/15	
Naphthalene	ND	ug/L	0.040	0.040					10/14/15 : 10/15/15	
Phenanthrene	ND	ug/L	0.020	0.020					10/14/15 : 10/15/15	
Pyrene	ND	ug/L	0.010	0.010					10/14/15 : 10/15/15	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					10/14/15 : 10/15/15	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					10/14/15 : 10/15/15	
Diethyl phthalate	ND	ug/L	1.0	0.50					10/14/15 : 10/15/15	
Dimethyl phthalate	ND	ug/L	1.0	0.50					10/14/15 : 10/15/15	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					10/14/15 : 10/15/15	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					10/14/15 : 10/15/15	

**Surrogate**

2-Methylnaphthalene-d10	0.27	ug/L			0.229		116% (60.4-153)		10/14/15 : 10/15/15	
Fluoranthene-d10	0.24	ug/L			0.229		106% (69-149)		10/14/15 : 10/15/15	

**LCS (B15J179-BS1)**

Acenaphthene	0.224	ug/L	0.020	0.020	0.229		98% (58.8-155)		10/14/15 : 10/15/15	
Acenaphthylene	0.237	ug/L	0.020	0.020	0.229		104% (64-155)		10/14/15 : 10/15/15	
Anthracene	0.222	ug/L	0.020	0.020	0.229		97% (76.2-129)		10/14/15 : 10/15/15	
Benzo(a)anthracene	0.234	ug/L	0.010	0.010	0.229		102% (72.9-138)		10/14/15 : 10/15/15	
Benzo(a)pyrene	0.232	ug/L	0.010	0.010	0.229		102% (75.5-137)		10/14/15 : 10/15/15	
Benzo(b)fluoranthene	0.223	ug/L	0.010	0.010	0.229		98% (59.9-160)		10/14/15 : 10/15/15	
Benzo(g,h,i)perylene	0.217	ug/L	0.010	0.010	0.229		95% (70.1-134)		10/14/15 : 10/15/15	
Benzo(k)fluoranthene	0.227	ug/L	0.010	0.010	0.229		99% (61.1-157)		10/14/15 : 10/15/15	
Chrysene	0.241	ug/L	0.010	0.010	0.229		106% (76.7-146)		10/14/15 : 10/15/15	
Dibenzo(a,h)anthracene	0.224	ug/L	0.010	0.010	0.229		98% (63.9-140)		10/14/15 : 10/15/15	
Fluoranthene	0.226	ug/L	0.010	0.010	0.229		99% (77.5-134)		10/14/15 : 10/15/15	
Fluorene	0.194	ug/L	0.020	0.020	0.229		85% (61.2-157)		10/14/15 : 10/15/15	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15J179**

**LCS (B15J179-BS1)**

Indeno(1,2,3-cd)pyrene	0.227	ug/L	0.010	0.010	0.229		100% (68.4-135)		10/14/15 :10/15/15	
1-Methylnaphthalene	0.272	ug/L	0.040	0.040	0.229		119% (79.6-158)		10/14/15 :10/15/15	
2-Methylnaphthalene	0.251	ug/L	0.040	0.040	0.229		110% (76-161)		10/14/15 :10/15/15	
Naphthalene	0.391	ug/L	0.040	0.040	0.229		171% (60.6-164)		10/14/15 :10/15/15	L2
Phenanthrene	0.225	ug/L	0.020	0.020	0.229		98% (77.4-140)		10/14/15 :10/15/15	
Pyrene	0.225	ug/L	0.010	0.010	0.229		98% (81.1-141)		10/14/15 :10/15/15	
Butyl benzyl phthalate	2.41	ug/L	1.0	0.50	2.29		105% (54.7-176)		10/14/15 :10/15/15	
Di-n-butyl phthalate	2.44	ug/L	1.0	0.50	2.29		107% (74.3-149)		10/14/15 :10/15/15	
Diethyl phthalate	2.07	ug/L	1.0	0.50	2.29		90% (75.5-173)		10/14/15 :10/15/15	
Dimethyl phthalate	2.07	ug/L	1.0	0.50	2.29		90% (81.6-148)		10/14/15 :10/15/15	
Di-n-octyl phthalate	2.31	ug/L	1.0	0.50	2.29		101% (60.2-155)		10/14/15 :10/15/15	
Bis(2-ethylhexyl) phthalate	2.21	ug/L	1.0	0.50	2.29		97% (64.4-162)		10/14/15 :10/15/15	

**Surrogate**

2-Methylnaphthalene-d10	0.25	ug/L			0.229		108% (60.4-153)		10/14/15 :10/15/15	
Fluoranthene-d10	0.24	ug/L			0.229		103% (69-149)		10/14/15 :10/15/15	

**Matrix Spike (B15J179-MS1)**

**Source: W15J074-01**

Acenaphthene	0.641	ug/L	0.020	0.020	0.571	0.0486	104% (58.8-155)		10/14/15 :10/15/15	
Acenaphthylene	0.624	ug/L	0.020	0.020	0.571	ND	109% (64-155)		10/14/15 :10/15/15	
Anthracene	0.599	ug/L	0.020	0.020	0.571	0.0394	98% (76.2-129)		10/14/15 :10/15/15	
Benzo(a)anthracene	0.451	ug/L	0.010	0.010	0.571	ND	79% (72.9-138)		10/14/15 :10/15/15	
Benzo(a)pyrene	0.387	ug/L	0.010	0.010	0.571	ND	68% (75.5-137)		10/14/15 :10/15/15	M4
Benzo(b)fluoranthene	0.386	ug/L	0.010	0.010	0.571	ND	68% (59.9-160)		10/14/15 :10/15/15	
Benzo(g,h,i)perylene	0.332	ug/L	0.010	0.010	0.571	0.0126	56% (70.1-134)		10/14/15 :10/15/15	M4
Benzo(k)fluoranthene	0.371	ug/L	0.010	0.010	0.571	ND	65% (61.1-157)		10/14/15 :10/15/15	
Chrysene	0.480	ug/L	0.010	0.010	0.571	ND	84% (76.7-146)		10/14/15 :10/15/15	
Dibenzo(a,h)anthracene	0.335	ug/L	0.010	0.010	0.571	ND	59% (63.9-140)		10/14/15 :10/15/15	M4
Fluoranthene	0.552	ug/L	0.010	0.010	0.571	0.0314	91% (77.5-134)		10/14/15 :10/15/15	
Fluorene	0.544	ug/L	0.020	0.020	0.571	0.0251	91% (61.2-157)		10/14/15 :10/15/15	
Indeno(1,2,3-cd)pyrene	0.339	ug/L	0.010	0.010	0.571	ND	59% (68.4-135)		10/14/15 :10/15/15	M4
1-Methylnaphthalene	0.769	ug/L	0.040	0.040	0.571	0.0480	126% (79.6-159)		10/14/15 :10/15/15	
2-Methylnaphthalene	0.657	ug/L	0.040	0.040	0.571	ND	115% (76-161)		10/14/15 :10/15/15	
Naphthalene	0.819	ug/L	0.040	0.040	0.571	ND	143% (60.6-164)		10/14/15 :10/15/15	L2
Phenanthrene	0.603	ug/L	0.020	0.020	0.571	0.0463	98% (77.4-140)		10/14/15 :10/15/15	
Pyrene	0.555	ug/L	0.010	0.010	0.571	0.0480	89% (81.1-141)		10/14/15 :10/15/15	
Butyl benzyl phthalate	5.12	ug/L	1.0	0.50	5.71	ND	90% (54.7-176)		10/14/15 :10/15/15	
Di-n-butyl phthalate	5.60	ug/L	1.0	0.50	5.71	ND	98% (74.3-149)		10/14/15 :10/15/15	
Diethyl phthalate	5.48	ug/L	1.0	0.50	5.71	ND	96% (75.5-173)		10/14/15 :10/15/15	
Dimethyl phthalate	5.80	ug/L	1.0	0.50	5.71	ND	102% (81.6-148)		10/14/15 :10/15/15	
Di-n-octyl phthalate	2.76	ug/L	1.0	0.50	5.71	ND	48% (60.2-155)		10/14/15 :10/15/15	M4
Bis(2-ethylhexyl) phthalate	2.97	ug/L	1.0	0.50	5.71	ND	52% (64.4-162)		10/14/15 :10/15/15	M4

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**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15J179**

**Matrix Spike (B15J179-MS1) Source: W15J074-01**

**Surrogate**

2-Methylnaphthalene-d10	0.23	ug/L			0.229		100% (60.4-153)		10/14/15 :10/15/15	
Fluoranthene-d10	0.21	ug/L			0.229		92% (69-149)		10/14/15 :10/15/15	

**Matrix Spike Dup (B15J179-MSD1) Source: W15J074-01**

Acenaphthene	0.659	ug/L	0.020	0.020	0.571	0.0486	107% (58.8-155 3 (50)		10/14/15 :10/15/15	
Acenaphthylene	0.649	ug/L	0.020	0.020	0.571	ND	114% (64-155) 4 (50)		10/14/15 :10/15/15	
Anthracene	0.625	ug/L	0.020	0.020	0.571	0.0394	102% (76.2-129 4 (50)		10/14/15 :10/15/15	
Benzo(a)anthracene	0.481	ug/L	0.010	0.010	0.571	ND	84% (72.9-138) 6 (50)		10/14/15 :10/15/15	
Benzo(a)pyrene	0.424	ug/L	0.010	0.010	0.571	ND	74% (75.5-137) 9 (50)		10/14/15 :10/15/15	M4
Benzo(b)fluoranthene	0.419	ug/L	0.010	0.010	0.571	ND	73% (59.9-160) 8 (50)		10/14/15 :10/15/15	
Benzo(g,h,i)perylene	0.366	ug/L	0.010	0.010	0.571	0.0126	62% (70.1-134) 10 (50)		10/14/15 :10/15/15	M4
Benzo(k)fluoranthene	0.405	ug/L	0.010	0.010	0.571	ND	71% (61.1-157) 9 (50)		10/14/15 :10/15/15	
Chrysene	0.512	ug/L	0.010	0.010	0.571	ND	90% (76.7-146) 6 (50)		10/14/15 :10/15/15	
Dibenzo(a,h)anthracene	0.368	ug/L	0.010	0.010	0.571	ND	64% (63.9-140) 9 (50)		10/14/15 :10/15/15	
Fluoranthene	0.571	ug/L	0.010	0.010	0.571	0.0314	94% (77.5-134) 3 (50)		10/14/15 :10/15/15	
Fluorene	0.552	ug/L	0.020	0.020	0.571	0.0251	92% (61.2-157) 1 (50)		10/14/15 :10/15/15	
Indeno(1,2,3-cd)pyrene	0.373	ug/L	0.010	0.010	0.571	ND	65% (68.4-135) 10 (50)		10/14/15 :10/15/15	M4
1-Methylnaphthalene	0.890	ug/L	0.040	0.040	0.571	0.0480	147% (79.6-159 15 (50)		10/14/15 :10/15/15	
2-Methylnaphthalene	0.765	ug/L	0.040	0.040	0.571	ND	134% (76-161) 15 (50)		10/14/15 :10/15/15	
Naphthalene	1.14	ug/L	0.040	0.040	0.571	ND	200% (60.6-164 33 (50)		10/14/15 :10/15/15	L2
Phenanthrene	0.622	ug/L	0.020	0.020	0.571	0.0463	101% (77.4-140 3 (50)		10/14/15 :10/15/15	
Pyrene	0.573	ug/L	0.010	0.010	0.571	0.0480	92% (81.1-141) 3 (50)		10/14/15 :10/15/15	
Butyl benzyl phthalate	5.37	ug/L	1.0	0.50	5.71	ND	94% (54.7-176) 5 (50)		10/14/15 :10/15/15	
Di-n-butyl phthalate	5.72	ug/L	1.0	0.50	5.71	ND	100% (74.3-149 2 (50)		10/14/15 :10/15/15	
Diethyl phthalate	5.44	ug/L	1.0	0.50	5.71	ND	95% (75.5-173) 0.6 (50)		10/14/15 :10/15/15	
Dimethyl phthalate	5.78	ug/L	1.0	0.50	5.71	ND	101% (81.6-148 0.4 (50)		10/14/15 :10/15/15	
Di-n-octyl phthalate	2.92	ug/L	1.0	0.50	5.71	ND	51% (60.2-155) 6 (50)		10/14/15 :10/15/15	M4
Bis(2-ethylhexyl) phthalate	3.13	ug/L	1.0	0.50	5.71	ND	55% (64.4-162) 5 (50)		10/14/15 :10/15/15	M4

**Surrogate**

2-Methylnaphthalene-d10	0.26	ug/L			0.229		115% (60.4-153)		10/14/15 :10/15/15	
Fluoranthene-d10	0.21	ug/L			0.229		93% (69-149)		10/14/15 :10/15/15	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W15J074**

**Client: Director's Office**  
**Received: 10/10/15 14:58**

**Polychlorinated Biphenyls (PCBs) - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>PCB Aroclors by GC-ECD - Batch B15J180</b>										
<b>Blank (B15J180-BLK1)</b>										
Aroclor 1016/1242	ND	ug/L	0.0250	0.0250					10/14/15 :10/14/15	
Aroclor 1221	ND	ug/L	0.0500	0.0500					10/14/15 :10/14/15	
Aroclor 1232	ND	ug/L	0.0250	0.0250					10/14/15 :10/14/15	
Aroclor 1248	ND	ug/L	0.0250	0.0250					10/14/15 :10/14/15	
Aroclor 1254	ND	ug/L	0.0250	0.0250					10/14/15 :10/14/15	
Aroclor 1260	ND	ug/L	0.0250	0.0250					10/14/15 :10/14/15	
<b>Surrogate</b>										
Tetrachloro-m-xylene	0.0270	ug/L			0.0500		54% (32.8-105)		10/14/15 :10/14/15	
Decachlorobiphenyl	0.0503	ug/L			0.0500		101% (29-133)		10/14/15 :10/14/15	
<b>LCS (B15J180-BS1)</b>										
Aroclor 1016/1242	0.4108	ug/L	0.0250	0.0250	0.500		82% (45.3-101)		10/14/15 :10/14/15	
<b>Surrogate</b>										
Tetrachloro-m-xylene	0.0276	ug/L			0.0500		55% (32.8-105)		10/14/15 :10/14/15	
Decachlorobiphenyl	0.0511	ug/L			0.0500		102% (29-133)		10/14/15 :10/14/15	
<b>LCS (B15J180-BS2)</b>										
Aroclor 1260	0.5950	ug/L	0.0500	0.0500	0.500		119% (57.8-118)		10/14/15 :10/14/15	L3
<b>Surrogate</b>										
Tetrachloro-m-xylene	0.0277	ug/L			0.0500		55% (32.8-105)		10/14/15 :10/14/15	
Decachlorobiphenyl	0.0532	ug/L			0.0500		106% (29-133)		10/14/15 :10/14/15	
<b>LCS Dup (B15J180-BSD1)</b>										
Aroclor 1016/1242	0.4174	ug/L	0.0250	0.0250	0.500		83% (45.3-101) 2 (20)		10/14/15 :10/14/15	
<b>Surrogate</b>										
Tetrachloro-m-xylene	0.0273	ug/L			0.0500		55% (32.8-105)		10/14/15 :10/14/15	
Decachlorobiphenyl	0.0546	ug/L			0.0500		109% (29-133)		10/14/15 :10/14/15	
<b>LCS Dup (B15J180-BSD2)</b>										
Aroclor 1260	0.6060	ug/L	0.0500	0.0500	0.500		121% (57.8-118) 2 (20)		10/14/15 :10/14/15	L3
<b>Surrogate</b>										
Tetrachloro-m-xylene	0.0273	ug/L			0.0500		55% (32.8-105)		10/14/15 :10/14/15	
Decachlorobiphenyl	0.0558	ug/L			0.0500		112% (29-133)		10/14/15 :10/14/15	

Reported: 11/09/15 09:53

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
 ORELAP Certification ID 4023



Project: **Portland Harbor**  
 Work Order: **W15J074**

Client: Director's Office  
 Received: 10/10/15 14:58

**Qualifiers**

- L2 Recovery for this analyte in the laboratory control sample was outside the acceptance range (high). Sample results may be high estimates.
- L3 LCS recovery for this analyte was high; the analyte was not detected in the samples and results are not affected.
- M4 Based on low matrix spike recovery, the sample result may be a low estimate due to matrix interference.
- V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.
- V3 Continuing calibration verification was low; sample results for this analyte may be low estimates.

**Definitions**

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 11/09/15 09:53

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

Jennifer Shackelford, Laboratory Coordinator QA/QC



### WPCL Cooler Receipt Form

Work Order Number: W155074

Cooler Receipt Form Filled Out By: RK

Project: Portland Harbor

Sample transport: Samples received on ice Yes Courier \_\_\_\_\_

Directly from field \_\_\_\_\_

Temperature (°C) 17

	Yes	No	NA
Is the COC present and signed?	✓		
Are sample bottles intact?	✓		
Do the COC and sample labels match?	✓		
Are the appropriate containers used?	✓		
Are samples appropriately preserved?	✓		
Do VOA vials have Headspace?			/
Are samples received within holding times?	/		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	1501053	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
<del>10/12/15</del> 10/12/15	1515	RK	W155074-01	F	1	
M2 10/12/15						

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

November 2, 2015

**Analytical Report for Service Request No: K1511465**

Jennifer Shackelford  
Portland, City of  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W15J074**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory October 12, 2015  
For your reference, these analyses have been assigned our service request number **K1511465**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
Idaho DHW	<a href="http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx">http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx</a>	-
ISO 17025	<a href="http://www.pjlabs.com/">http://www.pjlabs.com/</a>	L14-50
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Michigan DEQ	<a href="http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html">http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html</a>	9949
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wisconsin DNR	<a href="http://dnr.wi.gov/">http://dnr.wi.gov/</a>	998386840
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS ENVIRONMENTAL

**Client:** Portland, City of  
**Project:** Portland Harbor/ W15J074  
**Sample Matrix:** Water

**Service Request No.:** K1511465  
**Date Received:** 10/12/15

**Case Narrative**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

**Sample Receipt**

One water sample was received for analysis at ALS Environmental on 10/12/15. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

**Organochlorine Pesticides by EPA Method 8081**

**Second Source Exceptions:**

The analysis of Chlorinated Pesticides by EPA 8081 requires the use of dual column confirmation. When the Initial Calibration Verification (ICV) criteria are met for both columns, the higher of the two sample results is generally reported. The primary evaluation criteria were not met on the confirmation column for Endrin Aldehyde. The ICV results are reported from the acceptable column. The data quality is not affected. No further corrective action was necessary.

**Calibration Verification Exceptions:**

The upper control criterion was exceeded for several analytes in the Continuing Calibration Verification (CCV). The field samples analyzed in this sequence did not contain the analytes in question. Since the apparent problem indicated a potential high bias, the data quality was not affected. No further corrective action was required.

The analysis of Chlorinated Pesticides by EPA 8081 requires the use of dual column confirmation. When the Continuing Calibration Verification (CCV) criterion is met for both columns, the lower of the two sample results is generally reported. The primary evaluation criteria were not met on the confirmation column for Methoxychlor. The results were reported from the column with an acceptable CCV. The data quality was not affected. No further corrective action was necessary.

**Matrix Spike Recovery Exceptions:**

Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD for these samples.

Approved by \_\_\_\_\_



**Elevated Detection Limits:**

The reporting limit is elevated for several analytes in this sample. The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compounds at the reporting limit. The results are flagged to indicate the matrix interference.

No other anomalies associated with the analysis of this sample were observed.

Approved by \_\_\_\_\_





# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

SUBCONTRACT ORDER  
 City of Portland Water Pollution Control Lab  
 W15J074

K1511405

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

Columbia Analytical Services  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

WPCL Project Name  
**Portland Harbor**

<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush _ day(s)	<b>TURNAROUND REQUEST</b>
--	---------------------------

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: W15J074-01	Water	Sampled: 10/10/15 14:18		
Out-Pesticides Chlor LL (CAS)	10/26/15 17:00	10/17/15 14:18		
<i>Containers Supplied:</i>				
G amber 1L (C)				

CAS called 10/12/15 @ 0930 MZ

	10/12/15		10/12/15 10:50
Released By	Date	Received By	Date
Released By	Date	Received By	Date



H2  
PC

### Cooler Receipt and Preservation Form

Client / Project: City of Portland Service Request K15 71465  
 Received: 10-12-15 Opened: 10-12-15 By: DeW Unloaded: 10-12-15 By: DeW

- Samples were received via?  Mail  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- Samples were received in: (circle)  Cooler  Box  Envelope  Other \_\_\_\_\_ NA
- Were custody seals on coolers? NA  Y  N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y  N If present, were they signed and dated? Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
6.4	6.5	4.3	4.4	+0.1	359	NA		NA	

- Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves \_\_\_\_\_
- Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
- Did all bottles arrive in good condition (unbroken)? Indicate in the table below. NA  Y  N
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
- Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA  Y  N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
- Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below. NA  Y  N
- Were VOA vials received without headspace? Indicate in the table below. NA  Y  N
- Was C12/Res negative? NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Organochlorine Pesticides

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W15J074  
**Sample Matrix:** Water

**Service Request:** K1511465  
**Date Collected:** 10/10/2015  
**Date Received:** 10/12/2015

Organochlorine Pesticides

**Sample Name:** W15J074-01  
**Lab Code:** K1511465-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	Ui	2.7	2.7	1	10/15/15	10/16/15	KWG1509994	
beta-BHC	ND	Ui	1.2	1.2	1	10/15/15	10/16/15	KWG1509994	
gamma-BHC (Lindane)	ND	Ui	6.0	6.0	1	10/15/15	10/16/15	KWG1509994	
delta-BHC	ND	U	0.99	0.20	1	10/15/15	10/16/15	KWG1509994	
Heptachlor	ND	U	0.99	0.13	1	10/15/15	10/16/15	KWG1509994	
Aldrin	ND	U	0.99	0.20	1	10/15/15	10/16/15	KWG1509994	
Heptachlor Epoxide	ND	U	0.99	0.69	1	10/15/15	10/16/15	KWG1509994	
gamma-Chlordane†	ND	U	0.99	0.21	1	10/15/15	10/16/15	KWG1509994	
Endosulfan I	ND	U	0.99	0.15	1	10/15/15	10/16/15	KWG1509994	
alpha-Chlordane	ND	U	0.99	0.17	1	10/15/15	10/16/15	KWG1509994	
Dieldrin	ND	U	0.99	0.23	1	10/15/15	10/16/15	KWG1509994	
4,4'-DDE	ND	U	0.99	0.11	1	10/15/15	10/16/15	KWG1509994	
Endrin	ND	U	0.99	0.18	1	10/15/15	10/16/15	KWG1509994	
Endosulfan II	ND	U	0.99	0.20	1	10/15/15	10/16/15	KWG1509994	
4,4'-DDD	ND	U	0.99	0.28	1	10/15/15	10/16/15	KWG1509994	
Endrin Aldehyde	ND	U	0.99	0.22	1	10/15/15	10/16/15	KWG1509994	
Endosulfan Sulfate	ND	U	0.99	0.84	1	10/15/15	10/16/15	KWG1509994	
4,4'-DDT	ND	U	0.99	0.30	1	10/15/15	10/16/15	KWG1509994	
Endrin Ketone	ND	U	0.99	0.28	1	10/15/15	10/16/15	KWG1509994	
Methoxychlor	ND	U	0.99	0.22	1	10/15/15	10/16/15	KWG1509994	
Toxaphene	ND	U	50	19	1	10/15/15	10/16/15	KWG1509994	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	54	20-106	10/16/15	Acceptable
Decachlorobiphenyl	88	19-127	10/16/15	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments: \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W15J074  
**Sample Matrix:** Storm water

**Service Request:** K1511465  
**Date Collected:** NA  
**Date Received:** NA

Organochlorine Pesticides

**Sample Name:** Method Blank  
**Lab Code:** KWG1509994-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	0.99	0.19	1	10/15/15	10/17/15	KWG1509994	
beta-BHC	ND	U	0.99	0.47	1	10/15/15	10/17/15	KWG1509994	
gamma-BHC (Lindane)	ND	U	0.99	0.22	1	10/15/15	10/17/15	KWG1509994	
delta-BHC	ND	U	0.99	0.20	1	10/15/15	10/17/15	KWG1509994	
Heptachlor	ND	U	0.99	0.13	1	10/15/15	10/17/15	KWG1509994	
Aldrin	ND	U	0.99	0.20	1	10/15/15	10/17/15	KWG1509994	
Heptachlor Epoxide	ND	U	0.99	0.69	1	10/15/15	10/17/15	KWG1509994	
gamma-Chlordane†	ND	U	0.99	0.21	1	10/15/15	10/17/15	KWG1509994	
Endosulfan I	ND	U	0.99	0.15	1	10/15/15	10/17/15	KWG1509994	
alpha-Chlordane	ND	U	0.99	0.17	1	10/15/15	10/17/15	KWG1509994	
Dieldrin	ND	U	0.99	0.23	1	10/15/15	10/17/15	KWG1509994	
4,4'-DDE	ND	U	0.99	0.11	1	10/15/15	10/17/15	KWG1509994	
Endrin	ND	U	0.99	0.18	1	10/15/15	10/17/15	KWG1509994	
Endosulfan II	ND	U	0.99	0.20	1	10/15/15	10/17/15	KWG1509994	
4,4'-DDD	ND	U	0.99	0.28	1	10/15/15	10/17/15	KWG1509994	
Endrin Aldehyde	ND	U	0.99	0.22	1	10/15/15	10/17/15	KWG1509994	
Endosulfan Sulfate	ND	U	0.99	0.84	1	10/15/15	10/17/15	KWG1509994	
4,4'-DDT	ND	U	0.99	0.30	1	10/15/15	10/17/15	KWG1509994	
Endrin Ketone	ND	U	0.99	0.28	1	10/15/15	10/17/15	KWG1509994	
Methoxychlor	ND	U	0.99	0.22	1	10/15/15	10/17/15	KWG1509994	
Toxaphene	ND	U	50	19	1	10/15/15	10/17/15	KWG1509994	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	90	20-106	10/17/15	Acceptable
Decachlorobiphenyl	100	19-127	10/17/15	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments: \_\_\_\_\_

**Client:** Portland, City of  
**Project:** Portland Harbor/W15J074  
**Sample Matrix:** Water

**Service Request:** K1511465

**Surrogate Recovery Summary  
 Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>	<u>Sur2</u>
W15J074-01	K1511465-001	54	88
Method Blank	KWG1509994-5	90	100
Lab Control Sample	KWG1509994-1	97	76
Duplicate Lab Control Sample	KWG1509994-2	98	102

**Surrogate Recovery Control Limits (%)**

---

Sur1 = Tetrachloro-m-xylene	20-106
Sur2 = Decachlorobiphenyl	19-127

---

Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.

**Client:** Portland, City of  
**Project:** Portland Harbor/W15J074  
**Sample Matrix:** Storm water

**Service Request:** K1511465  
**Date Extracted:** 10/15/2015  
**Date Analyzed:** 10/17/2015

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1509994

Analyte Name	Lab Control Sample KWG1509994-1 Lab Control Spike			Duplicate Lab Control Sample KWG1509994-2 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
alpha-BHC	10.3	10.0	103	9.88	10.0	99	36-122	4	30
beta-BHC	9.40	10.0	94	9.21	10.0	92	42-125	2	30
gamma-BHC (Lindane)	10.9	10.0	109	10.5	10.0	105	44-117	4	30
delta-BHC	11.0	10.0	110	10.3	10.0	103	48-123	7	30
Heptachlor	10.1	10.0	101	9.44	10.0	94	40-115	7	30
Aldrin	9.47	10.0	95	8.94	10.0	89	10-102	6	30
Heptachlor Epoxide	9.68	10.0	97	9.61	10.0	96	49-109	1	30
gamma-Chlordane	9.55	10.0	95	9.09	10.0	91	47-113	5	30
Endosulfan I	8.53	10.0	85	7.93	10.0	79	35-115	7	30
alpha-Chlordane	9.48	10.0	95	9.33	10.0	93	45-115	2	30
Dieldrin	9.38	10.0	94	8.88	10.0	89	50-115	6	30
4,4'-DDE	9.55	10.0	96	9.67	10.0	97	41-116	1	30
Endrin	10.0	10.0	100	9.43	10.0	94	48-126	6	30
Endosulfan II	9.01	10.0	90	8.73	10.0	87	28-128	3	30
4,4'-DDD	9.84	10.0	98	9.20	10.0	92	33-132	7	30
Endrin Aldehyde	7.59	10.0	76	7.63	10.0	76	27-104	0	30
Endosulfan Sulfate	8.98	10.0	90	8.91	10.0	89	38-118	1	30
4,4'-DDT	9.13	10.0	91	8.60	10.0	86	42-143	6	30
Endrin Ketone	8.66	10.0	87	8.97	10.0	90	30-124	3	30
Methoxychlor	10.6	10.0	106	9.76	10.0	98	43-143	8	30
Toxaphene	302	400	76	334	400	84	36-137	10	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Seattle  
5755 8th Street East  
Tacoma, WA 98424  
Tel: (253)922-2310

TestAmerica Job ID: 580-54093-1

TestAmerica Sample Delivery Group: W15J074  
Client Project/Site: Portland Harbor

For:

City of Portland  
Water Pollution Laboratory  
6543 N. Burlington Ave  
Portland, Oregon 97203

Attn: Jennifer Shackelford



Authorized for release by:  
11/5/2015 7:15:25 PM

Kelsey Devries, Project Mgmt. Assistant  
(253)922-2310  
[kelsey.devries@testamericainc.com](mailto:kelsey.devries@testamericainc.com)

### LINKS

Review your project  
results through  
**Total Access**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: City of Portland  
Project/Site: Portland Harbor

TestAmerica Job ID: 580-54093-1  
SDG: W15J074

---

**Job ID: 580-54093-1**

---

**Laboratory: TestAmerica Seattle**

---

**Narrative**

**Job Narrative**  
**580-54093-1**

**Comments**

No additional comments.

**Receipt**

The sample was received on 10/12/2015 12:00 PM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.2° C.

**Subcontract non-Sister**

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



# Definitions/Glossary

Client: City of Portland  
Project/Site: Portland Harbor

TestAmerica Job ID: 580-54093-1  
SDG: W15J074

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Certification Summary

Client: City of Portland  
Project/Site: Portland Harbor

TestAmerica Job ID: 580-54093-1  
SDG: W15J074

## Laboratory: TestAmerica Seattle

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska (UST)	State Program	10	UST-022	03-02-16
California	State Program	9	2901	01-31-17
L-A-B	DoD ELAP		L2236	01-19-16
L-A-B	ISO/IEC 17025		L2236	01-19-16
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-06-16
US Fish & Wildlife	Federal		LE058448-0	02-28-16
USDA	Federal		P330-14-00126	04-08-17
Washington	State Program	10	C553	02-17-16

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# Sample Summary

Client: City of Portland  
Project/Site: Portland Harbor

TestAmerica Job ID: 580-54093-1  
SDG: W15J074

---

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-54093-1	W15J074-01	Water	10/10/15 14:18	10/12/15 12:00

---

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**Report Prepared for:**

Jay Willms  
Test America  
9405 SW Nimbus Ave.  
Beaverton OR 97008

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Information:**

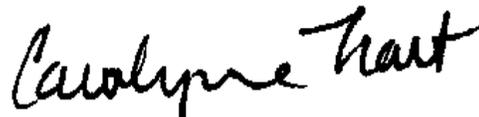
**Pace Project #: 10326085**  
**Sample Receipt Date: 10/14/2015**  
**Client Project #: 25000370 Portland Harbor**  
**Client Sub PO #: N/A**  
**State Cert #: MN200001-005**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Carolynne Trout, your Pace Project Manager.

**This report has been reviewed by:**



November 03, 2015

Carolynne Trout, Project Manager  
(612) 607-6351  
(612) 607-6444 (fax)  
Carolynne.Trout@pacelabs.com



**Report of Laboratory Analysis**

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The results relate only to the samples included in this report.

**Report Prepared Date:**

November 3, 2015



## DISCUSSION

This report presents the results from the analyses performed on one sample submitted by a representative of Test America - Portland. The sample was analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the volume of sample extracted.

The isotopically-labeled PCB internal standards in the sample extract were recovered at 35-104%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the field samples.

Laboratory spike samples were also prepared with the sample batch using water that had been fortified with native standards. The results show that the spiked native compounds were recovered at 89-109%, with relative percent differences of 0.0-6.5%. These results were within the target ranges for this method. Matrix spikes were not prepared with the sample batch.

## REPORT OF LABORATORY ANALYSIS

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia	9952C
Maryland	322	Wisconsin	999407970
Michigan	9909	Wyoming	8TMS-Q
Minnesota	027-053-137		

## REPORT OF LABORATORY ANALYSIS

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Report No.....10326085



# Appendix A

## Sample Management



**Sample Condition Upon Receipt** Client Name: Test America Project #: **WO# : 10326085**

Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  SpeedDee  Other: \_\_\_\_\_

Tracking Number: 0542 7760 0843



10326085

Custody Seal on Cooler/Box Present?  Yes  No      Seals Intact?  Yes  No      Optional: Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_

Packing Material:  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_      Temp Blank?  Yes  No

Thermometer Used:  B88A9130516413  B88A912167504  B88A0143310098      Type of Ice:  Wet  Blue  None  Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.3      Cooler Temp Corrected (°C): 5.3      Biological Tissue Frozen?  Yes  No  N/A

Temp should be above freezing to 6°C      Correction Factor: none      Date and Initials of Person Examining Contents: Whio. 10.15.15

USDA Regulated Soil  N/A, water sample

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, IA, MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)?  Yes  No      Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION** Field Data Required?  Yes  No

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/Resolution: \_\_\_\_\_

Project Manager Review: [Signature] Date: 10/15/15

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

### REPORT OF LABORATORY ANALYSIS

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Report No.....10326085

Report No.....10326085\_1668A

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# Appendix B

## Sample Analysis Summary



### Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - Test America

Client's Sample ID	W15J074-01 (580-54093-1)		
Lab Sample ID	10326085001		
Filename	P151028A_13		
Injected By	CVS		
Total Amount Extracted	1020 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/10/2015 14:18
ICAL ID	P151028A02	Received	10/14/2015 09:50
CCal Filename(s)	P151028A_01	Extracted	10/19/2015 14:00
Method Blank ID	BLANK-47417	Analyzed	10/28/2015 20:27

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.761	2.97	2.0	0.702	35
13C-4-MoCB	3	11.385	2.73	2.0	0.840	42
13C-2,2'-DiCB	4	11.648	1.59	2.0	0.873	44
13C-4,4'-DiCB	15	18.452	1.60	2.0	1.11	56
13C-2,2',6-TrCB	19	15.277	1.04	2.0	1.08	54
13C-3,4,4'-TrCB	37	26.094	1.07	2.0	1.46	73
13C-2,2',6,6'-TeCB	54	18.716	0.81	2.0	1.15	57
13C-3,4,4',5-TeCB	81	33.159	0.78	2.0	1.71	85
13C-3,3',4,4'-TeCB	77	33.729	0.82	2.0	1.63	81
13C-2,2',4,6,6'-PeCB	104	24.702	1.55	2.0	1.34	67
13C-2,3,3',4,4'-PeCB	105	37.290	1.54	2.0	1.75	87
13C-2,3,4,4',5-PeCB	114	36.636	1.64	2.0	1.76	88
13C-2,3',4,4',5-PeCB	118	36.082	1.57	2.0	1.80	90
13C-2,3',4,4',5'-PeCB	123	35.730	1.58	2.0	1.80	90
13C-3,3',4,4',5-PeCB	126	40.493	1.62	2.0	1.77	89
13C-2,2',4,4',6,6'-HxCB	155	30.660	1.28	2.0	1.49	75
13C-HxCB (156/157)	156/157	43.516	1.28	4.0	3.27	82
13C-2,3',4,4',5,5'-HxCB	167	42.342	1.30	2.0	1.71	86
13C-3,3',4,4',5,5'-HxCB	169	46.836	1.24	2.0	1.45	72
13C-2,2',3,4',5,6,6'-HpCB	188	36.552	1.07	2.0	1.89	94
13C-2,3,3',4,4',5,5'-HpCB	189	49.354	1.05	2.0	1.76	88
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.023	0.90	2.0	2.08	104
13C-2,3,3',4,4',5,5',6-OxCB	205	51.918	0.89	2.0	1.61	81
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.750	0.82	2.0	1.55	78
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	48.793	0.78	2.0	1.87	94
13C--DeCB	209	55.431	0.71	2.0	1.84	92
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.768	1.01	2.0	1.47	74
13C-2,3,3',5,5'-PeCB	111	33.713	1.56	2.0	1.65	83
13C-2,2',3,3',5,5',6-HpCB	178	39.671	1.06	2.0	1.87	93
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.971	1.61	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.697	0.77	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.912	1.58	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.252	1.24	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.444	0.85	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
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 \* = See Discussion  
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 RT = Retention Time  
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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W15J074-01 (580-54093-1)  
Lab Sample ID 10326085001  
Filename P151028A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.245
2		---	---	ND	---	0.245
3		---	---	ND	---	0.245
4		---	---	ND	---	0.245
5		---	---	ND	---	0.245
6		---	---	ND	---	0.245
7		---	---	ND	---	0.245
8		---	---	ND	---	0.245
9		---	---	ND	---	0.245
10		---	---	ND	---	0.245
11		---	---	ND	---	2.40
12	12/13	---	---	ND	---	0.490
13	12/13	---	---	ND	---	0.490
14		---	---	ND	---	0.245
15		---	---	ND	---	0.323
16		---	---	ND	---	0.245
17		---	---	ND	---	0.245
18	18/30	---	---	ND	---	0.490
19		---	---	ND	---	0.245
20	20/28	---	---	ND	---	1.26
21	21/33	---	---	ND	---	1.32
22		---	---	ND	---	0.930
23		---	---	ND	---	0.245
24		---	---	ND	---	0.245
25		---	---	ND	---	0.245
26	26/29	---	---	ND	---	0.490
27		---	---	ND	---	0.245
28	20/28	---	---	ND	---	1.26
29	26/29	---	---	ND	---	0.490
30	18/30	---	---	ND	---	0.490
31		---	---	ND	---	1.27
32		---	---	ND	---	0.245
33	21/33	---	---	ND	---	1.32
34		---	---	ND	---	0.245
35		---	---	ND	---	0.245
36		---	---	ND	---	0.245
37		---	---	ND	---	0.519
38		---	---	ND	---	0.245
39		---	---	ND	---	0.245
40	40/41/71	---	---	ND	---	1.47
41	40/41/71	---	---	ND	---	1.47
42		---	---	ND	---	0.490
43	43/73	---	---	ND	---	0.490
44	44/47/65	---	---	ND	---	1.47
45	45/51	---	---	ND	---	0.979
46		---	---	ND	---	0.490
47	44/47/65	---	---	ND	---	1.47
48		---	---	ND	---	0.490

Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W15J074-01 (580-54093-1)  
Lab Sample ID 10326085001  
Filename P151028A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.979
50	50/53	---	---	ND	---	0.979
51	45/51	---	---	ND	---	0.979
52		---	---	ND	---	1.51
53	50/53	---	---	ND	---	0.979
54		---	---	ND	---	0.490
55		---	---	ND	---	0.490
56		---	---	ND	---	0.490
57		---	---	ND	---	0.490
58		---	---	ND	---	0.490
59	59/62/75	---	---	ND	---	1.47
60		---	---	ND	---	0.490
61	61/70/74/76	---	---	ND	---	1.96
62	59/62/75	---	---	ND	---	1.47
63		---	---	ND	---	0.490
64		---	---	ND	---	0.490
65	44/47/65	---	---	ND	---	1.47
66		---	---	ND	---	0.822
67		---	---	ND	---	0.490
68		---	---	ND	---	0.490
69	49/69	---	---	ND	---	0.979
70	61/70/74/76	---	---	ND	---	1.96
71	40/41/71	---	---	ND	---	1.47
72		---	---	ND	---	0.490
73	43/73	---	---	ND	---	0.490
74	61/70/74/76	---	---	ND	---	1.96
75	59/62/75	---	---	ND	---	1.47
76	61/70/74/76	---	---	ND	---	1.96
77		---	---	ND	---	0.490
78		---	---	ND	---	0.490
79		---	---	ND	---	0.490
80		---	---	ND	---	0.490
81		---	---	ND	---	0.490
82		---	---	ND	---	0.490
83		---	---	ND	---	0.490
84		---	---	ND	---	0.490
85	85/116/117	---	---	ND	---	1.47
86	86/87/97/108/119/125	---	---	ND	---	2.94
87	86/87/97/108/119/125	---	---	ND	---	2.94
88	88/91	---	---	ND	---	0.979
89		---	---	ND	---	0.490
90	90/101/113	---	---	ND	---	1.47
91	88/91	---	---	ND	---	0.979
92		---	---	ND	---	0.490
93	93/98/100/102	---	---	ND	---	1.96
94		---	---	ND	---	0.490
95		---	---	ND	---	0.930
96		---	---	ND	---	0.490

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W15J074-01 (580-54093-1)  
Lab Sample ID 10326085001  
Filename P151028A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.94
98	93/98/100/102	---	---	ND	---	1.96
99		---	---	ND	---	0.490
100	93/98/100/102	---	---	ND	---	1.96
101	90/101/113	---	---	ND	---	1.47
102	93/98/100/102	---	---	ND	---	1.96
103		---	---	ND	---	0.490
104		---	---	ND	---	0.490
105		---	---	ND	---	0.490
106		---	---	ND	---	0.490
107	107/124	---	---	ND	---	0.979
108	86/87/97/108/119/125	---	---	ND	---	2.94
109		---	---	ND	---	0.490
110	110/115	---	---	ND	---	0.979
111		---	---	ND	---	0.490
112		---	---	ND	---	0.490
113	90/101/113	---	---	ND	---	1.47
114		---	---	ND	---	0.490
115	110/115	---	---	ND	---	0.979
116	85/116/117	---	---	ND	---	1.47
117	85/116/117	---	---	ND	---	1.47
118		---	---	ND	---	0.627
119	86/87/97/108/119/125	---	---	ND	---	2.94
120		---	---	ND	---	0.490
121		---	---	ND	---	0.490
122		---	---	ND	---	0.490
123		---	---	ND	---	0.490
124	107/124	---	---	ND	---	0.979
125	86/87/97/108/119/125	---	---	ND	---	2.94
126		---	---	ND	---	0.490
127		---	---	ND	---	0.490
128	128/166	---	---	ND	---	0.979
129	129/138/163	---	---	ND	---	1.47
130		---	---	ND	---	0.490
131		---	---	ND	---	0.490
132		---	---	ND	---	0.490
133		---	---	ND	---	0.490
134	134/143	---	---	ND	---	0.979
135	135/151	---	---	ND	---	0.979
136		---	---	ND	---	0.490
137		---	---	ND	---	0.490
138	129/138/163	---	---	ND	---	1.47
139	139/140	---	---	ND	---	0.979
140	139/140	---	---	ND	---	0.979
141		---	---	ND	---	0.490
142		---	---	ND	---	0.490
143	134/143	---	---	ND	---	0.979
144		---	---	ND	---	0.490

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W15J074-01 (580-54093-1)  
Lab Sample ID 10326085001  
Filename P151028A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.490
146		---	---	ND	---	0.490
147	147/149	---	---	ND	---	0.979
148		---	---	ND	---	0.490
149	147/149	---	---	ND	---	0.979
150		---	---	ND	---	0.490
151	135/151	---	---	ND	---	0.979
152		---	---	ND	---	0.490
153	153/168	---	---	ND	---	0.979
154		---	---	ND	---	0.490
155		---	---	ND	---	0.490
156	156/157	---	---	ND	---	0.979
157	156/157	---	---	ND	---	0.979
158		---	---	ND	---	0.490
159		---	---	ND	---	0.490
160		---	---	ND	---	0.490
161		---	---	ND	---	0.490
162		---	---	ND	---	0.490
163	129/138/163	---	---	ND	---	1.47
164		---	---	ND	---	0.490
165		---	---	ND	---	0.490
166	128/166	---	---	ND	---	0.979
167		---	---	ND	---	0.490
168	153/168	---	---	ND	---	0.979
169		---	---	ND	---	0.490
170		---	---	ND	---	0.490
171	171/173	---	---	ND	---	0.979
172		---	---	ND	---	0.490
173	171/173	---	---	ND	---	0.979
174		---	---	ND	---	0.490
175		---	---	ND	---	0.490
176		---	---	ND	---	0.490
177		---	---	ND	---	0.490
178		---	---	ND	---	0.490
179		---	---	ND	---	0.490
180	180/193	---	---	ND	---	0.979
181		---	---	ND	---	0.490
182		---	---	ND	---	0.490
183	183/185	---	---	ND	---	0.979
184		---	---	ND	---	0.490
185	183/185	---	---	ND	---	0.979
186		---	---	ND	---	0.490
187		---	---	ND	---	0.490
188		---	---	ND	---	0.490
189		---	---	ND	---	0.490
190		---	---	ND	---	0.490
191		---	---	ND	---	0.490
192		---	---	ND	---	0.490

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W15J074-01 (580-54093-1)  
 Lab Sample ID 10326085001  
 Filename P151028A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.979
194		---	---	ND	---	0.734
195		---	---	ND	---	0.734
196		---	---	ND	---	0.734
197	197/200	---	---	ND	---	1.47
198	198/199	---	---	ND	---	1.47
199	198/199	---	---	ND	---	1.47
200	197/200	---	---	ND	---	1.47
201		---	---	ND	---	0.734
202		---	---	ND	---	0.734
203		---	---	ND	---	0.734
204		---	---	ND	---	0.734
205		---	---	ND	---	0.734
206		---	---	ND	---	0.734
207		---	---	ND	---	0.734
208		---	---	ND	---	0.734
209		---	---	ND	---	0.734



Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID            W15J074-01 (580-54093-1)  
Lab Sample ID              10326085001  
Filename                      P151028A\_13

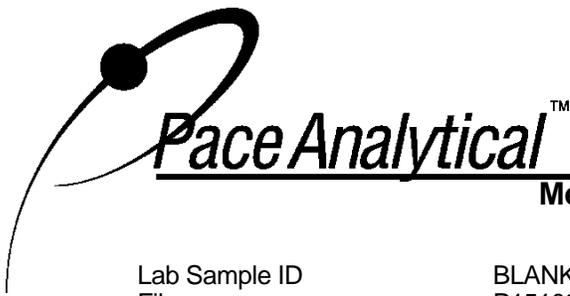
Congener Group	Concentration ng/L
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected



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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-47417	Matrix	Water
Filename	P151024B_06	Extracted	10/19/2015 14:00
Injected By	BAL	Analyzed	10/24/2015 21:21
Total Amount Extracted	1020 mL	Dilution	5
ICAL ID	P151024B02		
CCal Filename(s)	P151024B_01		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.701	3.04	2.0	1.20	60
13C-4-MoCB	3	11.312	3.03	2.0	1.32	66
13C-2,2'-DiCB	4	11.564	1.54	2.0	1.35	67
13C-4,4'-DiCB	15	18.378	1.60	2.0	1.40	70
13C-2,2',6-TrCB	19	15.180	1.11	2.0	1.40	70
13C-3,4,4'-TrCB	37	25.989	1.04	2.0	1.42	71
13C-2,2',6,6'-TeCB	54	18.645	0.78	2.0	1.45	73
13C-3,4,4',5-TeCB	81	33.037	0.77	2.0	1.58	79
13C-3,3',4,4'-TeCB	77	33.640	0.77	2.0	1.53	76
13C-2,2',4,6,6'-PeCB	104	24.597	1.64	2.0	1.51	76
13C-2,3,3',4,4'-PeCB	105	37.201	1.64	2.0	1.64	82
13C-2,3,4,4',5-PeCB	114	36.530	1.61	2.0	1.59	80
13C-2,3',4,4',5-PeCB	118	35.960	1.62	2.0	1.59	79
13C-2,3',4,4',5'-PeCB	123	35.641	1.61	2.0	1.61	80
13C-3,3',4,4',5-PeCB	126	40.387	1.57	2.0	1.58	79
13C-2,2',4,4',6,6'-HxCB	155	30.555	1.24	2.0	1.64	82
13C-HxCB (156/157)	156/157	43.410	1.23	4.0	3.05	76
13C-2,3',4,4',5,5'-HxCB	167	42.236	1.30	2.0	1.61	80
13C-3,3',4,4',5,5'-HxCB	169	46.730	1.35	2.0	1.45	73
13C-2,2',3,4',5,6,6'-HpCB	188	36.429	1.05	2.0	1.75	88
13C-2,3,3',4,4',5,5'-HpCB	189	49.240	1.05	2.0	1.68	84
13C-2,2',3,3',5,5',6,6'-OoCB	202	41.901	0.90	2.0	1.94	97
13C-2,3,3',4,4',5,5',6-OoCB	205	51.805	0.91	2.0	1.64	82
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.615	0.76	2.0	1.62	81
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	48.680	0.78	2.0	1.76	88
13C-DeCB	209	55.318	0.72	2.0	1.99	99
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.663	1.08	2.0	1.59	80
13C-2,3,3',5,5'-PeCB	111	33.607	1.59	2.0	1.58	79
13C-2,2',3,3',5,5',6-HpCB	178	39.565	1.09	2.0	1.84	92
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.886	1.56	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.608	0.79	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.807	1.58	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.129	1.31	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	51.331	0.88	2.0	NA	NA

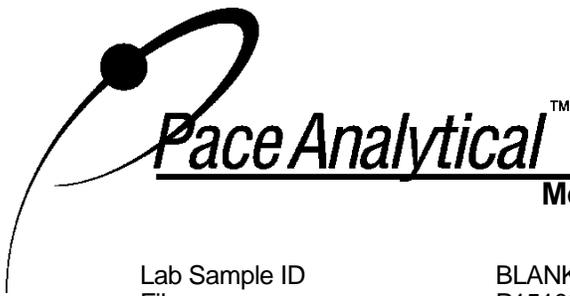
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EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-47417  
Filename P151024B\_06



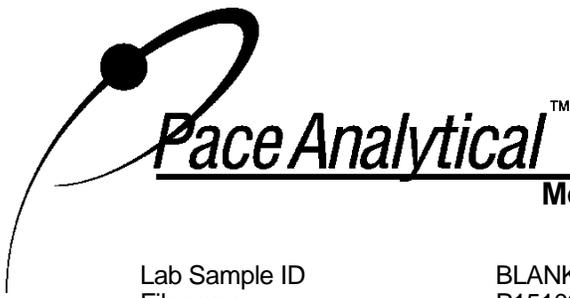
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.244
2		---	---	ND	---	0.244
3		---	---	ND	---	0.244
4		---	---	ND	---	0.244
5		---	---	ND	---	0.244
6		---	---	ND	---	0.244
7		---	---	ND	---	0.244
8		---	---	ND	---	0.244
9		---	---	ND	---	0.244
10		---	---	ND	---	0.244
11		---	---	ND	---	2.40
12	12/13	---	---	ND	---	0.489
13	12/13	---	---	ND	---	0.489
14		---	---	ND	---	0.244
15		---	---	ND	---	0.244
16		---	---	ND	---	0.244
17		---	---	ND	---	0.244
18	18/30	---	---	ND	---	0.489
19		---	---	ND	---	0.244
20	20/28	---	---	ND	---	1.26
21	21/33	---	---	ND	---	1.32
22		---	---	ND	---	0.929
23		---	---	ND	---	0.244
24		---	---	ND	---	0.244
25		---	---	ND	---	0.244
26	26/29	---	---	ND	---	0.489
27		---	---	ND	---	0.244
28	20/28	---	---	ND	---	1.26
29	26/29	---	---	ND	---	0.489
30	18/30	---	---	ND	---	0.489
31		---	---	ND	---	1.27
32		---	---	ND	---	0.244
33	21/33	---	---	ND	---	1.32
34		---	---	ND	---	0.244
35		---	---	ND	---	0.244
36		---	---	ND	---	0.244
37		---	---	ND	---	0.518
38		---	---	ND	---	0.244
39		---	---	ND	---	0.244
40	40/41/71	---	---	ND	---	1.47
41	40/41/71	---	---	ND	---	1.47
42		---	---	ND	---	0.489
43	43/73	---	---	ND	---	0.489
44	44/47/65	---	---	ND	---	1.47
45	45/51	---	---	ND	---	0.978

Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-47417  
 Filename P151024B\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		---	---	ND	---	0.489
47	44/47/65	---	---	ND	---	1.47
48		---	---	ND	---	0.489
49	49/69	---	---	ND	---	0.978
50	50/53	---	---	ND	---	0.978
51	45/51	---	---	ND	---	0.978
52		---	---	ND	---	1.51
53	50/53	---	---	ND	---	0.978
54		---	---	ND	---	0.489
55		---	---	ND	---	0.489
56		---	---	ND	---	0.489
57		---	---	ND	---	0.489
58		---	---	ND	---	0.489
59	59/62/75	---	---	ND	---	1.47
60		---	---	ND	---	0.489
61	61/70/74/76	---	---	ND	---	1.96
62	59/62/75	---	---	ND	---	1.47
63		---	---	ND	---	0.489
64		---	---	ND	---	0.489
65	44/47/65	---	---	ND	---	1.47
66		---	---	ND	---	0.821
67		---	---	ND	---	0.489
68		---	---	ND	---	0.489
69	49/69	---	---	ND	---	0.978
70	61/70/74/76	---	---	ND	---	1.96
71	40/41/71	---	---	ND	---	1.47
72		---	---	ND	---	0.489
73	43/73	---	---	ND	---	0.489
74	61/70/74/76	---	---	ND	---	1.96
75	59/62/75	---	---	ND	---	1.47
76	61/70/74/76	---	---	ND	---	1.96
77		---	---	ND	---	0.489
78		---	---	ND	---	0.489
79		---	---	ND	---	0.489
80		---	---	ND	---	0.489
81		---	---	ND	---	0.489
82		---	---	ND	---	0.489
83		---	---	ND	---	0.489
84		---	---	ND	---	0.489
85	85/116/117	---	---	ND	---	1.47
86	86/87/97/108/119/125	---	---	ND	---	2.93
87	86/87/97/108/119/125	---	---	ND	---	2.93
88	88/91	---	---	ND	---	0.978
89		---	---	ND	---	0.489
90	90/101/113	---	---	ND	---	1.47

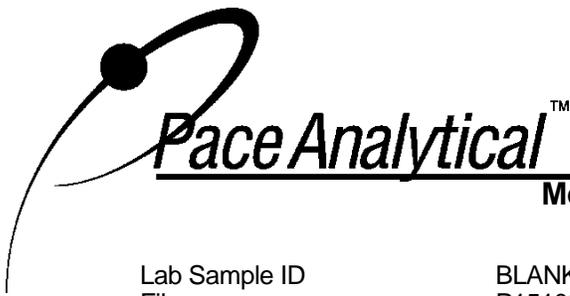
Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-47417  
Filename P151024B\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	---	---	ND	---	0.978
92		---	---	ND	---	0.489
93	93/98/100/102	---	---	ND	---	1.96
94		---	---	ND	---	0.489
95		---	---	ND	---	0.929
96		---	---	ND	---	0.489
97	86/87/97/108/119/125	---	---	ND	---	2.93
98	93/98/100/102	---	---	ND	---	1.96
99		---	---	ND	---	0.489
100	93/98/100/102	---	---	ND	---	1.96
101	90/101/113	---	---	ND	---	1.47
102	93/98/100/102	---	---	ND	---	1.96
103		---	---	ND	---	0.489
104		---	---	ND	---	0.489
105		---	---	ND	---	0.489
106		---	---	ND	---	0.489
107	107/124	---	---	ND	---	0.978
108	86/87/97/108/119/125	---	---	ND	---	2.93
109		---	---	ND	---	0.489
110	110/115	---	---	ND	---	0.978
111		---	---	ND	---	0.489
112		---	---	ND	---	0.489
113	90/101/113	---	---	ND	---	1.47
114		---	---	ND	---	0.489
115	110/115	---	---	ND	---	0.978
116	85/116/117	---	---	ND	---	1.47
117	85/116/117	---	---	ND	---	1.47
118		---	---	ND	---	0.626
119	86/87/97/108/119/125	---	---	ND	---	2.93
120		---	---	ND	---	0.489
121		---	---	ND	---	0.489
122		---	---	ND	---	0.489
123		---	---	ND	---	0.489
124	107/124	---	---	ND	---	0.978
125	86/87/97/108/119/125	---	---	ND	---	2.93
126		---	---	ND	---	0.489
127		---	---	ND	---	0.489
128	128/166	---	---	ND	---	0.978
129	129/138/163	---	---	ND	---	1.47
130		---	---	ND	---	0.489
131		---	---	ND	---	0.489
132		---	---	ND	---	0.489
133		---	---	ND	---	0.489
134	134/143	---	---	ND	---	0.978
135	135/151	---	---	ND	---	0.978

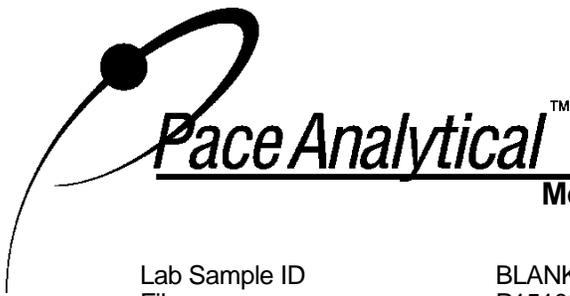
Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-47417  
Filename P151024B\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		---	---	ND	---	0.489
137		---	---	ND	---	0.489
138	129/138/163	---	---	ND	---	1.47
139	139/140	---	---	ND	---	0.978
140	139/140	---	---	ND	---	0.978
141		---	---	ND	---	0.489
142		---	---	ND	---	0.489
143	134/143	---	---	ND	---	0.978
144		---	---	ND	---	0.489
145		---	---	ND	---	0.489
146		---	---	ND	---	0.489
147	147/149	---	---	ND	---	0.978
148		---	---	ND	---	0.489
149	147/149	---	---	ND	---	0.978
150		---	---	ND	---	0.489
151	135/151	---	---	ND	---	0.978
152		---	---	ND	---	0.489
153	153/168	---	---	ND	---	0.978
154		---	---	ND	---	0.489
155		---	---	ND	---	0.489
156	156/157	---	---	ND	---	0.978
157	156/157	---	---	ND	---	0.978
158		---	---	ND	---	0.489
159		---	---	ND	---	0.489
160		---	---	ND	---	0.489
161		---	---	ND	---	0.489
162		---	---	ND	---	0.489
163	129/138/163	---	---	ND	---	1.47
164		---	---	ND	---	0.489
165		---	---	ND	---	0.489
166	128/166	---	---	ND	---	0.978
167		---	---	ND	---	0.489
168	153/168	---	---	ND	---	0.978
169		---	---	ND	---	0.489
170		---	---	ND	---	0.489
171	171/173	---	---	ND	---	0.978
172		---	---	ND	---	0.489
173	171/173	---	---	ND	---	0.978
174		---	---	ND	---	0.489
175		---	---	ND	---	0.489
176		---	---	ND	---	0.489
177		---	---	ND	---	0.489
178		---	---	ND	---	0.489
179		---	---	ND	---	0.489
180	180/193	---	---	ND	---	0.978

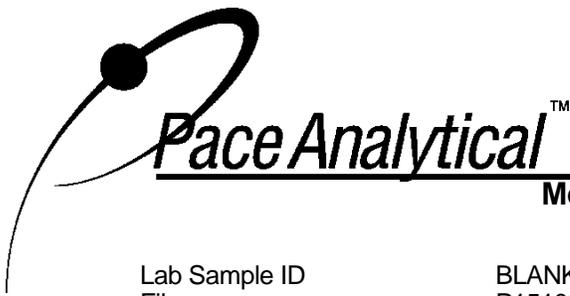
Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-47417  
 Filename P151024B\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		---	---	ND	---	0.489
182		---	---	ND	---	0.489
183	183/185	---	---	ND	---	0.978
184		---	---	ND	---	0.489
185	183/185	---	---	ND	---	0.978
186		---	---	ND	---	0.489
187		---	---	ND	---	0.489
188		---	---	ND	---	0.489
189		---	---	ND	---	0.489
190		---	---	ND	---	0.489
191		---	---	ND	---	0.489
192		---	---	ND	---	0.489
193	180/193	---	---	ND	---	0.978
194		---	---	ND	---	0.733
195		---	---	ND	---	0.733
196		---	---	ND	---	0.733
197	197/200	---	---	ND	---	1.47
198	198/199	---	---	ND	---	1.47
199	198/199	---	---	ND	---	1.47
200	197/200	---	---	ND	---	1.47
201		---	---	ND	---	0.733
202		---	---	ND	---	0.733
203		---	---	ND	---	0.733
204		---	---	ND	---	0.733
205		---	---	ND	---	0.733
206		---	---	ND	---	0.733
207		---	---	ND	---	0.733
208		---	---	ND	---	0.733
209		---	---	ND	---	0.733

Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID           CBLKGS  
Lab Sample ID             BLANK-47417  
Filename                    P151024B\_06

Congener Group	Concentration ng/L
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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### Method 1668A Polychlorobiphenyls Laboratory Control Spike Analysis Results

Lab Sample ID	LCS-47418	Matrix	Water
Filename	P151024B_03	Dilution	5
Total Amount Extracted	1040 mL	Extracted	10/19/2015 14:00
ICAL ID	P151024B02	Analyzed	10/24/2015 18:24
CCal Filename(s)	P151024B_01	Injected By	BAL
Method Blank ID	BLANK-47417		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	0.970	97	2.0	1.40	70
3	1.0	0.956	96	2.0	1.52	76
4	1.0	0.987	99	2.0	1.53	76
15	1.0	0.973	97	2.0	1.62	81
19	1.0	0.966	97	2.0	1.56	78
37	1.0	0.967	97	2.0	1.75	87
54	1.0	0.971	97	2.0	1.60	80
81	1.0	0.943	94	2.0	1.79	90
77	1.0	0.985	98	2.0	1.77	88
104	1.0	1.04	104	2.0	1.60	80
105	1.0	0.962	96	2.0	1.79	90
114	1.0	0.997	100	2.0	1.76	88
118	1.0	1.00	100	2.0	1.79	89
123	1.0	0.975	98	2.0	1.79	90
126	1.0	0.953	95	2.0	1.81	91
155	1.0	1.00	100	2.0	1.72	86
156/157	2.0	2.01	100	4.0	3.55	89
167	1.0	1.02	102	2.0	1.75	87
169	1.0	1.02	102	2.0	1.69	84
188	1.0	1.09	109	2.0	1.67	83
189	1.0	0.993	99	2.0	1.81	90
202	1.0	1.01	101	2.0	1.86	93
205	1.0	1.06	106	2.0	1.75	87
206	1.0	1.07	107	2.0	1.68	84
208	1.0	1.05	105	2.0	1.82	91
209	1.0	0.947	95	2.0	2.01	100

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

## REPORT OF LABORATORY ANALYSIS

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### Method 1668A Polychlorobiphenyls Laboratory Control Spike Analysis Results

Lab Sample ID	LCSD-47419	Matrix	Water
Filename	P151024B_04	Dilution	5
Total Amount Extracted	1020 mL	Extracted	10/19/2015 14:00
ICAL ID	P151024B02	Analyzed	10/24/2015 19:23
CCal Filename(s)	P151024B_01	Injected By	BAL
Method Blank ID	BLANK-47417		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	0.997	100	2.0	1.27	63
3	1.0	0.978	98	2.0	1.34	67
4	1.0	0.978	98	2.0	1.38	69
15	1.0	1.01	101	2.0	1.37	68
19	1.0	0.959	96	2.0	1.42	71
37	1.0	0.964	96	2.0	1.49	75
54	1.0	0.978	98	2.0	1.44	72
81	1.0	0.960	96	2.0	1.59	79
77	1.0	0.945	95	2.0	1.51	75
104	1.0	1.02	102	2.0	1.45	73
105	1.0	0.948	95	2.0	1.62	81
114	1.0	0.962	96	2.0	1.62	81
118	1.0	0.976	98	2.0	1.61	81
123	1.0	0.963	96	2.0	1.62	81
126	1.0	0.979	98	2.0	1.56	78
155	1.0	0.965	97	2.0	1.63	81
156/157	2.0	2.00	100	4.0	3.21	80
167	1.0	0.985	98	2.0	1.71	85
169	1.0	0.988	99	2.0	1.51	75
188	1.0	1.04	104	2.0	1.79	89
189	1.0	0.950	95	2.0	1.76	88
202	1.0	1.00	100	2.0	2.01	100
205	1.0	1.00	100	2.0	1.71	85
206	1.0	1.03	103	2.0	1.65	83
208	1.0	1.05	105	2.0	1.81	90
209	1.0	0.886	89	2.0	2.06	103

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client Test America

Spike 1 ID LCS-47418  
Spike 1 Filename P151024B\_03

Spike 2 ID LCSD-47419  
Spike 2 Filename P151024B\_04

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	97	100	3.0
4-MoCB	3	96	98	2.1
2,2'-DiCB	4	99	98	1.0
4,4'-DiCB	15	97	101	4.0
2,2',6-TrCB	19	97	96	1.0
3,4,4'-TrCB	37	97	96	1.0
2,2',6,6'-TeCB	54	97	98	1.0
3,3',4,4'-TeCB	77	98	95	3.1
3,4,4',5-TeCB	81	94	96	2.1
2,2',4,6,6'-PeCB	104	104	102	1.9
2,3,3',4,4'-PeCB	105	96	95	1.0
2,3,4,4',5-PeCB	114	100	96	4.1
2,3',4,4',5-PeCB	118	100	98	2.0
2,3',4,4',5'-PeCB	123	98	96	2.1
3,3',4,4',5-PeCB	126	95	98	3.1
2,2',4,4',6,6'-HxCB	155	100	97	3.0
(156/157)	156/157	100	100	0.0
2,3',4,4',5,5'-HxCB	167	102	98	4.0
3,3',4,4',5,5'-HxCB	169	102	99	3.0
2,2',3,4',5,6,6'-HpCB	188	109	104	4.7
2,3,3',4,4',5,5'-HpCB	189	99	95	4.1
2,2',3,3',5,5',6,6'-OcCB	202	101	100	1.0
2,3,3',4,4',5,5',6-OcCB	205	106	100	5.8
2,2',3,3',4,4',5,5',6-NoCB	206	107	103	3.8
2,2',3,3',4,5,5',6,6'-NoCB	208	105	105	0.0
Decachlorobiphenyl	209	95	89	6.5

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

**REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.

**SUBCONTRACT ORDER**  
**City of Portland Water Pollution Control Lab**  
**W15J074**



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle using P.O.# 30001516

**RECEIVING LABORATORY:**

TestAmerica  
 9405 SW Nimbus Ave  
 Beaverton, OR 97008  
 Phone : (503) 906-9200  
 Fax: (503) 906-9210

WPCL Project Name  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>	
<input checked="" type="checkbox"/> Standard	
<input type="checkbox"/> Rush _ day(s)	

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: W15J074-01	Water	Sampled: 10/10/15 14:18		
Out-PCB Congeners 209 (Pace)	10/26/15 17:00	04/07/16 14:18		
<i>Containers Supplied:</i> G amber 1L (B)				

TA called 10/12/15 @ 0930 - mZ

	10/12/15 Date		10/12/15 1055 Date
	10/12/15 1200 Date		10/12/15 @ 1200 Date

4.2 IR/P-L

# Login Sample Receipt Checklist

Client: City of Portland

Job Number: 580-54093-1

SDG Number: W15J074

**Login Number: 54093**

**List Number: 1**

**Creator: Svabik-Seror, Philip M**

**List Source: TestAmerica Seattle**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	





55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

## Laboratory Data QA/QC Review Outfall Basin 17

**To:** File  
**From:** Andrew Davidson, GSI  
**Date:** January 10, 2016

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during a source control investigation sampling event conducted by the City of Portland (City). One stormwater sample (W15J213-01) was collected in Outfall Basin 17 on October 31, 2015 and submitted for analyses.

The laboratory analyses for this source control program sample were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Total Field Conductivity – FO SOP 1.03a
  - Field pH – FO SOP 1.01a
  - Field temperature – FO SOP 1.05a
  - Total Suspended Solids (TSS) -- SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCLSOP M-10
  - Semivolatile Organic Compounds (SVOCs) – EPA 8270
  - Polynuclear Aromatic Hydrocarbons (PAHs) and phthalates – EPA 8270 - SIM
  - Polychlorinated Biphenyl (PCB) Aroclors – EPA 8082
- ALS Environmental (under subcontract to WPCL)
  - Organochlorine Pesticides – EPA 8081B
- Pace Analytical (under subcontract to Test America)
  - PCB Congeners – EPA 1668A

The WPCL summary report and the subcontracted laboratories' data reports for all analyses associated with this sampling event are attached for review.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and available:

- Chain-of-custody for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method blanks and/or field decontamination blanks
- Internal standard recoveries within laboratory control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike/matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control/duplicate laboratory control (LC/DLC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the WPCL report and subcontracted laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures appear to have been adequate indicating that sample integrity was maintained throughout the sample collection and delivery process.

## **Analysis Holding Times**

The samples were extracted and analyzed within the acceptable method-specific holding times for all analyses.

## **Method Blanks**

Method blanks were processed during the following analyses: TSS, total metals, total mercury, SVOCs, PAHs and phthalates, PCB Aroclors, PCB congeners, and organochlorine pesticides. No analytes were detected in any of the blank samples processed.

## **Field Decontamination Blanks**

Field decontamination blanks were not collected during this sampling event.

## Internal Standard Recoveries

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. Labeled internal standard recoveries were within method-specified target ranges for the stormwater sample, the method blank, and the LC/DLC samples. Pace reports that the data were automatically corrected for variation in recovery and accurate values were obtained.

## Surrogate Recoveries

Surrogate recoveries were processed during the laboratory analyses of SVOCs, PAHs and phthalates, PCB Aroclors, and organochlorine pesticides. All surrogate compound recoveries were within method-specified control limits with one exception:

- Recovery of the surrogate compound, fluoranthene-d10, was below laboratory control limits for the MS/MSD samples processed during the analysis of PAHs and phthalates. WPCL reports that some sample results may be low estimates. Surrogate recoveries in the field sample, LC sample, and blank sample were within laboratory control limits and the field sample results are not further qualified.

## Matrix Spike/Matrix Spike Duplicate

MS samples were processed during the laboratory analysis of total metals, mercury, SVOCs, and PAHs and phthalates. MSD samples were processed during the analysis of PAHs and phthalates. MS/MSD recoveries and RPDs were within acceptance limits for spiked analytes with the following exceptions:

- Recovery of the compounds 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, and hexachloroethane were below laboratory control limits in the MS sample processed during the analysis of SVOCs. These compounds were not detected in sample W15J213-01. These non-detects are flagged "UJ" to indicate that while the analyte was not detected above the reported sample quantitation limit, the reported quantitation limit is approximate and may be inaccurate or imprecise.
- Recovery of the compounds benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, pyrene, di-n-octyl phthalate, bis(2-ethylhexyl) phthalate were below laboratory control limits in the MS and/or MSD samples processed during the analysis of PAH and phthalates. All LC sample compound recoveries associated with the analysis of PAHs and phthalates were within laboratory control limits, and the field sample data are not qualified further.

In the analysis of organochlorine pesticides by ALS Environmental, insufficient volume was received to perform a MS/MSD for the stormwater sample. ALS reports that LCS/DLCS was analyzed and reported in lieu of the MS/MSD for these samples.

## Laboratory Control Samples/Duplicate Laboratory Control Samples

LC samples were processed during the analyses of TSS, total metals, mercury, SVOCs, PAHs and phthalates, PCB Aroclors, organochlorine pesticides, and PCB congeners. DLC samples were processed during the analyses of PCB Aroclors, pesticides, and PCB congeners. LC/DLC recoveries and RPDs were within laboratory control limits with the following exceptions:

- Recovery of the compounds 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, and hexachloroethane were below laboratory control limits in the LC sample processed during the analysis of SVOCs. These compounds were not detected in sample W15J213-01. However, these non-detects are flagged “UJ” to indicate that while the analyte was not detected above the reported sample quantitation limit, the reported quantitation limit is approximate and may be inaccurate or imprecise.
- Recovery of the compound bis(2-ethylhexyl)phthalate was above laboratory control limits in the LC sample processed during the analysis of SVOCs. Bis(2-ethylhexyl)phthalate was the only compound detected above its respective detection limit in the field sample W15J213-01 during the SVOC analysis. This sample result is flagged “J” to indicate that it may represent a high estimate.
- Although recoveries were within laboratory control limits, the RPD was above acceptance criteria for the LC/LCD samples processed during the analysis of PCB Aroclors. No PCB Aroclors were detected during the analysis of the field sample and the results are not further qualified.

## Duplicate Samples

Duplicate samples were processed during the analyses of TSS, total metals, mercury, and SVOCs. All RPDs were within acceptance criteria.

## Additional Information

- In the evaluation of SVOCs, the continuing calibration verification (CCV) recoveries were outside control criteria for several analytes in the field and QC samples. Sample results for which the CCV criteria were low (hexachlorocyclopentadiene) are flagged “UJ” to indicate that the reported quantitation limit is approximate and may be inaccurate or imprecise.
- ALS reports that the reporting limit is elevated for several analytes in the pesticide analysis due to non-target background components. Sample results for which ALS indicates additional elevation of the reporting limit are flagged Ui in the subcontracted report to indicate that matrix interference prevented adequate resolution of the target compounds at the normal limit.
- ALS reports that the initial calibration verification (ICV) criterion were not met in CAL 14410 for Endrin Aldehyde during the pesticide analysis. However, the data quality was not affected, and no further corrective action was necessary.



City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



November 24, 2015

Linda Scheffler  
Director's Office

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Work Order  
**W15J213**

Project  
**Portland Harbor**

Received  
10/31/15 15:05

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W15J213</b>	Project Mgr: Linda Scheffler
Received: 10/31/15 15:05	
Submitted By: Field Operations	

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
17_16SW	W15J213-01	Stormwater	Grab	10/31/15 14:48	10/31/15 14:48	

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**17\_16SW : W15J213-01**

**Field Parameters**

Conductivity*	34 umhos/cm			1	B15K014	10/31/15	10/31/15	FO SOP 1.03a	
pH*	7.2 pH Units			1	B15K014	10/31/15 14:48	10/31/15	FO SOP 1.01a	
Temperature*	16.0 °C			1	B15K014	10/31/15 14:48	10/31/15	FO SOP 1.05a	

**General Chemistry**

Total suspended solids	45 mg/L	2	2		B15K022	11/02/15	11/02/15	SM 2540D	
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**Total Metals**

Total Metals by ICPMS									
Arsenic	0.827 ug/L	0.100	0.100	1	B15K013	11/02/15	11/03/15	EPA 200.8	
Cadmium	0.112 ug/L	0.100	0.100	1	B15K013	11/02/15	11/03/15	EPA 200.8	
Chromium	3.22 ug/L	0.200	0.200	1	B15K013	11/02/15	11/03/15	EPA 200.8	
Copper	12.2 ug/L	0.200	0.200	1	B15K013	11/02/15	11/03/15	EPA 200.8	
Lead	7.07 ug/L	0.100	0.100	1	B15K013	11/02/15	11/03/15	EPA 200.8	
Mercury	0.0108 ug/L	0.00100	0.00100	1	B15K104	11/09/15	11/19/15	WPCLSOP M-10	
Nickel	1.83 ug/L	0.200	0.200	1	B15K013	11/02/15	11/03/15	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B15K013	11/02/15	11/04/15	EPA 200.8	
Zinc	74.6 ug/L	0.500	0.500	1	B15K013	11/02/15	11/03/15	EPA 200.8	

Reported: 11/24/15 11:17

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W15J213**

**Client: Director's Office**  
**Received: 10/31/15 15:05**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics**

Semivolatile Organic Compounds by GCMS

Acenaphthene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Acenaphthylene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Anthracene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Benzo(a)anthracene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Benzo(a)pyrene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Benzo(b)fluoranthene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Benzo(g,h,i)perylene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Benzo(k)fluoranthene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
4-Bromophenylphenyl ether	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Butyl benzyl phthalate	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
4-Chloro-3-methylphenol	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
4-Chloroaniline	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Bis(2-chloroethoxy) methane	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Bis(2-chloroethyl) ether	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Bis(2-chloroisopropyl) ether	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2-Chloronaphthalene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2-Chlorophenol	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
4-Chlorophenylphenyl ether	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Chrysene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Di-n-butyl phthalate	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Di-n-octyl phthalate	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Dibenzo(a,h)anthracene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Dibenzofuran	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
1,2-Dichlorobenzene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	L1
1,3-Dichlorobenzene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	L1
1,4-Dichlorobenzene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	L1
3,3'-Dichlorobenzidine	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2,4-Dichlorophenol	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Diethyl phthalate	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2,4-Dimethylphenol	ND ug/L	2.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Dimethyl phthalate	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
4,6-Dinitro-2-methylphenol	ND ug/L	2.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2,4-Dinitrophenol	ND ug/L	5.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2,4-Dinitrotoluene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2,6-Dinitrotoluene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Bis(2-ethylhexyl) phthalate	1.4 ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	L2
Fluoranthene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Fluorene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Hexachlorobenzene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Hexachlorobutadiene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Hexachlorocyclopentadiene	ND ug/L	2.0		1	B15K056	11/05/15	11/17/15	EPA 8270	V3
Hexachloroethane	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	L1

Reported: 11/24/15 11:17

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W15J213**

**Client: Director's Office**  
**Received: 10/31/15 15:05**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics**

Semivolatile Organic Compounds by GCMS

Indeno(1,2,3-cd)pyrene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Isophorone	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2-Methylnaphthalene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2-Methylphenol	ND ug/L	2.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
3- & 4-Methylphenol	ND ug/L	2.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Naphthalene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2-Nitroaniline	ND ug/L	2.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
3-Nitroaniline	ND ug/L	2.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
4-Nitroaniline	ND ug/L	2.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Nitrobenzene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2-Nitrophenol	ND ug/L	2.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
4-Nitrophenol	ND ug/L	5.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
N-Nitrosodimethylamine*	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
N-Nitrosodi-n-propylamine	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
N-Nitrosodiphenylamine	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Pentachlorophenol	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Phenanthrene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Phenol	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
Pyrene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2,3,4,6-Tetrachlorophenol	ND ug/L	2.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
1,2,4-Trichlorobenzene	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2,4,5-Trichlorophenol	ND ug/L	2.0		1	B15K056	11/05/15	11/17/15	EPA 8270	
2,4,6-Trichlorophenol	ND ug/L	1.0		1	B15K056	11/05/15	11/17/15	EPA 8270	

**Surrogate**

Surrogate	Result	Expected	%Rec	Limits(%)				
2-Fluorophenol	4.9 ug/L	6.06	81%	23-129	B15K056	11/05/15	11/17/15	EPA 8270
Phenol-d6	4.3 ug/L	6.06	71%	9.7-130	B15K056	11/05/15	11/17/15	EPA 8270
Nitrobenzene-d5	5.6 ug/L	6.06	92%	46-141	B15K056	11/05/15	11/17/15	EPA 8270
2-Fluorobiphenyl	5.1 ug/L	6.06	85%	49-122	B15K056	11/05/15	11/17/15	EPA 8270
2,4,6-Tribromophenol	6.8 ug/L	6.06	112%	30-159	B15K056	11/05/15	11/17/15	EPA 8270
p-Terphenyl-d14	6.6 ug/L	6.06	108%	24-143	B15K056	11/05/15	11/17/15	EPA 8270

Reported: 11/24/15 11:17

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W15J213**

**Client: Director's Office**  
**Received: 10/31/15 15:05**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

**Polynuclear Aromatics & Phthalates by GCMS-SIM**

Acenaphthene	ND ug/L	0.020	0.020	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Acenaphthylene	ND ug/L	0.020	0.020	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Anthracene	ND ug/L	0.020	0.020	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Benzo(a)anthracene	0.022 ug/L	0.010	0.010	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Benzo(a)pyrene	0.028 ug/L	0.010	0.010	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Benzo(b)fluoranthene	0.055 ug/L	0.010	0.010	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.064 ug/L	0.010	0.010	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Benzo(k)fluoranthene	0.022 ug/L	0.010	0.010	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Chrysene	0.039 ug/L	0.010	0.010	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND ug/L	0.010	0.010	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Fluoranthene	0.094 ug/L	0.010	0.010	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Fluorene	ND ug/L	0.020	0.020	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.027 ug/L	0.010	0.010	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
1-Methylnaphthalene	ND ug/L	0.040	0.040	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
2-Methylnaphthalene	ND ug/L	0.040	0.040	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Naphthalene	ND ug/L	0.040	0.040	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Phenanthrene	0.057 ug/L	0.020	0.020	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Pyrene	0.11 ug/L	0.010	0.010	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Butyl benzyl phthalate	ND ug/L	1.0	0.50	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Di-n-butyl phthalate	ND ug/L	1.0	0.50	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Diethyl phthalate	ND ug/L	1.0	0.50	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Dimethyl phthalate	ND ug/L	1.0	0.50	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Di-n-octyl phthalate	ND ug/L	1.0	0.50	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.9 ug/L	1.0	0.50	1	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.23 ug/L	0.229	100%	60.4-153	B15K026	11/02/15	11/02/15	EPA 8270-SIM	
Fluoranthene-d10	0.20 ug/L	0.229	87%	69-149	B15K026	11/02/15	11/02/15	EPA 8270-SIM	

**Polychlorinated Biphenyls (PCBs)**

**PCB Aroclors by GC-ECD**

Aroclor 1016/1242	ND ug/L	0.0255	0.0255	1	B15K011	11/02/15	11/02/15	EPA 8082	
Aroclor 1221	ND ug/L	0.0510	0.0510	1	B15K011	11/02/15	11/02/15	EPA 8082	
Aroclor 1232	ND ug/L	0.0255	0.0255	1	B15K011	11/02/15	11/02/15	EPA 8082	
Aroclor 1248	ND ug/L	0.0255	0.0255	1	B15K011	11/02/15	11/02/15	EPA 8082	
Aroclor 1254	ND ug/L	0.0255	0.0255	1	B15K011	11/02/15	11/02/15	EPA 8082	
Aroclor 1260	ND ug/L	0.0255	0.0255	1	B15K011	11/02/15	11/02/15	EPA 8082	
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
Tetrachloro-m-xylene	0.0272 ug/L	0.0510	53%	32.8-105	B15K011	11/02/15	11/02/15	EPA 8082	
Decachlorobiphenyl	0.0360 ug/L	0.0510	71%	29-133	B15K011	11/02/15	11/02/15	EPA 8082	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Work Order: **W15J213**

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Received: 10/31/15 15:05

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Total Suspended Solids - Batch B15K022										
<b>Blank (B15K022-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					11/02/15 : 11/02/15	
<b>LCS (B15K022-BS1)</b>										
Total suspended solids	94	mg/L			100		94% (90-110)		11/02/15 : 11/02/15	
<b>Duplicate (B15K022-DUP1) Source: W15J214-01</b>										
Total suspended solids	196	mg/L	2	2		182		7 (20)	11/02/15 : 11/02/15	
<b>Duplicate (B15K022-DUP2) Source: W15K004-18</b>										
Total suspended solids	20	mg/L	2	2		21		5 (20)	11/02/15 : 11/02/15	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Total Metals by ICPMS - Batch B15K013										
<b>Blank (B15K013-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					11/02/15 : 11/03/15	
Cadmium	ND	ug/L	0.100	0.100					11/02/15 : 11/03/15	
Chromium	ND	ug/L	0.200	0.200					11/02/15 : 11/03/15	
Copper	ND	ug/L	0.200	0.200					11/02/15 : 11/03/15	
Lead	ND	ug/L	0.100	0.100					11/02/15 : 11/03/15	
Nickel	ND	ug/L	0.200	0.200					11/02/15 : 11/03/15	
Silver	ND	ug/L	0.100	0.100					11/02/15 : 11/04/15	
Zinc	ND	ug/L	0.500	0.500					11/02/15 : 11/03/15	
<b>LCS (B15K013-BS1)</b>										
Arsenic	9.66	ug/L	0.100	0.100	10.0		97% (85-115)		11/02/15 : 11/03/15	
Cadmium	9.84	ug/L	0.100	0.100	10.0		98% (85-115)		11/02/15 : 11/03/15	
Chromium	9.90	ug/L	0.200	0.200	10.0		99% (85-115)		11/02/15 : 11/03/15	
Copper	9.89	ug/L	0.200	0.200	10.0		99% (85-115)		11/02/15 : 11/03/15	
Lead	9.69	ug/L	0.100	0.100	10.0		97% (85-115)		11/02/15 : 11/03/15	
Nickel	9.93	ug/L	0.200	0.200	10.0		99% (85-115)		11/02/15 : 11/03/15	
Silver	9.92	ug/L	0.100	0.100	10.0		99% (85-115)		11/02/15 : 11/04/15	
Zinc	49.2	ug/L	0.500	0.500	50.0		98% (85-115)		11/02/15 : 11/03/15	
<b>Duplicate (B15K013-DUP1) Source: W15J201-01</b>										
Arsenic	1.67	ug/L	0.100	0.100		1.66		0.7 (20)	11/02/15 : 11/03/15	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	11/02/15 : 11/03/15	

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**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B15K013**

<b>Duplicate (B15K013-DUP1)</b>		<b>Source: W15J201-01</b>								
Chromium	1.87 ug/L	0.200	0.200			1.85		0.9 (20)	11/02/15 :11/03/15	
Copper	5.08 ug/L	0.200	0.200			4.97		2 (20)	11/02/15 :11/03/15	
Lead	2.14 ug/L	0.100	0.100			2.12		1 (20)	11/02/15 :11/03/15	
Nickel	1.28 ug/L	0.200	0.200			1.42		11 (20)	11/02/15 :11/03/15	
Silver	ND ug/L	0.100	0.100			ND		(20)	11/02/15 :11/04/15	
Zinc	33.8 ug/L	0.500	0.500			33.3		1 (20)	11/02/15 :11/03/15	

<b>Matrix Spike (B15K013-MS1)</b>		<b>Source: W15J201-01</b>								
Arsenic	11.8 ug/L	0.100	0.100	10.0	1.66	102% (70-130)			11/02/15 :11/03/15	
Cadmium	10.0 ug/L	0.100	0.100	10.0	ND	100% (70-130)			11/02/15 :11/03/15	
Chromium	12.1 ug/L	0.200	0.200	10.0	1.85	102% (70-130)			11/02/15 :11/03/15	
Copper	15.1 ug/L	0.200	0.200	10.0	4.97	101% (70-130)			11/02/15 :11/03/15	
Lead	12.4 ug/L	0.100	0.100	10.0	2.12	103% (70-130)			11/02/15 :11/03/15	
Nickel	11.3 ug/L	0.200	0.200	10.0	1.42	99% (70-130)			11/02/15 :11/03/15	
Silver	9.97 ug/L	0.100	0.100	10.0	ND	100% (70-130)			11/02/15 :11/04/15	
Zinc	83.8 ug/L	0.500	0.500	50.0	33.3	101% (70-130)			11/02/15 :11/03/15	

**Total Metals by ICPMS - Batch B15K104**

<b>Blank (B15K104-BLK1)</b>										
Mercury	ND ug/L	0.000900	0.000900						11/09/15 :11/19/15	

<b>LCS (B15K104-BS1)</b>										
Mercury	0.00967 ug/L	0.000900	0.000900	0.0100			97% (85-125)		11/09/15 :11/19/15	

<b>Duplicate (B15K104-DUP1)</b>		<b>Source: W15K044-03</b>								
Mercury	0.00854 ug/L	0.00100	0.00100			0.00791		8 (20)	11/09/15 :11/19/15	

<b>Matrix Spike (B15K104-MS1)</b>		<b>Source: W15K044-03</b>								
Mercury	0.0208 ug/L	0.00100	0.00100	0.0111	0.00791	116% (70-130)			11/09/15 :11/19/15	

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**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B15K056

**Blank (B15K056-BLK1)**

Acenaphthene	ND	ug/L	1.0						11/05/15 :11/17/15	
Acenaphthylene	ND	ug/L	1.0						11/05/15 :11/17/15	
Anthracene	ND	ug/L	1.0						11/05/15 :11/17/15	
Benzo(a)anthracene	ND	ug/L	1.0						11/05/15 :11/17/15	
Benzo(a)pyrene	ND	ug/L	1.0						11/05/15 :11/17/15	
Benzo(b)fluoranthene	ND	ug/L	1.0						11/05/15 :11/17/15	
Benzo(g,h,i)perylene	ND	ug/L	1.0						11/05/15 :11/17/15	
Benzo(k)fluoranthene	ND	ug/L	1.0						11/05/15 :11/17/15	
4-Bromophenylphenyl ether	ND	ug/L	1.0						11/05/15 :11/17/15	
Butyl benzyl phthalate	ND	ug/L	1.0						11/05/15 :11/17/15	
4-Chloro-3-methylphenol	ND	ug/L	1.0						11/05/15 :11/17/15	
4-Chloroaniline	ND	ug/L	1.0						11/05/15 :11/17/15	
Bis(2-chloroethoxy) methane	ND	ug/L	1.0						11/05/15 :11/17/15	
Bis(2-chloroethyl) ether	ND	ug/L	1.0						11/05/15 :11/17/15	
Bis(2-chloroisopropyl) ether	ND	ug/L	1.0						11/05/15 :11/17/15	
2-Chloronaphthalene	ND	ug/L	1.0						11/05/15 :11/17/15	
2-Chlorophenol	ND	ug/L	1.0						11/05/15 :11/17/15	
4-Chlorophenylphenyl ether	ND	ug/L	1.0						11/05/15 :11/17/15	
Chrysene	ND	ug/L	1.0						11/05/15 :11/17/15	
Di-n-butyl phthalate	ND	ug/L	1.0						11/05/15 :11/17/15	
Di-n-octyl phthalate	ND	ug/L	1.0						11/05/15 :11/17/15	
Dibenzo(a,h)anthracene	ND	ug/L	1.0						11/05/15 :11/17/15	
Dibenzofuran	ND	ug/L	1.0						11/05/15 :11/17/15	
1,2-Dichlorobenzene	ND	ug/L	1.0						11/05/15 :11/17/15	
1,3-Dichlorobenzene	ND	ug/L	1.0						11/05/15 :11/17/15	
1,4-Dichlorobenzene	ND	ug/L	1.0						11/05/15 :11/17/15	
3,3'-Dichlorobenzidine	ND	ug/L	1.0						11/05/15 :11/17/15	
2,4-Dichlorophenol	ND	ug/L	1.0						11/05/15 :11/17/15	
Diethyl phthalate	ND	ug/L	1.0						11/05/15 :11/17/15	
2,4-Dimethylphenol	ND	ug/L	2.0						11/05/15 :11/17/15	
Dimethyl phthalate	ND	ug/L	1.0						11/05/15 :11/17/15	
4,6-Dinitro-2-methylphenol	ND	ug/L	2.0						11/05/15 :11/17/15	
2,4-Dinitrophenol	ND	ug/L	5.0						11/05/15 :11/17/15	
2,4-Dinitrotoluene	ND	ug/L	1.0						11/05/15 :11/17/15	
2,6-Dinitrotoluene	ND	ug/L	1.0						11/05/15 :11/17/15	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0						11/05/15 :11/17/15	
Fluoranthene	ND	ug/L	1.0						11/05/15 :11/17/15	
Fluorene	ND	ug/L	1.0						11/05/15 :11/17/15	
Hexachlorobenzene	ND	ug/L	1.0						11/05/15 :11/17/15	
Hexachlorobutadiene	ND	ug/L	1.0						11/05/15 :11/17/15	
Hexachlorocyclopentadiene	ND	ug/L	2.0						11/05/15 :11/17/15	

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**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B15K056

**Blank (B15K056-BLK1)**

Hexachloroethane	ND	ug/L	1.0						11/05/15 :11/17/15	
Indeno(1,2,3-cd)pyrene	ND	ug/L	1.0						11/05/15 :11/17/15	
Isophorone	ND	ug/L	1.0						11/05/15 :11/17/15	
2-Methylnaphthalene	ND	ug/L	1.0						11/05/15 :11/17/15	
2-Methylphenol	ND	ug/L	2.0						11/05/15 :11/17/15	
3- & 4-Methylphenol	ND	ug/L	2.0						11/05/15 :11/17/15	
Naphthalene	ND	ug/L	1.0						11/05/15 :11/17/15	
2-Nitroaniline	ND	ug/L	2.0						11/05/15 :11/17/15	
3-Nitroaniline	ND	ug/L	2.0						11/05/15 :11/17/15	
4-Nitroaniline	ND	ug/L	2.0						11/05/15 :11/17/15	
Nitrobenzene	ND	ug/L	1.0						11/05/15 :11/17/15	
2-Nitrophenol	ND	ug/L	2.0						11/05/15 :11/17/15	
4-Nitrophenol	ND	ug/L	5.0						11/05/15 :11/17/15	
N-Nitrosodimethylamine	ND	ug/L	1.0						11/05/15 :11/17/15	
N-Nitrosodi-n-propylamine	ND	ug/L	1.0						11/05/15 :11/17/15	
N-Nitrosodiphenylamine	ND	ug/L	1.0						11/05/15 :11/17/15	
Pentachlorophenol	ND	ug/L	1.0						11/05/15 :11/17/15	
Phenanthrene	ND	ug/L	1.0						11/05/15 :11/17/15	
Phenol	ND	ug/L	1.0						11/05/15 :11/17/15	
Pyrene	ND	ug/L	1.0						11/05/15 :11/17/15	
2,3,4,6-Tetrachlorophenol	ND	ug/L	2.0						11/05/15 :11/17/15	
1,2,4-Trichlorobenzene	ND	ug/L	1.0						11/05/15 :11/17/15	
2,4,5-Trichlorophenol	ND	ug/L	2.0						11/05/15 :11/17/15	
2,4,6-Trichlorophenol	ND	ug/L	1.0						11/05/15 :11/17/15	

**Surrogate**

2-Fluorophenol	4.8	ug/L			6.06		79% (23-129)		11/05/15 :11/17/15	
Phenol-d6	4.4	ug/L			6.06		72% (9.7-130)		11/05/15 :11/17/15	
Nitrobenzene-d5	6.1	ug/L			6.06		101% (46-141)		11/05/15 :11/17/15	
2-Fluorobiphenyl	5.3	ug/L			6.06		88% (49-122)		11/05/15 :11/17/15	
2,4,6-Tribromophenol	6.5	ug/L			6.06		107% (30-159)		11/05/15 :11/17/15	
p-Terphenyl-d14	7.5	ug/L			6.06		124% (24-143)		11/05/15 :11/17/15	

**LCS (B15K056-BS1)**

Acenaphthene	4.78	ug/L	1.0		6.06		79% (60-116)		11/05/15 :11/17/15	
Acenaphthylene	5.08	ug/L	1.0		6.06		84% (62-118)		11/05/15 :11/17/15	
Anthracene	5.50	ug/L	1.0		6.06		91% (30-132)		11/05/15 :11/17/15	
Benzo(a)anthracene	5.89	ug/L	1.0		6.06		97% (33-134)		11/05/15 :11/17/15	
Benzo(a)pyrene	5.44	ug/L	1.0		6.06		90% (29-129)		11/05/15 :11/17/15	
Benzo(b)fluoranthene	5.40	ug/L	1.0		6.06		89% (31-131)		11/05/15 :11/17/15	
Benzo(g,h,i)perylene	5.30	ug/L	1.0		6.06		88% (32-134)		11/05/15 :11/17/15	
Benzo(k)fluoranthene	5.13	ug/L	1.0		6.06		85% (29-128)		11/05/15 :11/17/15	
4-Bromophenylphenyl ether	5.02	ug/L	1.0		6.06		83% (51-122)		11/05/15 :11/17/15	

Reported: 11/24/15 11:17

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W15J213**

**Client: Director's Office**  
**Received: 10/31/15 15:05**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Semivolatile Organic Compounds by GCMS - Batch B15K056										
<b>LCS (B15K056-BS1)</b>										
Butyl benzyl phthalate	6.19	ug/L	1.0		6.06		102% (10-177)		11/05/15 :11/17/15	
4-Chloro-3-methylphenol	7.16	ug/L	1.0		6.06		118% (43-154)		11/05/15 :11/17/15	
4-Chloroaniline	5.55	ug/L	1.0		6.06		92% (5-137)		11/05/15 :11/17/15	V1
Bis(2-chloroethoxy) methane	6.53	ug/L	1.0		6.06		108% (57-129)		11/05/15 :11/17/15	
Bis(2-chloroethyl) ether	5.24	ug/L	1.0		6.06		86% (55-122)		11/05/15 :11/17/15	
Bis(2-chloroisopropyl) ether	5.24	ug/L	1.0		6.06		86% (47-130)		11/05/15 :11/17/15	
2-Chloronaphthalene	4.00	ug/L	1.0		6.06		66% (57-117)		11/05/15 :11/17/15	
2-Chlorophenol	5.07	ug/L	1.0		6.06		84% (33-139)		11/05/15 :11/17/15	
4-Chlorophenylphenyl ether	4.80	ug/L	1.0		6.06		79% (50-125)		11/05/15 :11/17/15	
Chrysene	5.46	ug/L	1.0		6.06		90% (33-132)		11/05/15 :11/17/15	
Di-n-butyl phthalate	7.27	ug/L	1.0		6.06		120% (40-140)		11/05/15 :11/17/15	
Di-n-octyl phthalate	5.69	ug/L	1.0		6.06		94% (20-160)		11/05/15 :11/17/15	
Dibenzo(a,h)anthracene	5.16	ug/L	1.0		6.06		85% (34-131)		11/05/15 :11/17/15	
Dibenzofuran	4.74	ug/L	1.0		6.06		78% (58-119)		11/05/15 :11/17/15	
1,2-Dichlorobenzene	3.32	ug/L	1.0		6.06		55% (61-115)		11/05/15 :11/17/15	L1
1,3-Dichlorobenzene	3.28	ug/L	1.0		6.06		54% (62-113)		11/05/15 :11/17/15	L1
1,4-Dichlorobenzene	3.26	ug/L	1.0		6.06		54% (64-111)		11/05/15 :11/17/15	L1
2,4-Dichlorophenol	6.02	ug/L	1.0		6.06		99% (54-137)		11/05/15 :11/17/15	
Diethyl phthalate	6.31	ug/L	1.0		6.06		104% (57-143)		11/05/15 :11/17/15	
2,4-Dimethylphenol	6.37	ug/L	2.0		6.06		105% (29-136)		11/05/15 :11/17/15	
Dimethyl phthalate	6.06	ug/L	1.0		6.06		100% (66-139)		11/05/15 :11/17/15	
4,6-Dinitro-2-methylphenol	6.42	ug/L	2.0		6.06		106% (1-168)		11/05/15 :11/17/15	
2,4-Dinitrophenol	34.3	ug/L	5.0		30.3		113% (1-205)		11/05/15 :11/17/15	
2,4-Dinitrotoluene	5.97	ug/L	1.0		6.06		98% (59-143)		11/05/15 :11/17/15	
2,6-Dinitrotoluene	5.85	ug/L	1.0		6.06		96% (61-138)		11/05/15 :11/17/15	
Bis(2-ethylhexyl) phthalate	8.46	ug/L	1.0		6.06		140% (47-130)		11/05/15 :11/17/15	L2
Fluoranthene	6.59	ug/L	1.0		6.06		109% (41-129)		11/05/15 :11/17/15	
Fluorene	5.04	ug/L	1.0		6.06		83% (56-123)		11/05/15 :11/17/15	
Hexachlorobenzene	4.94	ug/L	1.0		6.06		81% (44-128)		11/05/15 :11/17/15	
Hexachlorobutadiene	3.25	ug/L	1.0		6.06		54% (45-123)		11/05/15 :11/17/15	
Hexachlorocyclopentadiene	ND	ug/L	2.0		6.06		% (1-137)		11/05/15 :11/17/15	V3
Hexachloroethane	3.06	ug/L	1.0		6.06		50% (59-110)		11/05/15 :11/17/15	L1
Indeno(1,2,3-cd)pyrene	5.27	ug/L	1.0		6.06		87% (31-132)		11/05/15 :11/17/15	
Isophorone	7.37	ug/L	1.0		6.06		122% (61-131)		11/05/15 :11/17/15	V1
2-Methylnaphthalene	4.49	ug/L	1.0		6.06		74% (59-117)		11/05/15 :11/17/15	
2-Methylphenol	5.55	ug/L	2.0		6.06		92% (17-148)		11/05/15 :11/17/15	
3- & 4-Methylphenol	7.74	ug/L	2.0		6.06		128% (28-141)		11/05/15 :11/17/15	
Naphthalene	4.38	ug/L	1.0		6.06		72% (61-117)		11/05/15 :11/17/15	
2-Nitroaniline	6.44	ug/L	2.0		6.06		106% (60-143)		11/05/15 :11/17/15	
3-Nitroaniline	5.10	ug/L	2.0		6.06		84% (14-144)		11/05/15 :11/17/15	
4-Nitroaniline	5.42	ug/L	2.0		6.06		89% (22-143)		11/05/15 :11/17/15	

Reported: 11/24/15 11:17

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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Water Pollution Control Laboratory**

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**Project: Portland Harbor**  
**Work Order: W15J213**

**Client: Director's Office**  
**Received: 10/31/15 15:05**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B15K056

**LCS (B15K056-BS1)**

Nitrobenzene	6.05	ug/L	1.0		6.06		100% (51-143)		11/05/15 :11/17/15	
2-Nitrophenol	5.86	ug/L	2.0		6.06		97% (57-154)		11/05/15 :11/17/15	
4-Nitrophenol	17.7	ug/L	5.0		30.3		58% (1-105)		11/05/15 :11/17/15	
N-Nitrosodimethylamine	3.42	ug/L	1.0		6.06		56% (26-100)		11/05/15 :11/17/15	
N-Nitrosodi-n-propylamine	6.34	ug/L	1.0		6.06		105% (57-133)		11/05/15 :11/17/15	
N-Nitrosodiphenylamine	5.18	ug/L	1.0		6.06		86% (43-128)		11/05/15 :11/17/15	
Pentachlorophenol	7.65	ug/L	1.0		6.06		126% (36-150)		11/05/15 :11/17/15	
Phenanthrene	5.23	ug/L	1.0		6.06		86% (59-113)		11/05/15 :11/17/15	
Phenol	4.76	ug/L	1.0		6.06		79% (15-129)		11/05/15 :11/17/15	
Pyrene	6.60	ug/L	1.0		6.06		109% (42-129)		11/05/15 :11/17/15	
2,3,4,6-Tetrachlorophenol	5.35	ug/L	2.0		6.06		88% (56-138)		11/05/15 :11/17/15	
1,2,4-Trichlorobenzene	3.40	ug/L	1.0		6.06		56% (56-121)		11/05/15 :11/17/15	
2,4,5-Trichlorophenol	5.22	ug/L	2.0		6.06		86% (46-145)		11/05/15 :11/17/15	
2,4,6-Trichlorophenol	5.79	ug/L	1.0		6.06		96% (67-126)		11/05/15 :11/17/15	

**Surrogate**

2-Fluorophenol	4.6	ug/L			6.06		75% (23-129)		11/05/15 :11/17/15	
Phenol-d6	4.1	ug/L			6.06		68% (9.7-130)		11/05/15 :11/17/15	
Nitrobenzene-d5	5.9	ug/L			6.06		98% (46-141)		11/05/15 :11/17/15	
2-Fluorobiphenyl	4.6	ug/L			6.06		76% (49-122)		11/05/15 :11/17/15	
2,4,6-Tribromophenol	6.4	ug/L			6.06		105% (30-159)		11/05/15 :11/17/15	
p-Terphenyl-d14	7.0	ug/L			6.06		116% (24-143)		11/05/15 :11/17/15	

**Duplicate (B15K056-DUP1)**

**Source: W15J209-01**

Acenaphthene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Acenaphthylene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Anthracene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Benzo(a)anthracene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Benzo(a)pyrene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Benzo(b)fluoranthene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Benzo(g,h,i)perylene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Benzo(k)fluoranthene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
4-Bromophenylphenyl ether	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Butyl benzyl phthalate	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
4-Chloro-3-methylphenol	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
4-Chloroaniline	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Bis(2-chloroethoxy) methane	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Bis(2-chloroethyl) ether	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Bis(2-chloroisopropyl) ether	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
2-Chloronaphthalene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
2-Chlorophenol	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
4-Chlorophenylphenyl ether	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Chrysene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	

Reported: 11/24/15 11:17

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**Project: Portland Harbor**  
**Work Order: W15J213**

**Client: Director's Office**  
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**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B15K056

**Duplicate (B15K056-DUP1)**

**Source: W15J209-01**

Di-n-butyl phthalate	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Di-n-octyl phthalate	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Dibenzo(a,h)anthracene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Dibenzofuran	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
1,2-Dichlorobenzene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	L1
1,3-Dichlorobenzene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	L1
1,4-Dichlorobenzene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	L1
3,3'-Dichlorobenzidine	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
2,4-Dichlorophenol	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
2,6-Dichlorophenol	ND	ug/L	1.0			ND	(200)		11/05/15 :11/17/15	
Diethyl phthalate	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
2,4-Dimethylphenol	ND	ug/L	2.0			ND	(50)		11/05/15 :11/17/15	
Dimethyl phthalate	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
4,6-Dinitro-2-methylphenol	ND	ug/L	2.0			ND	(50)		11/05/15 :11/17/15	
2,4-Dinitrophenol	ND	ug/L	5.0			ND	(50)		11/05/15 :11/17/15	
2,4-Dinitrotoluene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
2,6-Dinitrotoluene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Bis(2-ethylhexyl) phthalate	3.93	ug/L	1.0			4.10	4 (50)		11/05/15 :11/17/15	L2
Fluoranthene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Fluorene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Hexachlorobenzene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Hexachlorobutadiene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Hexachlorocyclopentadiene	ND	ug/L	2.0			ND	(50)		11/05/15 :11/17/15	V3
Hexachloroethane	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	L1
Indeno(1,2,3-cd)pyrene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Isophorone	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
2-Methylnaphthalene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
2-Methylphenol	ND	ug/L	2.0			ND	(50)		11/05/15 :11/17/15	
3- & 4-Methylphenol	ND	ug/L	2.0			ND	(50)		11/05/15 :11/17/15	
Naphthalene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
2-Nitroaniline	ND	ug/L	2.0			ND	(50)		11/05/15 :11/17/15	
3-Nitroaniline	ND	ug/L	2.0			ND	(50)		11/05/15 :11/17/15	
4-Nitroaniline	ND	ug/L	2.0			ND	(50)		11/05/15 :11/17/15	
Nitrobenzene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
2-Nitrophenol	ND	ug/L	2.0			ND	(50)		11/05/15 :11/17/15	
4-Nitrophenol	ND	ug/L	5.0			ND	(50)		11/05/15 :11/17/15	
N-Nitrosodimethylamine	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
N-Nitrosodi-n-propylamine	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
N-Nitrosodiphenylamine	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	
Pentachlorophenol	2.38	ug/L	1.0			2.11	12 (50)		11/05/15 :11/17/15	
Phenanthrene	ND	ug/L	1.0			ND	(50)		11/05/15 :11/17/15	

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**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B15K056

**Duplicate (B15K056-DUP1)**

**Source: W15J209-01**

Phenol	ND	ug/L	1.0			ND		(50)	11/05/15 :11/17/15	
Pyrene	ND	ug/L	1.0			ND		(50)	11/05/15 :11/17/15	
2,3,4,6-Tetrachlorophenol	ND	ug/L	2.0			ND		(50)	11/05/15 :11/17/15	
1,2,4-Trichlorobenzene	ND	ug/L	1.0			ND		(50)	11/05/15 :11/17/15	
2,4,5-Trichlorophenol	ND	ug/L	2.0			ND		(50)	11/05/15 :11/17/15	
2,4,6-Trichlorophenol	ND	ug/L	1.0			ND		(50)	11/05/15 :11/17/15	
<b>Surrogate</b>										
2-Fluorophenol	4.7	ug/L			6.06		78%	(23-129)	11/05/15 :11/17/15	
Phenol-d6	3.9	ug/L			6.06		65%	(9.7-130)	11/05/15 :11/17/15	
Nitrobenzene-d5	5.5	ug/L			6.06		90%	(46-141)	11/05/15 :11/17/15	
2-Fluorobiphenyl	4.8	ug/L			6.06		79%	(49-122)	11/05/15 :11/17/15	
2,4,6-Tribromophenol	7.1	ug/L			6.06		117%	(30-159)	11/05/15 :11/17/15	
p-Terphenyl-d14	5.3	ug/L			6.06		88%	(24-143)	11/05/15 :11/17/15	

**Matrix Spike (B15K056-MS1)**

**Source: W15J209-01**

Acenaphthene	4.77	ug/L	1.0		6.06	ND	79%	(60-116)	11/05/15 :11/17/15	
Acenaphthylene	5.06	ug/L	1.0		6.06	ND	83%	(62-118)	11/05/15 :11/17/15	
Anthracene	5.37	ug/L	1.0		6.06	ND	89%	(30-132)	11/05/15 :11/17/15	
Benzo(a)anthracene	5.01	ug/L	1.0		6.06	ND	83%	(33-134)	11/05/15 :11/17/15	
Benzo(a)pyrene	4.31	ug/L	1.0		6.06	ND	71%	(29-129)	11/05/15 :11/17/15	
Benzo(b)fluoranthene	4.28	ug/L	1.0		6.06	ND	71%	(31-131)	11/05/15 :11/17/15	
Benzo(g,h,i)perylene	4.04	ug/L	1.0		6.06	ND	67%	(32-134)	11/05/15 :11/17/15	
Benzo(k)fluoranthene	4.06	ug/L	1.0		6.06	ND	67%	(29-128)	11/05/15 :11/17/15	
4-Bromophenylphenyl ether	5.10	ug/L	1.0		6.06	ND	84%	(51-122)	11/05/15 :11/17/15	
Butyl benzyl phthalate	5.22	ug/L	1.0		6.06	ND	86%	(10-177)	11/05/15 :11/17/15	
4-Chloro-3-methylphenol	6.56	ug/L	1.0		6.06	ND	108%	(43-154)	11/05/15 :11/17/15	
4-Chloroaniline	1.65	ug/L	1.0		6.06	ND	27%	(5-137)	11/05/15 :11/17/15	V1
Bis(2-chloroethoxy) methane	5.91	ug/L	1.0		6.06	ND	97%	(57-129)	11/05/15 :11/17/15	
Bis(2-chloroethyl) ether	4.68	ug/L	1.0		6.06	ND	77%	(55-122)	11/05/15 :11/17/15	
Bis(2-chloroisopropyl) ether	4.74	ug/L	1.0		6.06	ND	78%	(47-130)	11/05/15 :11/17/15	
2-Chloronaphthalene	4.33	ug/L	1.0		6.06	ND	71%	(57-117)	11/05/15 :11/17/15	
2-Chlorophenol	4.55	ug/L	1.0		6.06	ND	75%	(33-139)	11/05/15 :11/17/15	
4-Chlorophenylphenyl ether	4.86	ug/L	1.0		6.06	ND	80%	(50-125)	11/05/15 :11/17/15	
Chrysene	4.81	ug/L	1.0		6.06	ND	79%	(33-132)	11/05/15 :11/17/15	
Di-n-butyl phthalate	6.13	ug/L	1.0		6.06	ND	101%	(40-140)	11/05/15 :11/17/15	
Di-n-octyl phthalate	4.54	ug/L	1.0		6.06	ND	75%	(20-160)	11/05/15 :11/17/15	
Dibenzo(a,h)anthracene	3.83	ug/L	1.0		6.06	ND	63%	(34-131)	11/05/15 :11/17/15	
Dibenzofuran	4.95	ug/L	1.0		6.06	ND	82%	(58-119)	11/05/15 :11/17/15	
1,2-Dichlorobenzene	3.53	ug/L	1.0		6.06	ND	58%	(61-115)	11/05/15 :11/17/15	L1
1,3-Dichlorobenzene	3.56	ug/L	1.0		6.06	ND	59%	(62-113)	11/05/15 :11/17/15	L1
1,4-Dichlorobenzene	3.63	ug/L	1.0		6.06	ND	60%	(64-111)	11/05/15 :11/17/15	L1
2,4-Dichlorophenol	5.98	ug/L	1.0		6.06	ND	99%	(54-137)	11/05/15 :11/17/15	

Reported: 11/24/15 11:17

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W15J213**

**Client: Director's Office**  
**Received: 10/31/15 15:05**

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B15K056

**Matrix Spike (B15K056-MS1)**

**Source: W15J209-01**

Diethyl phthalate	6.04	ug/L	1.0		6.06	ND	100% (57-143)		11/05/15 :11/17/15	
2,4-Dimethylphenol	6.48	ug/L	2.0		6.06	ND	107% (29-136)		11/05/15 :11/17/15	
Dimethyl phthalate	5.90	ug/L	1.0		6.06	ND	97% (66-139)		11/05/15 :11/17/15	
4,6-Dinitro-2-methylphenol	6.89	ug/L	2.0		6.06	ND	114% (1-168)		11/05/15 :11/17/15	
2,4-Dinitrophenol	37.2	ug/L	5.0		30.3	ND	123% (1-205)		11/05/15 :11/17/15	
2,4-Dinitrotoluene	5.86	ug/L	1.0		6.06	ND	97% (59-143)		11/05/15 :11/17/15	
2,6-Dinitrotoluene	5.71	ug/L	1.0		6.06	ND	94% (61-138)		11/05/15 :11/17/15	
Bis(2-ethylhexyl) phthalate	8.44	ug/L	1.0		6.06	4.10	72% (47-130)		11/05/15 :11/17/15	L2
Fluoranthene	5.85	ug/L	1.0		6.06	ND	97% (41-129)		11/05/15 :11/17/15	
Fluorene	5.08	ug/L	1.0		6.06	ND	84% (56-123)		11/05/15 :11/17/15	
Hexachlorobenzene	4.91	ug/L	1.0		6.06	ND	81% (44-128)		11/05/15 :11/17/15	
Hexachlorobutadiene	3.45	ug/L	1.0		6.06	ND	57% (45-132)		11/05/15 :11/17/15	
Hexachlorocyclopentadiene	2.84	ug/L	2.0		6.06	ND	47% (1-137)		11/05/15 :11/17/15	V3
Hexachloroethane	3.41	ug/L	1.0		6.06	ND	56% (59-110)		11/05/15 :11/17/15	L1
Indeno(1,2,3-cd)pyrene	4.04	ug/L	1.0		6.06	ND	67% (31-132)		11/05/15 :11/17/15	
Isophorone	6.85	ug/L	1.0		6.06	ND	113% (61-131)		11/05/15 :11/17/15	V1
2-Methylnaphthalene	4.79	ug/L	1.0		6.06	ND	79% (59-117)		11/05/15 :11/17/15	
2-Methylphenol	4.94	ug/L	2.0		6.06	ND	82% (17-148)		11/05/15 :11/17/15	
3- & 4-Methylphenol	5.72	ug/L	2.0		6.06	ND	94% (28-141)		11/05/15 :11/17/15	
Naphthalene	4.17	ug/L	1.0		6.06	ND	69% (61-117)		11/05/15 :11/17/15	
2-Nitroaniline	7.53	ug/L	2.0		6.06	ND	124% (60-143)		11/05/15 :11/17/15	
3-Nitroaniline	2.18	ug/L	2.0		6.06	ND	36% (14-144)		11/05/15 :11/17/15	
4-Nitroaniline	2.15	ug/L	2.0		6.06	ND	35% (22-143)		11/05/15 :11/17/15	
Nitrobenzene	5.10	ug/L	1.0		6.06	ND	84% (51-143)		11/05/15 :11/17/15	
2-Nitrophenol	5.69	ug/L	2.0		6.06	ND	94% (57-154)		11/05/15 :11/17/15	
4-Nitrophenol	21.9	ug/L	5.0		30.3	ND	72% (1-105)		11/05/15 :11/17/15	
N-Nitrosodimethylamine	3.38	ug/L	1.0		6.06	ND	56% (26-100)		11/05/15 :11/17/15	
N-Nitrosodi-n-propylamine	5.95	ug/L	1.0		6.06	ND	98% (57-133)		11/05/15 :11/17/15	
N-Nitrosodiphenylamine	5.55	ug/L	1.0		6.06	ND	92% (43-128)		11/05/15 :11/17/15	
Pentachlorophenol	9.79	ug/L	1.0		6.06	2.11	127% (36-150)		11/05/15 :11/17/15	
Phenanthrene	5.19	ug/L	1.0		6.06	ND	86% (59-113)		11/05/15 :11/17/15	
Phenol	3.98	ug/L	1.0		6.06	ND	66% (15-129)		11/05/15 :11/17/15	
Pyrene	6.00	ug/L	1.0		6.06	ND	99% (42-129)		11/05/15 :11/17/15	
2,3,4,6-Tetrachlorophenol	5.68	ug/L	2.0		6.06	ND	94% (56-138)		11/05/15 :11/17/15	
1,2,4-Trichlorobenzene	3.62	ug/L	1.0		6.06	ND	60% (56-121)		11/05/15 :11/17/15	
2,4,5-Trichlorophenol	5.29	ug/L	2.0		6.06	ND	87% (46-145)		11/05/15 :11/17/15	
2,4,6-Trichlorophenol	6.34	ug/L	1.0		6.06	ND	105% (67-126)		11/05/15 :11/17/15	
<b>Surrogate</b>										
2-Fluorophenol	5.0	ug/L			6.06		82% (23-129)		11/05/15 :11/17/15	
Phenol-d6	4.7	ug/L			6.06		67% (9.7-130)		11/05/15 :11/17/15	
Nitrobenzene-d5	5.7	ug/L			6.06		93% (46-141)		11/05/15 :11/17/15	

Reported: 11/24/15 11:17

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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Project: **Portland Harbor**  
Work Order: **W15J213**

Client: Director's Office  
Received: 10/31/15 15:05

**Semivolatile Organics - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Semivolatile Organic Compounds by GCMS - Batch B15K056

**Matrix Spike (B15K056-MS1)** **Source: W15J209-01**

**Surrogate**

2-Fluorobiphenyl	5.0	ug/L			6.06		82% (49-122)		11/05/15 :11/17/15	
2,4,6-Tribromophenol	7.3	ug/L			6.06		121% (30-159)		11/05/15 :11/17/15	
p-Terphenyl-d14	5.1	ug/L			6.06		85% (24-143)		11/05/15 :11/17/15	

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**Project: Portland Harbor**  
**Work Order: W15J213**

**Client: Director's Office**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15K026**

**Blank (B15K026-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					11/02/15 :11/02/15	
Acenaphthylene	ND	ug/L	0.020	0.020					11/02/15 :11/02/15	
Anthracene	ND	ug/L	0.020	0.020					11/02/15 :11/02/15	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					11/02/15 :11/02/15	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					11/02/15 :11/02/15	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					11/02/15 :11/02/15	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					11/02/15 :11/02/15	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					11/02/15 :11/02/15	
Chrysene	ND	ug/L	0.010	0.010					11/02/15 :11/02/15	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					11/02/15 :11/02/15	
Fluoranthene	ND	ug/L	0.010	0.010					11/02/15 :11/02/15	
Fluorene	ND	ug/L	0.020	0.020					11/02/15 :11/02/15	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					11/02/15 :11/02/15	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					11/02/15 :11/02/15	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					11/02/15 :11/02/15	
Naphthalene	ND	ug/L	0.040	0.040					11/02/15 :11/02/15	
Phenanthrene	ND	ug/L	0.020	0.020					11/02/15 :11/02/15	
Pyrene	ND	ug/L	0.010	0.010					11/02/15 :11/02/15	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					11/02/15 :11/02/15	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					11/02/15 :11/02/15	
Diethyl phthalate	ND	ug/L	1.0	0.50					11/02/15 :11/02/15	
Dimethyl phthalate	ND	ug/L	1.0	0.50					11/02/15 :11/02/15	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					11/02/15 :11/02/15	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					11/02/15 :11/02/15	

**Surrogate**

2-Methylnaphthalene-d10	0.21	ug/L			0.229		91% (60.4-153)		11/02/15 :11/02/15	
Fluoranthene-d10	0.19	ug/L			0.229		85% (69-149)		11/02/15 :11/02/15	

**LCS (B15K026-BS1)**

Acenaphthene	0.205	ug/L	0.020	0.020	0.229		90% (58.8-155)		11/02/15 :11/02/15	
Acenaphthylene	0.215	ug/L	0.020	0.020	0.229		94% (64-155)		11/02/15 :11/02/15	
Anthracene	0.220	ug/L	0.020	0.020	0.229		96% (76.2-129)		11/02/15 :11/02/15	
Benzo(a)anthracene	0.217	ug/L	0.010	0.010	0.229		95% (72.9-138)		11/02/15 :11/02/15	
Benzo(a)pyrene	0.217	ug/L	0.010	0.010	0.229		95% (75.5-137)		11/02/15 :11/02/15	
Benzo(b)fluoranthene	0.223	ug/L	0.010	0.010	0.229		97% (59.9-160)		11/02/15 :11/02/15	
Benzo(g,h,i)perylene	0.215	ug/L	0.010	0.010	0.229		94% (70.1-134)		11/02/15 :11/02/15	
Benzo(k)fluoranthene	0.224	ug/L	0.010	0.010	0.229		98% (61.1-157)		11/02/15 :11/02/15	
Chrysene	0.223	ug/L	0.010	0.010	0.229		98% (76.7-146)		11/02/15 :11/02/15	
Dibenzo(a,h)anthracene	0.205	ug/L	0.010	0.010	0.229		90% (63.9-140)		11/02/15 :11/02/15	
Fluoranthene	0.223	ug/L	0.010	0.010	0.229		97% (77.5-134)		11/02/15 :11/02/15	
Fluorene	0.211	ug/L	0.020	0.020	0.229		92% (61.2-157)		11/02/15 :11/02/15	

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**Project: Portland Harbor**  
**Work Order: W15J213**

**Client: Director's Office**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15K026**

**LCS (B15K026-BS1)**

Indeno(1,2,3-cd)pyrene	0.209	ug/L	0.010	0.010	0.229		91% (68.4-135)		11/02/15 :11/02/15	
Naphthalene	0.203	ug/L	0.040	0.040	0.229		89% (60.6-164)		11/02/15 :11/02/15	
Phenanthrene	0.221	ug/L	0.020	0.020	0.229		96% (77.4-140)		11/02/15 :11/02/15	
Pyrene	0.219	ug/L	0.010	0.010	0.229		96% (81.1-141)		11/02/15 :11/02/15	
Butyl benzyl phthalate	2.42	ug/L	1.0	0.50	2.29		106% (54.7-176)		11/02/15 :11/02/15	
Di-n-butyl phthalate	2.16	ug/L	1.0	0.50	2.29		94% (74.3-149)		11/02/15 :11/02/15	
Diethyl phthalate	2.68	ug/L	1.0	0.50	2.29		117% (75.5-173)		11/02/15 :11/02/15	
Dimethyl phthalate	2.63	ug/L	1.0	0.50	2.29		115% (81.6-148)		11/02/15 :11/02/15	
Di-n-octyl phthalate	2.29	ug/L	1.0	0.50	2.29		100% (60.2-155)		11/02/15 :11/02/15	
Bis(2-ethylhexyl) phthalate	2.25	ug/L	1.0	0.50	2.29		98% (64.4-162)		11/02/15 :11/02/15	
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.19	ug/L			0.229		85% (60.4-153)		11/02/15 :11/02/15	
Fluoranthene-d10	0.17	ug/L			0.229		74% (69-149)		11/02/15 :11/02/15	

**Matrix Spike (B15K026-MS1)**

**Source: W15J209-01**

Acenaphthene	0.486	ug/L	0.020	0.020	0.571	ND	85% (58.8-155)		11/02/15 :11/02/15	
Acenaphthylene	0.580	ug/L	0.020	0.020	0.571	ND	102% (64-155)		11/02/15 :11/02/15	
Anthracene	0.506	ug/L	0.020	0.020	0.571	ND	89% (76.2-129)		11/02/15 :11/02/15	
Benzo(a)anthracene	0.352	ug/L	0.010	0.010	0.571	ND	62% (72.9-138)		11/02/15 :11/02/15	M4
Benzo(a)pyrene	0.243	ug/L	0.010	0.010	0.571	ND	42% (75.5-137)		11/02/15 :11/02/15	M4
Benzo(b)fluoranthene	0.239	ug/L	0.010	0.010	0.571	0.0114	40% (59.9-160)		11/02/15 :11/02/15	M4
Benzo(g,h,i)perylene	0.214	ug/L	0.010	0.010	0.571	0.0274	33% (70.1-134)		11/02/15 :11/02/15	M4
Benzo(k)fluoranthene	0.225	ug/L	0.010	0.010	0.571	ND	39% (61.1-157)		11/02/15 :11/02/15	M4
Chrysene	0.336	ug/L	0.010	0.010	0.571	0.0160	56% (76.7-146)		11/02/15 :11/02/15	M4
Dibenzo(a,h)anthracene	0.164	ug/L	0.010	0.010	0.571	ND	29% (63.9-140)		11/02/15 :11/02/15	M4
Fluoranthene	0.462	ug/L	0.010	0.010	0.571	0.0269	76% (77.5-134)		11/02/15 :11/02/15	M4
Fluorene	0.475	ug/L	0.020	0.020	0.571	ND	83% (61.2-157)		11/02/15 :11/02/15	
Indeno(1,2,3-cd)pyrene	0.176	ug/L	0.010	0.010	0.571	ND	31% (68.4-135)		11/02/15 :11/02/15	M4
Naphthalene	0.566	ug/L	0.040	0.040	0.571	ND	99% (60.6-164)		11/02/15 :11/02/15	
Phenanthrene	0.473	ug/L	0.020	0.020	0.571	0.0234	79% (77.4-140)		11/02/15 :11/02/15	
Pyrene	0.488	ug/L	0.010	0.010	0.571	0.0497	77% (81.1-141)		11/02/15 :11/02/15	M4
Butyl benzyl phthalate	4.85	ug/L	1.0	0.50	5.71	ND	85% (54.7-176)		11/02/15 :11/02/15	
Di-n-butyl phthalate	4.67	ug/L	1.0	0.50	5.71	ND	82% (74.3-149)		11/02/15 :11/02/15	
Diethyl phthalate	6.42	ug/L	1.0	0.50	5.71	ND	112% (75.5-173)		11/02/15 :11/02/15	
Dimethyl phthalate	6.26	ug/L	1.0	0.50	5.71	ND	110% (81.6-148)		11/02/15 :11/02/15	
Di-n-octyl phthalate	2.06	ug/L	1.0	0.50	5.71	ND	36% (60.2-155)		11/02/15 :11/02/15	M4
Bis(2-ethylhexyl) phthalate	5.17	ug/L	1.0	0.50	5.71	2.82	41% (64.4-162)		11/02/15 :11/02/15	M4
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.21	ug/L			0.229		90% (60.4-153)		11/02/15 :11/02/15	
Fluoranthene-d10	0.14	ug/L			0.229		61% (69-149)		11/02/15 :11/02/15	SU1

**Matrix Spike Dup (B15K026-MSD1)**

**Source: W15J209-01**

Reported: 11/24/15 11:17

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*Jennifer Shackelford*

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**Project: Portland Harbor**  
**Work Order: W15J213**

**Client: Director's Office**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15K026**

**Matrix Spike Dup (B15K026-MSD1)**

**Source: W15J209-01**

Acenaphthene	0.513	ug/L	0.020	0.020	0.571	ND	90% (58.8-155)	5 (50)	11/02/15 :11/02/15	
Acenaphthylene	0.613	ug/L	0.020	0.020	0.571	ND	107% (64-155)	6 (50)	11/02/15 :11/02/15	
Anthracene	0.606	ug/L	0.020	0.020	0.571	ND	106% (76.2-129)	18 (50)	11/02/15 :11/02/15	
Benzo(a)anthracene	0.524	ug/L	0.010	0.010	0.571	ND	92% (72.9-138)	39 (50)	11/02/15 :11/02/15	
Benzo(a)pyrene	0.363	ug/L	0.010	0.010	0.571	ND	64% (75.5-137)	40 (50)	11/02/15 :11/02/15	M4
Benzo(b)fluoranthene	0.360	ug/L	0.010	0.010	0.571	0.0114	61% (59.9-160)	40 (50)	11/02/15 :11/02/15	
Benzo(g,h,i)perylene	0.337	ug/L	0.010	0.010	0.571	0.0274	54% (70.1-134)	45 (50)	11/02/15 :11/02/15	M4
Benzo(k)fluoranthene	0.352	ug/L	0.010	0.010	0.571	ND	62% (61.1-157)	44 (50)	11/02/15 :11/02/15	
Chrysene	0.509	ug/L	0.010	0.010	0.571	0.0160	86% (76.7-146)	41 (50)	11/02/15 :11/02/15	
Dibenzo(a,h)anthracene	0.265	ug/L	0.010	0.010	0.571	ND	46% (63.9-140)	47 (50)	11/02/15 :11/02/15	M4
Fluoranthene	0.618	ug/L	0.010	0.010	0.571	0.0269	103% (77.5-134)	29 (50)	11/02/15 :11/02/15	
Fluorene	0.513	ug/L	0.020	0.020	0.571	ND	90% (61.2-157)	8 (50)	11/02/15 :11/02/15	
Indeno(1,2,3-cd)pyrene	0.279	ug/L	0.010	0.010	0.571	ND	49% (68.4-135)	45 (50)	11/02/15 :11/02/15	M4
Naphthalene	0.558	ug/L	0.040	0.040	0.571	ND	98% (60.6-164)	1 (50)	11/02/15 :11/02/15	
Phenanthrene	0.564	ug/L	0.020	0.020	0.571	0.0234	95% (77.4-140)	18 (50)	11/02/15 :11/02/15	
Pyrene	0.650	ug/L	0.010	0.010	0.571	0.0497	105% (81.1-141)	29 (50)	11/02/15 :11/02/15	
Butyl benzyl phthalate	6.13	ug/L	1.0	0.50	5.71	ND	107% (54.7-176)	23 (50)	11/02/15 :11/02/15	
Di-n-butyl phthalate	5.57	ug/L	1.0	0.50	5.71	ND	98% (74.3-149)	18 (50)	11/02/15 :11/02/15	
Diethyl phthalate	6.68	ug/L	1.0	0.50	5.71	ND	117% (75.5-173)	4 (50)	11/02/15 :11/02/15	
Dimethyl phthalate	6.48	ug/L	1.0	0.50	5.71	ND	113% (81.6-148)	3 (50)	11/02/15 :11/02/15	
Di-n-octyl phthalate	2.44	ug/L	1.0	0.50	5.71	ND	43% (60.2-155)	17 (50)	11/02/15 :11/02/15	M4
Bis(2-ethylhexyl) phthalate	6.08	ug/L	1.0	0.50	5.71	2.82	57% (64.4-162)	16 (50)	11/02/15 :11/02/15	M4
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.21	ug/L			0.229		90% (60.4-153)		11/02/15 :11/02/15	
Fluoranthene-d10	0.16	ug/L			0.229		68% (69-149)		11/02/15 :11/02/15	SU1

Reported: 11/24/15 11:17

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W15J213**

**Client: Director's Office**  
**Received: 10/31/15 15:05**

**Polychlorinated Biphenyls (PCBs) - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>PCB Aroclors by GC-ECD - Batch B15K011</b>										
<b>Blank (B15K011-BLK1)</b>										
Aroclor 1016/1242	ND	ug/L	0.0250	0.0250					11/02/15 :11/02/15	
Aroclor 1221	ND	ug/L	0.0500	0.0500					11/02/15 :11/02/15	
Aroclor 1232	ND	ug/L	0.0250	0.0250					11/02/15 :11/02/15	
Aroclor 1248	ND	ug/L	0.0250	0.0250					11/02/15 :11/02/15	
Aroclor 1254	ND	ug/L	0.0250	0.0250					11/02/15 :11/02/15	
Aroclor 1260	ND	ug/L	0.0250	0.0250					11/02/15 :11/02/15	
<b>Surrogate</b>										
Tetrachloro-m-xylene	0.0369	ug/L			0.0500		74% (32.8-105)		11/02/15 :11/02/15	
Decachlorobiphenyl	0.0425	ug/L			0.0500		85% (29-133)		11/02/15 :11/02/15	
<b>LCS (B15K011-BS1)</b>										
Aroclor 1016/1242	0.1393	ug/L	0.0250	0.0250	0.200		70% (45.3-101)		11/02/15 :11/02/15	M0
Aroclor 1260	0.1745	ug/L	0.0250	0.0250	0.200		87% (57.8-118)		11/02/15 :11/02/15	
<b>Surrogate</b>										
Tetrachloro-m-xylene	0.0300	ug/L			0.0500		60% (32.8-105)		11/02/15 :11/02/15	
Decachlorobiphenyl	0.0491	ug/L			0.0500		98% (29-133)		11/02/15 :11/02/15	
<b>LCS Dup (B15K011-BSD1)</b>										
Aroclor 1016/1242	0.1060	ug/L	0.0250	0.0250	0.200		53% (45.3-101) 27 (20)		11/02/15 :11/02/15	M0
Aroclor 1260	0.1567	ug/L	0.0250	0.0250	0.200		78% (57.8-118) 11 (20)		11/02/15 :11/02/15	
<b>Surrogate</b>										
Tetrachloro-m-xylene	0.0244	ug/L			0.0500		49% (32.8-105)		11/02/15 :11/02/15	
Decachlorobiphenyl	0.0488	ug/L			0.0500		98% (29-133)		11/02/15 :11/02/15	

Reported: 11/24/15 11:17

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W15J213**

**Client: Director's Office**  
**Received: 10/31/15 15:05**

**Qualifiers**

- L1 Recovery for this analyte in the laboratory control sample was outside the acceptance range (low). Sample results may be low estimates.
- L2 Recovery for this analyte in the laboratory control sample was outside the acceptance range (high). Sample results may be high estimates.
- M0 LCS/LCSD (BS/BSD) RPD is high for this analyte; recoveries are acceptable.
- M4 Based on low matrix spike recovery, the sample result may be a low estimate due to matrix interference.
- SU1 Recovery for one or more surrogate compounds was outside the acceptance range (low). Sample results may be low estimates.
- V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.
- V3 Continuing calibration verification was low; sample results for this analyte may be low estimates.

**Definitions**

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 11/24/15 11:17

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

Jennifer Shackelford, Laboratory Coordinator QA/QC



### WPCL Cooler Receipt Form

Work Order Number: W155213

Cooler Receipt Form Filled Out By: RH

Project: Portland Harbor

Sample transport: Samples received on ice yes Courier \_\_\_\_\_

Directly from field \_\_\_\_\_

Temperature (°C) 17

	Yes	No	NA
Is the COC present and signed?	/		
Are sample bottles intact?	/		
Do the COC and sample labels match?	/		
Are the appropriate containers used?	/		
Are samples appropriately preserved?	/		
Do VOA vials have Headspace?			/
Are samples received within holding times?	/		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	150195	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
10-31-15	1530	RH	W155213-01	P	1	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Seattle  
5755 8th Street East  
Tacoma, WA 98424  
Tel: (253)922-2310

TestAmerica Job ID: 580-54681-1

TestAmerica Sample Delivery Group: W15J213

Client Project/Site: W15J213

Revision: 1

For:

City of Portland  
Water Pollution Laboratory  
6543 N. Burlington Ave  
Portland, Oregon 97203

Attn: Jennifer Shackelford



Authorized for release by:

11/20/2015 2:06:50 PM

Kelsey Devries, Project Management Assistant I  
(253)922-2310

[kelsey.devries@testamericainc.com](mailto:kelsey.devries@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: City of Portland  
Project/Site: W15J213

TestAmerica Job ID: 580-54681-1  
SDG: W15J213

**Job ID: 580-54681-1**

**Laboratory: TestAmerica Seattle**

## Narrative

**Job Narrative**  
**580-54681-1**

## Comments

No additional comments.

## Receipt

The sample was received on 11/2/2015 2:40 PM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.2° C.

## Subcontract non-Sister

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

## Subcontract Work

Methods City of Portland EDD, PCB Congeners 209: These methods were subcontracted to Pace Laboratories, Minneapolis. The subcontract laboratory certifications are different from that of the facility issuing the final report.

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# Definitions/Glossary

Client: City of Portland  
Project/Site: W15J213

TestAmerica Job ID: 580-54681-1  
SDG: W15J213

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Certification Summary

Client: City of Portland  
Project/Site: W15J213

TestAmerica Job ID: 580-54681-1  
SDG: W15J213

## Laboratory: TestAmerica Seattle

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska (UST)	State Program	10	UST-022	03-02-16
California	State Program	9	2901	01-31-17
L-A-B	DoD ELAP		L2236	01-19-16
L-A-B	ISO/IEC 17025		L2236	01-19-16
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-06-16
US Fish & Wildlife	Federal		LE058448-0	02-28-16
USDA	Federal		P330-14-00126	04-08-17
Washington	State Program	10	C553	02-17-16

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# Sample Summary

Client: City of Portland  
Project/Site: W15J213

TestAmerica Job ID: 580-54681-1  
SDG: W15J213

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-54681-1	W15J213-01	Water	10/31/15 14:48	11/02/15 14:40

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**Pace Analytical Services, Inc.**  
1700 Elm Street  
Minneapolis, MN 55414  
Phone: 612.607.1700  
Fax: 612.607.6444



**Report Prepared for:**

Kelsey DeVries  
Test America  
5755 8th .St. East  
Tacoma WA 98424

**Report Information:**

**Pace Project #: 10328823**  
**Sample Receipt Date: 11/04/2015**  
**Client Project #: 25000370 W15J213**  
**Client Sub PO #: N/A**  
**State Cert #: MN200001-005**

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Carolynne Trout, your Pace Project Manager.

**This report has been reviewed by:**

November 19, 2015

Carolynne Trout, Project Manager  
(612) 607-6351  
(612) 607-6444 (fax)  
Carolynne.Trout@pacelabs.com



**Report of Laboratory Analysis**

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.

**Report Prepared Date:**

November 19, 2015



## DISCUSSION

This report presents the results from the analyses performed on one sample submitted by a representative of Test America - Portland. The sample was analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the volume of sample extracted.

The isotopically-labeled PCB internal standards in the sample extract were recovered at 49-106%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the field samples.

Laboratory spike samples were also prepared with the sample batch using water that had been fortified with native standards. The results show that the spiked native compounds were recovered at 84-105%, with relative percent differences of 0.0-9.1%. These results were within the target ranges for this method. Matrix spikes were not prepared with the sample batch.

## REPORT OF LABORATORY ANALYSIS

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia	9952C
Maryland	322	Wisconsin	999407970
Michigan	9909	Wyoming	8TMS-Q
Minnesota	027-053-137		

## REPORT OF LABORATORY ANALYSIS

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Report No.....10328823



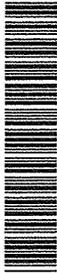
# Appendix A

## Sample Management

W32 8823



THE LEADER IN ENVIRONMENTAL TESTING



# Chain of Custody Record

<b>Client Information (Sub Contract Lab)</b> Client Contact: Willms, Jay R Shipping/Receiving: jay.willms@testamericainc.com Company: Pace Analytical Services, Inc.		Lab P#: Willms, Jay R E-Mail: jay.willms@testamericainc.com		Carrier Tracking No(s): COC No: 580-32387-1 Page: Page 1 of 1 Job #: 580-54681-1	
Address: 1700 Elm St., Suite 200, Minneapolis State, Zip: MN, 55414 Phone: Email:		<b>Analysis Requested</b> Due Date Requested: 11/12/2015 TAT Requested (days): PO #: WO #: Project #: 25000370 SSO#: Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:		Total Number of Containers: 1 Special Instructions/Note:	
<b>Sample Identification - Client ID (Lab ID)</b> (580-54681-1)		SUB (PCB Congeners 209) / PCB Congeners 209 SUB (City of Portland EDP) / City of Portland EDP Perform MS/MSD (Yes or No) Field Filtered Sample (Yes or No)		SUB (City of Portland EDP) / City of Portland EDP SUB (City of Portland EDP) / City of Portland EDP Perform MS/MSD (Yes or No) Field Filtered Sample (Yes or No)	
Sample Date: 10/31/15 Sample Time: 14:48 Pacific Matrix (W=water, S=solid, O=wastefl, B=tissue, A=air) Sample Type (C=comp, G=grab) Preservation Code: Water		SUB (City of Portland EDP) / City of Portland EDP SUB (City of Portland EDP) / City of Portland EDP Perform MS/MSD (Yes or No) Field Filtered Sample (Yes or No)		SUB (City of Portland EDP) / City of Portland EDP SUB (City of Portland EDP) / City of Portland EDP Perform MS/MSD (Yes or No) Field Filtered Sample (Yes or No)	
<b>Possible Hazard Identification</b> Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify)		SUB (City of Portland EDP) / City of Portland EDP SUB (City of Portland EDP) / City of Portland EDP Perform MS/MSD (Yes or No) Field Filtered Sample (Yes or No)		SUB (City of Portland EDP) / City of Portland EDP SUB (City of Portland EDP) / City of Portland EDP Perform MS/MSD (Yes or No) Field Filtered Sample (Yes or No)	
Empty Kit Relinquished by: Relinquished by: Relinquished by:		Date/Time: 11/9/15 @ 1500 Date/Time: Date/Time:		Method of Shipment: Date/Time: 11-405 930 Date/Time: Date/Time:	
Custody Seals Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Δ No <input type="checkbox"/> Custody Seal No.:		Relinquished by: M. Smith - Sera Company: TAP Company Company: Company		Special Instructions/QC Requirements: Return To Client <input type="checkbox"/> Archive For <input type="checkbox"/> Months Disposal By Lab <input type="checkbox"/>	



**Sample Condition Upon Receipt** Client Name: Test America Project #: **WO#: 10328823**

Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  SpeedDee  Other: \_\_\_\_\_

Tracking Number: 6542 7760 9062



Custody Seal on Cooler/Box Present?  Yes  No      Seals Intact?  Yes  No      Optional: Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_

Packing Material:  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_      Temp Blank?  Yes  No

Thermometer Used:  B88A9130516413  B88A912167504  B88A0143310098      Type of Ice:  Wet  Blue  None  Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.5      Cooler Temp Corrected (°C): 1.5      Biological Tissue Frozen?  Yes  No  N/A  
Temp should be above freezing to 6°C      Correction Factor: none      Date and Initials of Person Examining Contents: 11-4-15/AG

USDA Regulated Soil:  N/A, water sample)      Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)?  Yes  No      Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**      Field Data Required?  Yes  No

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/Resolution: \_\_\_\_\_

Project Manager Review: [Signature]      Date: 11/5/15

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office ( i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

## REPORT OF LABORATORY ANALYSIS

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Report No.....10328823

Report No.....10328823\_1668A

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# Appendix B

## Sample Analysis Summary



**Method 1668A Polychlorobiphenyl Sample Analysis Results**

Client - Test America

Client's Sample ID	(580-54681-1)		
Lab Sample ID	10328823001		
Filename	P151114B_13		
Injected By	BAL		
Total Amount Extracted	966 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/31/2015 14:48
ICAL ID	P151114B02	Received	11/04/2015 09:30
CCal Filename(s)	P151114B_01	Extracted	11/06/2015 13:15
Method Blank ID	BLANK-47674	Analyzed	11/15/2015 12:56

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.641	2.90	2.0	1.20	60
13C-4-MoCB	3	11.241	2.99	2.0	1.24	62
13C-2,2'-DiCB	4	11.505	1.58	2.0	1.40	70
13C-4,4'-DiCB	15	18.320	1.55	2.0	1.34	67
13C-2,2',6-TrCB	19	15.313	1.03	2.0	1.29	64
13C-3,4,4'-TrCB	37	25.871	1.01	2.0	1.33	67
13C-2,2',6,6'-TeCB	54	18.576	0.80	2.0	1.29	65
13C-3,4,4',5-TeCB	81	32.919	0.81	2.0	1.43	72
13C-3,3',4,4'-TeCB	77	33.506	0.85	2.0	1.32	66
13C-2,2',4,6,6'-PeCB	104	24.496	1.55	2.0	1.37	69
13C-2,3,3',4,4'-PeCB	105	37.049	1.64	2.0	1.41	70
13C-2,3,4,4',5-PeCB	114	36.395	1.55	2.0	1.46	73
13C-2,3',4,4',5-PeCB	118	35.842	1.59	2.0	1.48	74
13C-2,3',4,4',5'-PeCB	123	35.507	1.56	2.0	1.49	75
13C-3,3',4,4',5-PeCB	126	40.236	1.57	2.0	1.37	69
13C-2,2',4,4',6,6'-HxCB	155	30.437	1.28	2.0	1.45	73
13C-HxCB (156/157)	156/157	43.259	1.23	4.0	2.32	58
13C-2,3',4,4',5,5'-HxCB	167	42.085	1.26	2.0	1.25	62
13C-3,3',4,4',5,5'-HxCB	169	46.579	1.20	2.0	0.984	49
13C-2,2',3,4',5,6,6'-HpCB	188	36.312	1.04	2.0	2.11	106
13C-2,3,3',4,4',5,5'-HpCB	189	49.076	1.03	2.0	1.44	72
13C-2,2',3,3',5,5',6,6'-OcCB	202	41.767	0.89	2.0	2.12	106
13C-2,3,3',4,4',5,5',6-OcCB	205	51.662	0.86	2.0	1.32	66
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.473	0.83	2.0	1.21	60
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	48.537	0.75	2.0	1.68	84
13C--DeCB	209	55.132	0.76	2.0	1.36	68
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.578	1.07	2.0	1.53	76
13C-2,3,3',5,5'-PeCB	111	33.472	1.57	2.0	1.60	80
13C-2,2',3,3',5,5',6-HpCB	178	39.431	1.09	2.0	1.79	90
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.839	1.58	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.506	0.79	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.689	1.55	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.011	1.22	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OcCB	194	51.188	0.94	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID (580-54681-1)  
Lab Sample ID 10328823001  
Filename P151114B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.259
2		---	---	ND	---	0.259
3		---	---	ND	---	0.259
4		---	---	ND	---	0.259
5		---	---	ND	---	0.259
6		---	---	ND	---	0.259
7		---	---	ND	---	0.259
8		---	---	ND	---	0.259
9		---	---	ND	---	0.259
10		---	---	ND	---	0.259
11		---	---	ND	---	2.54
12	12/13	---	---	ND	---	0.518
13	12/13	---	---	ND	---	0.518
14		---	---	ND	---	0.259
15		---	---	ND	---	0.342
16		---	---	ND	---	0.259
17		---	---	ND	---	0.259
18	18/30	---	---	ND	---	0.518
19		---	---	ND	---	0.259
20	20/28	---	---	ND	---	1.34
21	21/33	---	---	ND	---	1.40
22		---	---	ND	---	0.983
23		---	---	ND	---	0.259
24		---	---	ND	---	0.259
25		---	---	ND	---	0.259
26	26/29	---	---	ND	---	0.518
27		---	---	ND	---	0.259
28	20/28	---	---	ND	---	1.34
29	26/29	---	---	ND	---	0.518
30	18/30	---	---	ND	---	0.518
31		---	---	ND	---	1.35
32		---	---	ND	---	0.259
33	21/33	---	---	ND	---	1.40
34		---	---	ND	---	0.259
35		---	---	ND	---	0.259
36		---	---	ND	---	0.259
37		---	---	ND	---	0.549
38		---	---	ND	---	0.259
39		---	---	ND	---	0.259
40	40/41/71	---	---	ND	---	1.55
41	40/41/71	---	---	ND	---	1.55
42		---	---	ND	---	0.518
43	43/73	---	---	ND	---	0.518
44	44/47/65	---	---	ND	---	1.55
45	45/51	---	---	ND	---	1.04
46		---	---	ND	---	0.518
47	44/47/65	---	---	ND	---	1.55
48		---	---	ND	---	0.518

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID (580-54681-1)  
Lab Sample ID 10328823001  
Filename P151114B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.04
50	50/53	---	---	ND	---	1.04
51	45/51	---	---	ND	---	1.04
52		---	---	ND	---	1.59
53	50/53	---	---	ND	---	1.04
54		---	---	ND	---	0.518
55		---	---	ND	---	0.518
56		---	---	ND	---	0.518
57		---	---	ND	---	0.518
58		---	---	ND	---	0.518
59	59/62/75	---	---	ND	---	1.55
60		---	---	ND	---	0.518
61	61/70/74/76	---	---	ND	---	2.07
62	59/62/75	---	---	ND	---	1.55
63		---	---	ND	---	0.518
64		---	---	ND	---	0.518
65	44/47/65	---	---	ND	---	1.55
66		---	---	ND	---	0.870
67		---	---	ND	---	0.518
68		---	---	ND	---	0.518
69	49/69	---	---	ND	---	1.04
70	61/70/74/76	---	---	ND	---	2.07
71	40/41/71	---	---	ND	---	1.55
72		---	---	ND	---	0.518
73	43/73	---	---	ND	---	0.518
74	61/70/74/76	---	---	ND	---	2.07
75	59/62/75	---	---	ND	---	1.55
76	61/70/74/76	---	---	ND	---	2.07
77		---	---	ND	---	0.518
78		---	---	ND	---	0.518
79		---	---	ND	---	0.518
80		---	---	ND	---	0.518
81		---	---	ND	---	0.518
82		---	---	ND	---	0.518
83		---	---	ND	---	0.518
84		---	---	ND	---	0.518
85	85/116/117	---	---	ND	---	1.55
86	86/87/97/108/119/125	---	---	ND	---	3.11
87	86/87/97/108/119/125	---	---	ND	---	3.11
88	88/91	---	---	ND	---	1.04
89		---	---	ND	---	0.518
90	90/101/113	---	---	ND	---	1.55
91	88/91	---	---	ND	---	1.04
92		---	---	ND	---	0.518
93	93/98/100/102	---	---	ND	---	2.07
94		---	---	ND	---	0.518
95		---	---	ND	---	0.983
96		---	---	ND	---	0.518

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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Nn = Value obtained from additional analyses

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID (580-54681-1)  
Lab Sample ID 10328823001  
Filename P151114B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.11
98	93/98/100/102	---	---	ND	---	2.07
99		---	---	ND	---	0.518
100	93/98/100/102	---	---	ND	---	2.07
101	90/101/113	---	---	ND	---	1.55
102	93/98/100/102	---	---	ND	---	2.07
103		---	---	ND	---	0.518
104		---	---	ND	---	0.518
105		---	---	ND	---	0.518
106		---	---	ND	---	0.518
107	107/124	---	---	ND	---	1.04
108	86/87/97/108/119/125	---	---	ND	---	3.11
109		---	---	ND	---	0.518
110	110/115	32.768	1.59	1.16	---	1.04
111		---	---	ND	---	0.518
112		---	---	ND	---	0.518
113	90/101/113	---	---	ND	---	1.55
114		---	---	ND	---	0.518
115	110/115	32.768	1.59	(1.16)	---	1.04
116	85/116/117	---	---	ND	---	1.55
117	85/116/117	---	---	ND	---	1.55
118		35.875	1.52	0.969	---	0.663
119	86/87/97/108/119/125	---	---	ND	---	3.11
120		---	---	ND	---	0.518
121		---	---	ND	---	0.518
122		---	---	ND	---	0.518
123		---	---	ND	---	0.518
124	107/124	---	---	ND	---	1.04
125	86/87/97/108/119/125	---	---	ND	---	3.11
126		---	---	ND	---	0.518
127		---	---	ND	---	0.518
128	128/166	---	---	ND	---	1.04
129	129/138/163	39.028	1.23	1.80	---	1.55
130		---	---	ND	---	0.518
131		---	---	ND	---	0.518
132		35.926	1.20	0.592	---	0.518
133		---	---	ND	---	0.518
134	134/143	---	---	ND	---	1.04
135	135/151	---	---	ND	---	1.04
136		---	---	ND	---	0.518
137		---	---	ND	---	0.518
138	129/138/163	39.028	1.23	(1.80)	---	1.55
139	139/140	---	---	ND	---	1.04
140	139/140	---	---	ND	---	1.04
141		---	---	ND	---	0.518
142		---	---	ND	---	0.518
143	134/143	---	---	ND	---	1.04
144		---	---	ND	---	0.518

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID (580-54681-1)  
Lab Sample ID 10328823001  
Filename P151114B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.518
146		---	---	ND	---	0.518
147	147/149	34.651	1.25	1.17	---	1.04
148		---	---	ND	---	0.518
149	147/149	34.651	1.25	(1.17)	---	1.04
150		---	---	ND	---	0.518
151	135/151	---	---	ND	---	1.04
152		---	---	ND	---	0.518
153	153/168	37.754	1.25	1.17	---	1.04
154		---	---	ND	---	0.518
155		---	---	ND	---	0.518
156	156/157	---	---	ND	---	1.04
157	156/157	---	---	ND	---	1.04
158		---	---	ND	---	0.518
159		---	---	ND	---	0.518
160		---	---	ND	---	0.518
161		---	---	ND	---	0.518
162		---	---	ND	---	0.518
163	129/138/163	39.028	1.23	(1.80)	---	1.55
164		---	---	ND	---	0.518
165		---	---	ND	---	0.518
166	128/166	---	---	ND	---	1.04
167		---	---	ND	---	0.518
168	153/168	37.754	1.25	(1.17)	---	1.04
169		---	---	ND	---	0.518
170		---	---	ND	---	0.518
171	171/173	---	---	ND	---	1.04
172		---	---	ND	---	0.518
173	171/173	---	---	ND	---	1.04
174		---	---	ND	---	0.518
175		---	---	ND	---	0.518
176		---	---	ND	---	0.518
177		---	---	ND	---	0.518
178		---	---	ND	---	0.518
179		---	---	ND	---	0.518
180	180/193	---	---	ND	---	1.04
181		---	---	ND	---	0.518
182		---	---	ND	---	0.518
183	183/185	---	---	ND	---	1.04
184		---	---	ND	---	0.518
185	183/185	---	---	ND	---	1.04
186		---	---	ND	---	0.518
187		---	---	ND	---	0.518
188		---	---	ND	---	0.518
189		---	---	ND	---	0.518
190		---	---	ND	---	0.518
191		---	---	ND	---	0.518
192		---	---	ND	---	0.518

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID (580-54681-1)  
 Lab Sample ID 10328823001  
 Filename P151114B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.04
194		---	---	ND	---	0.776
195		---	---	ND	---	0.776
196		---	---	ND	---	0.776
197	197/200	---	---	ND	---	1.55
198	198/199	---	---	ND	---	1.55
199	198/199	---	---	ND	---	1.55
200	197/200	---	---	ND	---	1.55
201		---	---	ND	---	0.776
202		---	---	ND	---	0.776
203		---	---	ND	---	0.776
204		---	---	ND	---	0.776
205		---	---	ND	---	0.776
206		---	---	ND	---	0.776
207		---	---	ND	---	0.776
208		---	---	ND	---	0.776
209		---	---	ND	---	0.776



Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID (580-54681-1)  
Lab Sample ID 10328823001  
Filename P151114B\_13

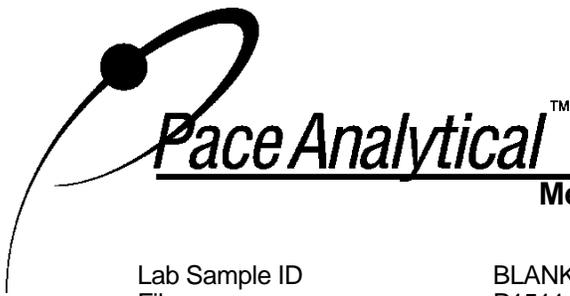
Congener Group	Concentration ng/L
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	2.12
Total Hexachloro Biphenyls	4.74
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	6.86

ND = Not Detected



**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-47674	Matrix	Water
Filename	P151115A_08	Extracted	11/06/2015 13:15
Injected By	BAL	Analyzed	11/15/2015 21:57
Total Amount Extracted	1040 mL	Dilution	5
ICAL ID	P151115A02		
CCal Filename(s)	P151115A_01		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.665	2.97	2.0	1.18	59
13C-4-MoCB	3	11.265	3.02	2.0	1.22	61
13C-2,2'-DiCB	4	11.517	1.57	2.0	1.32	66
13C-4,4'-DiCB	15	18.296	1.59	2.0	1.26	63
13C-2,2',6-TrCB	19	15.109	1.06	2.0	1.39	69
13C-3,4,4'-TrCB	37	25.921	1.05	2.0	1.41	70
13C-2,2',6,6'-TeCB	54	18.560	0.86	2.0	1.36	68
13C-3,4,4',5-TeCB	81	32.935	0.87	2.0	1.48	74
13C-3,3',4,4'-TeCB	77	33.522	0.75	2.0	1.42	71
13C-2,2',4,6,6'-PeCB	104	24.496	1.58	2.0	1.46	73
13C-2,3,3',4,4'-PeCB	105	37.065	1.60	2.0	1.61	81
13C-2,3,4,4',5-PeCB	114	36.411	1.57	2.0	1.61	81
13C-2,3',4,4',5-PeCB	118	35.875	1.69	2.0	1.66	83
13C-2,3',4,4',5'-PeCB	123	35.523	1.57	2.0	1.63	82
13C-3,3',4,4',5-PeCB	126	40.251	1.62	2.0	1.60	80
13C-2,2',4,4',6,6'-HxCB	155	30.454	1.29	2.0	1.51	76
13C-HxCB (156/157)	156/157	43.291	1.28	4.0	2.94	73
13C-2,3',4,4',5,5'-HxCB	167	42.101	1.32	2.0	1.46	73
13C-3,3',4,4',5,5'-HxCB	169	46.595	1.29	2.0	1.34	67
13C-2,2',3,4',5,6,6'-HpCB	188	36.327	1.05	2.0	1.70	85
13C-2,3,3',4,4',5,5'-HpCB	189	49.117	1.05	2.0	1.52	76
13C-2,2',3,3',5,5',6,6'-OoCB	202	41.782	0.89	2.0	1.81	91
13C-2,3,3',4,4',5,5',6-OoCB	205	51.682	0.91	2.0	1.60	80
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.492	0.80	2.0	1.50	75
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	48.535	0.81	2.0	1.59	80
13C-DeCB	209	55.174	0.69	2.0	1.78	89
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.595	1.17	2.0	1.63	82
13C-2,3,3',5,5'-PeCB	111	33.488	1.59	2.0	1.51	76
13C-2,2',3,3',5,5',6-HpCB	178	39.446	1.05	2.0	1.82	91
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.839	1.56	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.507	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.705	1.65	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.010	1.30	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	51.186	0.91	2.0	NA	NA

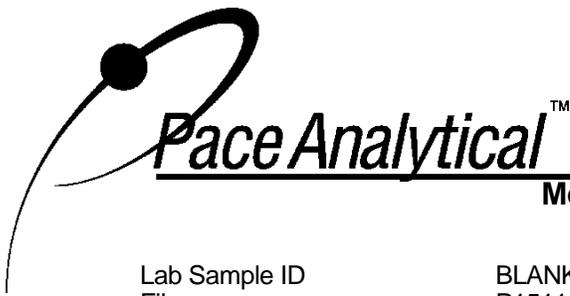
Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-47674  
Filename P151115A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.241
2		---	---	ND	---	0.241
3		---	---	ND	---	0.241
4		---	---	ND	---	0.241
5		---	---	ND	---	0.241
6		---	---	ND	---	0.241
7		---	---	ND	---	0.241
8		---	---	ND	---	0.241
9		---	---	ND	---	0.241
10		---	---	ND	---	0.241
11		---	---	ND	---	2.36
12	12/13	---	---	ND	---	0.481
13	12/13	---	---	ND	---	0.481
14		---	---	ND	---	0.241
15		---	---	ND	---	0.241
16		---	---	ND	---	0.241
17		---	---	ND	---	0.241
18	18/30	---	---	ND	---	0.481
19		---	---	ND	---	0.241
20	20/28	---	---	ND	---	1.24
21	21/33	---	---	ND	---	1.30
22		---	---	ND	---	0.914
23		---	---	ND	---	0.241
24		---	---	ND	---	0.241
25		---	---	ND	---	0.241
26	26/29	---	---	ND	---	0.481
27		---	---	ND	---	0.241
28	20/28	---	---	ND	---	1.24
29	26/29	---	---	ND	---	0.481
30	18/30	---	---	ND	---	0.481
31		---	---	ND	---	1.25
32		---	---	ND	---	0.241
33	21/33	---	---	ND	---	1.30
34		---	---	ND	---	0.241
35		---	---	ND	---	0.241
36		---	---	ND	---	0.241
37		---	---	ND	---	0.510
38		---	---	ND	---	0.241
39		---	---	ND	---	0.241
40	40/41/71	---	---	ND	---	1.44
41	40/41/71	---	---	ND	---	1.44
42		---	---	ND	---	0.481
43	43/73	---	---	ND	---	0.481
44	44/47/65	---	---	ND	---	1.44
45	45/51	---	---	ND	---	0.963

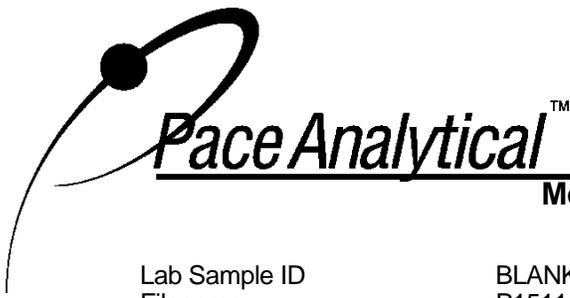
Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-47674  
Filename P151115A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		---	---	ND	---	0.481
47	44/47/65	---	---	ND	---	1.44
48		---	---	ND	---	0.481
49	49/69	---	---	ND	---	0.963
50	50/53	---	---	ND	---	0.963
51	45/51	---	---	ND	---	0.963
52		---	---	ND	---	1.48
53	50/53	---	---	ND	---	0.963
54		---	---	ND	---	0.481
55		---	---	ND	---	0.481
56		---	---	ND	---	0.481
57		---	---	ND	---	0.481
58		---	---	ND	---	0.481
59	59/62/75	---	---	ND	---	1.44
60		---	---	ND	---	0.481
61	61/70/74/76	---	---	ND	---	1.93
62	59/62/75	---	---	ND	---	1.44
63		---	---	ND	---	0.481
64		---	---	ND	---	0.481
65	44/47/65	---	---	ND	---	1.44
66		---	---	ND	---	0.809
67		---	---	ND	---	0.481
68		---	---	ND	---	0.481
69	49/69	---	---	ND	---	0.963
70	61/70/74/76	---	---	ND	---	1.93
71	40/41/71	---	---	ND	---	1.44
72		---	---	ND	---	0.481
73	43/73	---	---	ND	---	0.481
74	61/70/74/76	---	---	ND	---	1.93
75	59/62/75	---	---	ND	---	1.44
76	61/70/74/76	---	---	ND	---	1.93
77		---	---	ND	---	0.481
78		---	---	ND	---	0.481
79		---	---	ND	---	0.481
80		---	---	ND	---	0.481
81		---	---	ND	---	0.481
82		---	---	ND	---	0.481
83		---	---	ND	---	0.481
84		---	---	ND	---	0.481
85	85/116/117	---	---	ND	---	1.44
86	86/87/97/108/119/125	---	---	ND	---	2.89
87	86/87/97/108/119/125	---	---	ND	---	2.89
88	88/91	---	---	ND	---	0.963
89		---	---	ND	---	0.481
90	90/101/113	---	---	ND	---	1.44

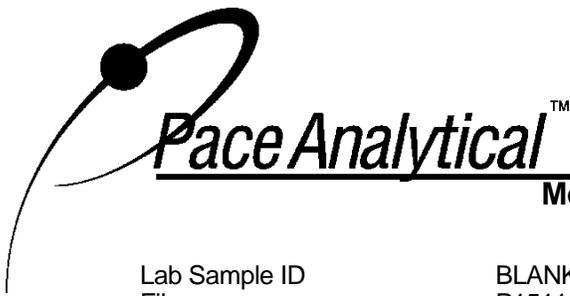
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R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-47674  
Filename P151115A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	---	---	ND	---	0.963
92		---	---	ND	---	0.481
93	93/98/100/102	---	---	ND	---	1.93
94		---	---	ND	---	0.481
95		---	---	ND	---	0.914
96		---	---	ND	---	0.481
97	86/87/97/108/119/125	---	---	ND	---	2.89
98	93/98/100/102	---	---	ND	---	1.93
99		---	---	ND	---	0.481
100	93/98/100/102	---	---	ND	---	1.93
101	90/101/113	---	---	ND	---	1.44
102	93/98/100/102	---	---	ND	---	1.93
103		---	---	ND	---	0.481
104		---	---	ND	---	0.481
105		---	---	ND	---	0.481
106		---	---	ND	---	0.481
107	107/124	---	---	ND	---	0.963
108	86/87/97/108/119/125	---	---	ND	---	2.89
109		---	---	ND	---	0.481
110	110/115	---	---	ND	---	0.963
111		---	---	ND	---	0.481
112		---	---	ND	---	0.481
113	90/101/113	---	---	ND	---	1.44
114		---	---	ND	---	0.481
115	110/115	---	---	ND	---	0.963
116	85/116/117	---	---	ND	---	1.44
117	85/116/117	---	---	ND	---	1.44
118		---	---	ND	---	0.616
119	86/87/97/108/119/125	---	---	ND	---	2.89
120		---	---	ND	---	0.481
121		---	---	ND	---	0.481
122		---	---	ND	---	0.481
123		---	---	ND	---	0.481
124	107/124	---	---	ND	---	0.963
125	86/87/97/108/119/125	---	---	ND	---	2.89
126		---	---	ND	---	0.481
127		---	---	ND	---	0.481
128	128/166	---	---	ND	---	0.963
129	129/138/163	---	---	ND	---	1.44
130		---	---	ND	---	0.481
131		---	---	ND	---	0.481
132		---	---	ND	---	0.481
133		---	---	ND	---	0.481
134	134/143	---	---	ND	---	0.963
135	135/151	---	---	ND	---	0.963

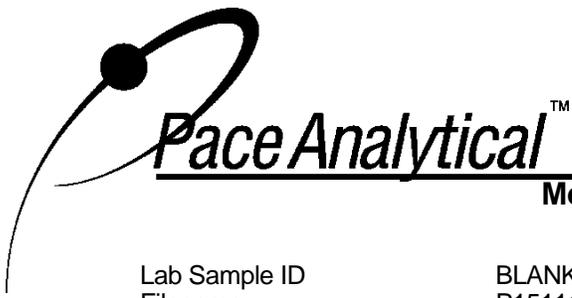
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-47674  
 Filename P151115A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		---	---	ND	---	0.481
137		---	---	ND	---	0.481
138	129/138/163	---	---	ND	---	1.44
139	139/140	---	---	ND	---	0.963
140	139/140	---	---	ND	---	0.963
141		---	---	ND	---	0.481
142		---	---	ND	---	0.481
143	134/143	---	---	ND	---	0.963
144		---	---	ND	---	0.481
145		---	---	ND	---	0.481
146		---	---	ND	---	0.481
147	147/149	---	---	ND	---	0.963
148		---	---	ND	---	0.481
149	147/149	---	---	ND	---	0.963
150		---	---	ND	---	0.481
151	135/151	---	---	ND	---	0.963
152		---	---	ND	---	0.481
153	153/168	---	---	ND	---	0.963
154		---	---	ND	---	0.481
155		---	---	ND	---	0.481
156	156/157	---	---	ND	---	0.963
157	156/157	---	---	ND	---	0.963
158		---	---	ND	---	0.481
159		---	---	ND	---	0.481
160		---	---	ND	---	0.481
161		---	---	ND	---	0.481
162		---	---	ND	---	0.481
163	129/138/163	---	---	ND	---	1.44
164		---	---	ND	---	0.481
165		---	---	ND	---	0.481
166	128/166	---	---	ND	---	0.963
167		---	---	ND	---	0.481
168	153/168	---	---	ND	---	0.963
169		---	---	ND	---	0.481
170		---	---	ND	---	0.481
171	171/173	---	---	ND	---	0.963
172		---	---	ND	---	0.481
173	171/173	---	---	ND	---	0.963
174		---	---	ND	---	0.481
175		---	---	ND	---	0.481
176		---	---	ND	---	0.481
177		---	---	ND	---	0.481
178		---	---	ND	---	0.481
179		---	---	ND	---	0.481
180	180/193	---	---	ND	---	0.963

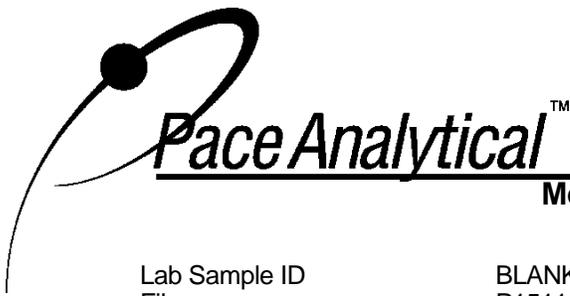
Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
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 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-47674  
 Filename P151115A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		---	---	ND	---	0.481
182		---	---	ND	---	0.481
183	183/185	---	---	ND	---	0.963
184		---	---	ND	---	0.481
185	183/185	---	---	ND	---	0.963
186		---	---	ND	---	0.481
187		---	---	ND	---	0.481
188		---	---	ND	---	0.481
189		---	---	ND	---	0.481
190		---	---	ND	---	0.481
191		---	---	ND	---	0.481
192		---	---	ND	---	0.481
193	180/193	---	---	ND	---	0.963
194		---	---	ND	---	0.722
195		---	---	ND	---	0.722
196		---	---	ND	---	0.722
197	197/200	---	---	ND	---	1.44
198	198/199	---	---	ND	---	1.44
199	198/199	---	---	ND	---	1.44
200	197/200	---	---	ND	---	1.44
201		---	---	ND	---	0.722
202		---	---	ND	---	0.722
203		---	---	ND	---	0.722
204		---	---	ND	---	0.722
205		---	---	ND	---	0.722
206		---	---	ND	---	0.722
207		---	---	ND	---	0.722
208		---	---	ND	---	0.722
209		---	---	ND	---	0.722

Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID           CBLKJW  
Lab Sample ID            BLANK-47674  
Filename                   P151115A\_08

Congener Group	Concentration ng/L
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected



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### Method 1668A Polychlorobiphenyls Laboratory Control Spike Analysis Results

Lab Sample ID	LCS-47675	Matrix	Water
Filename	P151115A_03	Dilution	5
Total Amount Extracted	1030 mL	Extracted	11/06/2015 13:15
ICAL ID	P151115A02	Analyzed	11/15/2015 17:03
CCal Filename(s)	P151115A_01	Injected By	BAL
Method Blank ID	BLANK-47674		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	0.966	97	2.0	1.13	57
3	1.0	0.949	95	2.0	1.24	62
4	1.0	1.00	100	2.0	1.37	68
15	1.0	0.943	94	2.0	1.38	69
19	1.0	0.841	84	2.0	1.74	87
37	1.0	0.950	95	2.0	1.45	73
54	1.0	0.874	87	2.0	1.41	71
81	1.0	1.00	100	2.0	1.52	76
77	1.0	0.973	97	2.0	1.49	74
104	1.0	1.03	103	2.0	1.51	75
105	1.0	0.975	97	2.0	1.69	84
114	1.0	0.993	99	2.0	1.70	85
118	1.0	0.975	98	2.0	1.69	84
123	1.0	1.01	101	2.0	1.67	83
126	1.0	0.981	98	2.0	1.70	85
155	1.0	0.996	100	2.0	1.54	77
156/157	2.0	1.92	96	4.0	3.01	75
167	1.0	0.978	98	2.0	1.51	75
169	1.0	0.988	99	2.0	1.40	70
188	1.0	1.02	102	2.0	1.72	86
189	1.0	0.994	99	2.0	1.63	81
202	1.0	0.940	94	2.0	1.79	90
205	1.0	0.965	97	2.0	1.64	82
206	1.0	1.05	105	2.0	1.60	80
208	1.0	1.03	103	2.0	1.63	81
209	1.0	0.930	93	2.0	1.86	93

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

## REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, Inc.



### Method 1668A Polychlorobiphenyls Laboratory Control Spike Analysis Results

Lab Sample ID	LCSD-47676	Matrix	Water
Filename	P151115A_04	Dilution	5
Total Amount Extracted	1020 mL	Extracted	11/06/2015 13:15
ICAL ID	P151115A02	Analyzed	11/15/2015 18:02
CCal Filename(s)	P151115A_01	Injected By	BAL
Method Blank ID	BLANK-47674		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	0.995	99	2.0	1.24	62
3	1.0	0.968	97	2.0	1.41	70
4	1.0	0.939	94	2.0	1.54	77
15	1.0	0.981	98	2.0	1.46	73
19	1.0	0.921	92	2.0	1.75	87
37	1.0	0.971	97	2.0	1.42	71
54	1.0	0.887	89	2.0	1.52	76
81	1.0	0.993	99	2.0	1.38	69
77	1.0	0.961	96	2.0	1.36	68
104	1.0	1.05	105	2.0	1.59	80
105	1.0	0.999	100	2.0	1.55	78
114	1.0	1.02	102	2.0	1.54	77
118	1.0	0.980	98	2.0	1.58	79
123	1.0	0.955	96	2.0	1.64	82
126	1.0	1.02	102	2.0	1.55	77
155	1.0	0.967	97	2.0	1.62	81
156/157	2.0	1.93	97	4.0	2.95	74
167	1.0	0.968	97	2.0	1.51	75
169	1.0	0.958	96	2.0	1.39	69
188	1.0	1.05	105	2.0	1.70	85
189	1.0	1.04	104	2.0	1.53	76
202	1.0	0.983	98	2.0	1.83	91
205	1.0	0.979	98	2.0	1.60	80
206	1.0	1.04	104	2.0	1.52	76
208	1.0	1.04	104	2.0	1.67	83
209	1.0	0.941	94	2.0	1.81	91

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client Test America

Spike 1 ID LCS-47675  
Spike 1 Filename P151115A\_03

Spike 2 ID LCSD-47676  
Spike 2 Filename P151115A\_04

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	97	99	2.0
4-MoCB	3	95	97	2.1
2,2'-DiCB	4	100	94	6.2
4,4'-DiCB	15	94	98	4.2
2,2',6-TrCB	19	84	92	9.1
3,4,4'-TrCB	37	95	97	2.1
2,2',6,6'-TeCB	54	87	89	2.3
3,3',4,4'-TeCB	77	97	96	1.0
3,4,4',5-TeCB	81	100	99	1.0
2,2',4,6,6'-PeCB	104	103	105	1.9
2,3,3',4,4'-PeCB	105	97	100	3.0
2,3,4,4',5-PeCB	114	99	102	3.0
2,3',4,4',5-PeCB	118	98	98	0.0
2,3',4,4',5'-PeCB	123	101	96	5.1
3,3',4,4',5-PeCB	126	98	102	4.0
2,2',4,4',6,6'-HxCB	155	100	97	3.0
(156/157)	156/157	96	97	1.0
2,3',4,4',5,5'-HxCB	167	98	97	1.0
3,3',4,4',5,5'-HxCB	169	99	96	3.1
2,2',3,4',5,6,6'-HpCB	188	102	105	2.9
2,3,3',4,4',5,5'-HpCB	189	99	104	4.9
2,2',3,3',5,5',6,6'-OcCB	202	94	98	4.2
2,3,3',4,4',5,5',6-OcCB	205	97	98	1.0
2,2',3,3',4,4',5,5',6-NoCB	206	105	104	1.0
2,2',3,3',4,5,5',6,6'-NoCB	208	103	104	1.0
Decachlorobiphenyl	209	93	94	1.1

%REC = Percent Recovered

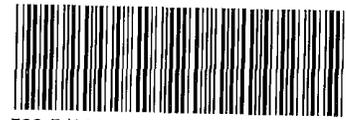
RPD = The difference between the two values divided by the mean value

**REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full,  
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SUBCONTRACT ORDER

City of Portland Water Pollution Control Lab  
W15J213



580-54681 Chain of Custody

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

SENDING LABORATORY:

City of Portland Water Pollution Control Lab  
6543 N. Burlington Ave  
Portland, OR 97203  
Phone: 503-823-5600  
Fax: 503-823-5656  
Invoice To: Charles Lytle using P.O.# 30001516

RECEIVING LABORATORY:

TestAmerica  
9405 SW Nimbus Ave  
Beaverton, OR 97008  
Phone : (503) 906-9200  
Fax: (503) 906-9210

WPCL Project Name  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>	
<input checked="" type="checkbox"/> Standard	
<input type="checkbox"/> Rush _ day(s)	

Analysis	Due	Expires	Laboratory ID	Comments
----------	-----	---------	---------------	----------

Sample ID: W15J213-01	Water	Sampled: 10/31/15 14:48		
Out-PCB Congeners 209 (Pace)	11/17/15 17:00	04/28/16 14:48		

Containers Supplied:  
G amber 1L (B)

- called 11/15 - spoke w Steve for pick up today (11/15)

*★ Please send to Pace*

*2.2 ml/p.2*

<i>[Signature]</i>	11/2/15 1330	<i>[Signature]</i>	11/2/15 1330
Released By	Date	Received By	Date
<i>[Signature]</i>	11/2/15 1440	<i>[Signature]</i>	11/2/15 1440
Released By	Date	Received By	Date

# Login Sample Receipt Checklist

Client: City of Portland

Job Number: 580-54681-1

SDG Number: W15J213

**Login Number: 54681**

**List Number: 1**

**Creator: Gonzales, Steve**

**List Source: TestAmerica Seattle**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

November 17, 2015

**Analytical Report for Service Request No: K1512432**

Jennifer Shackelford  
Portland, City of  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W15J213**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory November 02, 2015  
For your reference, these analyses have been assigned our service request number **K1512432**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
Idaho DHW	<a href="http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx">http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L14-50
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Michigan DEQ	<a href="http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html">http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html</a>	9949
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdwlabservice.htm">http://ndep.nv.gov/bsdwlabservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wisconsin DNR	<a href="http://dnr.wi.gov/">http://dnr.wi.gov/</a>	998386840
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS ENVIRONMENTAL

**Client:** Portland, City of  
**Project:** Portland Harbor/ W15J213  
**Sample Matrix:** Water

**Service Request No.:** K1512432  
**Date Received:** 11/02/15

**Case Narrative**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

**Sample Receipt**

One water sample was received for analysis at ALS Environmental on 11/02/15. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

**Organochlorine Pesticides by EPA Method 8081**

**Elevated Detection Limits:**

The detection limit was elevated for several analytes in this field sample. The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compounds at the normal limit. The results were flagged to indicate the matrix interference.

**Matrix Spike Recovery Exceptions:**

Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD for these samples.

**Second Source Exceptions:**

The analysis of Chlorinated Pesticides by EPA 8081 requires the use of dual column confirmation. When the Initial Calibration Verification (ICV) criteria are met for both columns, the lower of the two sample results is generally reported. The criteria were not met for Endrin Aldehyde in CAL 14410. The data quality was not affected. No further corrective action was necessary.

No other anomalies associated with the analysis of these samples were observed.

Approved by \_\_\_\_\_





# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

SUBCONTRACT ORDER

City of Portland Water Pollution Control Lab

W15J213

K1512432

SENDING LABORATORY:

City of Portland Water Pollution Control Lab  
6543 N. Burlington Ave  
Portland, OR 97203  
Phone: 503-823-5600  
Fax: 503-823-5656  
Invoice To: Charles Lytle

RECEIVING LABORATORY:

Columbia Analytical Services  
1317 S. 13th Avenue  
Kelso, WA 98626  
Phone : (360) 577-7222  
Fax: (360) 636-1068

WPCL Project Name

Portland Harbor

TURNAROUND REQUEST

Standard

Rush \_ day(s)

Analysis	Due	Expires	Laboratory ID	Comments
----------	-----	---------	---------------	----------

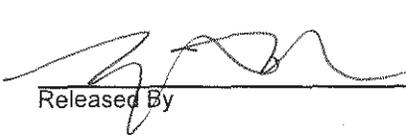
Sample ID: W15J213-01	Water	Sampled: 10/31/15 14:48		
Out-Pesticides Chlor LL (CAS)	11/17/15 17:00	11/07/15 14:48		

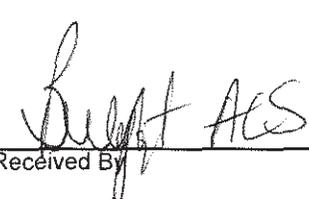
Containers Supplied:

G amber 1L (C)

-called & got pickup for today 11/2 @

\* Please run at low-level

 11/2/15  
Released By Date

 11-2-15  
Received By Date

bw 9:25

Released By Date Received By Date



PC cl

### Cooler Receipt and Preservation Form

Client / Project: City of Portland WPCL Service Request K15 K1512432  
 Received: 11-2-15 Opened: 11-2-15 By: bw Unloaded: 11-2-15 By: bw

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* Courier *Hand Delivered*  
 2. Samples were received in: (circle) Cooler *Box* *Envelope* *Other* NA  
 3. Were custody seals on coolers? *NA* *Y* N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? *Y* N If present, were they signed and dated? *Y* N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
4.1	4.3	-	-	+0.2	354	NA	NA	NA

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* Gel Packs *Wet Ice* *Dry Ice* *Sleeves* \_\_\_\_\_  
 5. Were custody papers properly filled out (ink, signed, etc.)? *NA* Y *N*  
 6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* *NA* Y *N*  
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? *NA* Y *N*  
 8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* *NA* Y *N*  
 9. Were appropriate bottles/containers and volumes received for the tests indicated? *NA* Y *N*  
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA *Y* *N*  
 11. Were VOA vials received without headspace? *Indicate in the table below.* NA *Y* *N*  
 12. Was C12/Res negative? *NA* Y *N*

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Organochlorine Pesticides

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W15J213  
**Sample Matrix:** Water

**Service Request:** K1512432  
**Date Collected:** 10/31/2015  
**Date Received:** 11/02/2015

Organochlorine Pesticides

**Sample Name:** W15J213-01  
**Lab Code:** K1512432-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	1.0	0.19	1	11/04/15	11/08/15	KWG1510739	
beta-BHC	ND	U	1.0	0.47	1	11/04/15	11/08/15	KWG1510739	
gamma-BHC (Lindane)	ND	Ui	3.2	3.2	1	11/04/15	11/08/15	KWG1510739	
delta-BHC	ND	Ui	2.4	2.4	1	11/04/15	11/08/15	KWG1510739	
Heptachlor	ND	Ui	2.2	2.2	1	11/04/15	11/08/15	KWG1510739	
Aldrin	ND	U	1.0	0.20	1	11/04/15	11/08/15	KWG1510739	
Heptachlor Epoxide	ND	U	1.0	0.69	1	11/04/15	11/08/15	KWG1510739	
gamma-Chlordane†	ND	U	1.0	0.21	1	11/04/15	11/08/15	KWG1510739	
Endosulfan I	ND	Ui	1.0	0.74	1	11/04/15	11/08/15	KWG1510739	
alpha-Chlordane	ND	Ui	2.7	2.7	1	11/04/15	11/08/15	KWG1510739	
Dieldrin	ND	Ui	3.2	3.2	1	11/04/15	11/08/15	KWG1510739	
4,4'-DDE	ND	U	1.0	0.11	1	11/04/15	11/08/15	KWG1510739	
Endrin	ND	U	1.0	0.18	1	11/04/15	11/08/15	KWG1510739	
Endosulfan II	ND	U	1.0	0.20	1	11/04/15	11/08/15	KWG1510739	
4,4'-DDD	ND	U	1.0	0.28	1	11/04/15	11/08/15	KWG1510739	
Endrin Aldehyde	ND	Ui	2.9	2.9	1	11/04/15	11/08/15	KWG1510739	
Endosulfan Sulfate	ND	U	1.0	0.84	1	11/04/15	11/08/15	KWG1510739	
4,4'-DDT	ND	Ui	3.2	3.2	1	11/04/15	11/08/15	KWG1510739	
Endrin Ketone	ND	U	1.0	0.28	1	11/04/15	11/08/15	KWG1510739	
Methoxychlor	ND	U	1.0	0.22	1	11/04/15	11/08/15	KWG1510739	
Toxaphene	ND	U	50	19	1	11/04/15	11/08/15	KWG1510739	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	55	20-106	11/08/15	Acceptable
Decachlorobiphenyl	94	19-127	11/08/15	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments: \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W15J213  
**Sample Matrix:** Storm water

**Service Request:** K1512432  
**Date Collected:** NA  
**Date Received:** NA

**Organochlorine Pesticides**

**Sample Name:** Method Blank  
**Lab Code:** KWG1510739-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	0.99	0.19	1	11/04/15	11/08/15	KWG1510739	
beta-BHC	ND	U	0.99	0.47	1	11/04/15	11/08/15	KWG1510739	
gamma-BHC (Lindane)	ND	U	0.99	0.22	1	11/04/15	11/08/15	KWG1510739	
delta-BHC	ND	U	0.99	0.20	1	11/04/15	11/08/15	KWG1510739	
Heptachlor	ND	U	0.99	0.13	1	11/04/15	11/08/15	KWG1510739	
Aldrin	ND	U	0.99	0.20	1	11/04/15	11/08/15	KWG1510739	
Heptachlor Epoxide	ND	U	0.99	0.69	1	11/04/15	11/08/15	KWG1510739	
gamma-Chlordane†	ND	U	0.99	0.21	1	11/04/15	11/08/15	KWG1510739	
Endosulfan I	ND	U	0.99	0.15	1	11/04/15	11/08/15	KWG1510739	
alpha-Chlordane	ND	U	0.99	0.17	1	11/04/15	11/08/15	KWG1510739	
Dieldrin	ND	U	0.99	0.23	1	11/04/15	11/08/15	KWG1510739	
4,4'-DDE	ND	U	0.99	0.11	1	11/04/15	11/08/15	KWG1510739	
Endrin	ND	U	0.99	0.18	1	11/04/15	11/08/15	KWG1510739	
Endosulfan II	ND	U	0.99	0.20	1	11/04/15	11/08/15	KWG1510739	
4,4'-DDD	ND	U	0.99	0.28	1	11/04/15	11/08/15	KWG1510739	
Endrin Aldehyde	ND	U	0.99	0.22	1	11/04/15	11/08/15	KWG1510739	
Endosulfan Sulfate	ND	U	0.99	0.84	1	11/04/15	11/08/15	KWG1510739	
4,4'-DDT	ND	U	0.99	0.30	1	11/04/15	11/08/15	KWG1510739	
Endrin Ketone	ND	U	0.99	0.28	1	11/04/15	11/08/15	KWG1510739	
Methoxychlor	ND	U	0.99	0.22	1	11/04/15	11/08/15	KWG1510739	
Toxaphene	ND	U	50	19	1	11/04/15	11/08/15	KWG1510739	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	63	20-106	11/08/15	Acceptable
Decachlorobiphenyl	80	19-127	11/08/15	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

**Comments:** \_\_\_\_\_

**Client:** Portland, City of  
**Project:** Portland Harbor/W15J213  
**Sample Matrix:** Water

**Service Request:** K1512432

**Surrogate Recovery Summary  
 Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>	<u>Sur2</u>
W15J213-01	K1512432-001	55	94
Method Blank	KWG1510739-5	63	80
Lab Control Sample	KWG1510739-1	70	71
Duplicate Lab Control Sample	KWG1510739-2	75	77

**Surrogate Recovery Control Limits (%)**

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Sur1 = Tetrachloro-m-xylene	20-106
Sur2 = Decachlorobiphenyl	19-127

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Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.

**Client:** Portland, City of  
**Project:** Portland Harbor/W15J213  
**Sample Matrix:** Storm water

**Service Request:** K1512432  
**Date Extracted:** 11/04/2015  
**Date Analyzed:** 11/08/2015

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1510739

Analyte Name	Lab Control Sample KWG1510739-1 Lab Control Spike			Duplicate Lab Control Sample KWG1510739-2 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
alpha-BHC	9.14	10.0	91	9.10	10.0	91	36-122	1	30
beta-BHC	9.11	10.0	91	9.20	10.0	92	42-125	1	30
gamma-BHC (Lindane)	9.45	10.0	95	9.27	10.0	93	44-117	2	30
delta-BHC	9.55	10.0	96	9.61	10.0	96	48-123	1	30
Heptachlor	8.64	10.0	86	8.97	10.0	90	40-115	4	30
Aldrin	8.36	10.0	84	8.43	10.0	84	10-102	1	30
Heptachlor Epoxide	8.79	10.0	88	8.82	10.0	88	49-109	0	30
gamma-Chlordane	8.56	10.0	86	8.57	10.0	86	47-113	0	30
Endosulfan I	5.60	10.0	56	5.68	10.0	57	35-115	1	30
alpha-Chlordane	8.41	10.0	84	8.53	10.0	85	45-115	1	30
Dieldrin	8.62	10.0	86	8.70	10.0	87	50-115	1	30
4,4'-DDE	8.25	10.0	83	8.25	10.0	82	41-116	0	30
Endrin	8.76	10.0	88	8.81	10.0	88	48-126	1	30
Endosulfan II	6.79	10.0	68	6.60	10.0	66	28-128	3	30
4,4'-DDD	9.12	10.0	91	9.31	10.0	93	33-132	2	30
Endrin Aldehyde	7.74	10.0	77	7.72	10.0	77	27-104	0	30
Endosulfan Sulfate	8.62	10.0	86	8.30	10.0	83	38-118	4	30
4,4'-DDT	8.81	10.0	88	8.70	10.0	87	42-143	1	30
Endrin Ketone	7.91	10.0	79	7.68	10.0	77	30-124	3	30
Methoxychlor	7.55	10.0	75	8.20	10.0	82	43-143	8	30
Toxaphene	233	400	58	231	400	58	36-137	1	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# **Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Composite Sampling City Outfall Basin 19**

**To:** File  
**From:** Andrew Davidson, GSI Water Solutions, Inc.  
**Date:** May 24, 2016

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in March 2016. One stormwater composite sample (W16C101-01), one field decontamination blank (W16C070-01), and one field duplicate sample (W16C101-02) were collected in Outfall Basin 19 and submitted for analyses. Sample collection dates and laboratory identification numbers are presented in Table 1.

The laboratory analyses for these samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- Pace Analytical Services (Pace)
  - Polychlorinated Biphenyls (PCB) Congeners – EPA 1668A

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with these source control program samples.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method and field decontamination blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control and duplicate laboratory control (LC/DLC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for field duplicate and laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## **Analysis Holding Times**

The samples were extracted and analyzed within the acceptable holding times for all analyses.

## **Method Blanks**

Method blanks were analyzed during the subcontracted laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. Separate batches were analyzed with the field sample/field duplicate and the field decontamination blank. No analytes were detected in the method blanks processed during any of the analyses.

## **Field Decontamination Blanks**

A field decontamination blank (W16C070-01) was processed with the field sample and field duplicate sample. The field decontamination blank was analyzed for TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. No analytes were detected in the field decontamination blank.

## Surrogate Recoveries

Surrogate recoveries were completed during the analyses of PAHs and phthalates. All surrogate recoveries for the field sample, field duplicate, field decontamination blank and all associated QC samples were within control criteria.

## Internal Standard Recoveries

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. Labeled internal standard recoveries were within method-specified target ranges for the samples and the associated QC samples.

## Matrix Spike/Matrix Spike Duplicates

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates. All MS recoveries were within acceptance limits.

## Laboratory Control Sample / Duplicate Laboratory Control Samples

LC samples were processed during the analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. DLC samples were processed during the analysis of PCB congeners. LC/DLC sample recoveries and RPDs were within laboratory control limits for all analyses.

## Laboratory Duplicate

WPCL processed duplicate samples during the TSS analysis, the total metals analysis, the analysis of mercury, and the analysis of PAHs and phthalates. RPDs were within laboratory acceptance limits for all lab duplicate samples with one exception:

- The RPD for benzo(a)anthracene in a laboratory duplicate of field duplicate sample W16C092-12 was right at the laboratory control limit of 50 percent. WPCL reports that the associated field duplicate sample result should be considered an estimate (“J” flag). This did not affect these composite stormwater sample results.

## Field Duplicate

A field duplicate sample W16C101-02 was collected along with W16C101-01 (19\_SW3). Both samples were analyzed for TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. Field duplicate detections and RPDs are presented in Tables 2. All RPDs were within acceptance criteria with one exception:

- PCB Congener 37 was detected in the field duplicate but not in the parent sample. However, the difference between the detection and the reporting limit was less than the reporting limit for PCB congener 37. Accordingly, the data are not qualified further.

## **Other**

WPCL qualified results detected at a concentration below the reporting limit as estimates. WPCL also reports that the continuing calibration verification was high for several PAH compounds analyzed during the analysis of the field and field duplicate sample. Detected results for these compounds should be considered high estimates (“J+” flag).

No other anomalies were reported in by WPCL or the subcontracted laboratories. A list of additional data qualifications added during validation is provided in Table 3.

**Table 2. Field Duplicate Detections**

City of Portland

Outfall 19

Sample IDs	Analyte	Unit	Reporting Limit	Primary Sample	Field Duplicate	Relative Percent Difference
<b>Total Suspended Solids</b>						
W16C101-01 & W16C101-02	Total Suspended Solids	mg/L	2	59	59	0
<b>Total Metals</b>						
W16C101-01 & W16C101-02	Arsenic	µg/L	0.100	1.31	1.33	2
	Cadmium	µg/L	0.100	0.127	0.13	2
	Chromium	µg/L	0.200	3.6	3.63	1
	Copper	µg/L	0.200	9.47	9.48	0
	Lead	µg/L	0.100	12.6	12.9	2
	Mercury	µg/L	0.001	0.0175	0.0223	24
	Nickel	µg/L	0.200	2.2	2.22	1
	Zinc	µg/L	0.50	114	116	2
<b>PAHs and phthalates</b>						
W16C101-01 & W16C101-02	Acenaphthylene	µg/L	0.020	0.036	0.034	6
	Anthracene	µg/L	0.020	0.085	0.081	5
	Benzo(a)anthracene	µg/L	0.010	0.046	0.043	7
	Benzo(a)pyrene	µg/L	0.010	0.05	0.048	4
	Benzo(b)fluoranthene	µg/L	0.010	0.076	0.073	4
	Benzo(g,h,i)perylene	µg/L	0.010	0.062	0.059	5
	Benzo(k)fluoranthene	µg/L	0.010	0.021	0.02	5
	Chrysene	µg/L	0.010	0.061	0.054	12
	Fluoranthene	µg/L	0.010	0.12	0.11	9
	Indeno(1,2,3-cd)pyrene	µg/L	0.010	0.03	0.03	0
	Naphthalene	µg/L	0.040	0.04 U	0.041	2
	Phenanthrene	µg/L	0.020	0.049	0.046	6
	Pyrene	µg/L	0.010	0.18	0.16	12
	Dimethyl phthalate	µg/L	1.0	2.8	2.3	20
Bis(2-ethylhexyl) phthalate	µg/L	1.0	2.1	1.7	21	
<b>PCB Congeners</b>						
W16C101-01 & W16C101-02	PCB Congener 37	ng/L	0.527	0.524 U	0.816	44

**Notes**

ug/L = micrograms per liter

mg/L = milligrams per liter

ng/L = nanograms per liter

J = Result is an estimated concentration that is less than the method reporting limit, but greater than or equal to the method detection limit

U = Analyte was not detected above the reported sample quantification limit.

1 The analyte was detected in one of the duplicate samples, but the difference between the detected result and the limit is less than the associated reporting limit.





City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



April 07, 2016

Linda Scheffler  
Director's Office

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Work Order  
**W16C101**

Project  
**Portland Harbor**

Received  
03/10/16 14:15

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W16C101</b>	Project Mgr: Linda Scheffler
Received: 3/10/16 14:15	
Submitted By: Field Operations	

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
19_SW3	W16C101-01	Stormwater	Composite	03/09/16 08:03	03/10/16 03:03	
Field Duplicate	W16C101-02	Stormwater	Composite	03/10/16 00:00	03/10/16 00:00	

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**General Chemistry**

Total Suspended Solids

19\_SW3 : W16C101-01

Total suspended solids      **59** mg/L      2      2      B16C238   03/14/16      03/14/16   SM 2540D

Field Duplicate : W16C101-02

Total suspended solids      **59** mg/L      2      2      B16C238   03/14/16      03/14/16   SM 2540D

**Total Metals**

Total Metals by ICPMS

19\_SW3 : W16C101-01

Arsenic	<b>1.31</b> ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8
Cadmium	<b>0.127</b> ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8
Chromium	<b>3.60</b> ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8
Copper	<b>9.47</b> ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8
Lead	<b>12.6</b> ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8
Mercury	<b>0.0175</b> ug/L	0.00100	0.00100	1	B16C204	03/11/16	03/14/16	WPCLSOP M-10
Nickel	<b>2.20</b> ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8
Silver	ND ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8
Zinc	<b>114</b> ug/L	0.500	0.500	1	B16C197	03/11/16	03/11/16	EPA 200.8

Field Duplicate : W16C101-02

Arsenic	<b>1.33</b> ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8
Cadmium	<b>0.130</b> ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8
Chromium	<b>3.63</b> ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8
Copper	<b>9.48</b> ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8
Lead	<b>12.9</b> ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8
Mercury	<b>0.0223</b> ug/L	0.00100	0.00100	1	B16C204	03/11/16	03/14/16	WPCLSOP M-10
Nickel	<b>2.22</b> ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8
Silver	ND ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8
Zinc	<b>116</b> ug/L	0.500	0.500	1	B16C197	03/11/16	03/11/16	EPA 200.8

Reported: 04/07/16 13:44

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16C101**

**Client: Director's Office**  
**Received: 03/10/16 14:15**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

19\_SW3 : W16C101-01

Acenaphthene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	0.036	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	0.085	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.046	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.050	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.076	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.062	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.021	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	0.061	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	0.12	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.030	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	0.049	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	0.18	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	2.8	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.1	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.23	ug/L	0.229	99%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.28	ug/L	0.229	124%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

Field Duplicate : W16C101-02

Acenaphthene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	0.034	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	0.081	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.043	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.048	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.073	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.059	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.020	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	0.054	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	0.11	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.030	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Water Pollution Control Laboratory**

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**Project: Portland Harbor**  
**Work Order: W16C101**

**Client: Director's Office**  
**Received: 03/10/16 14:15**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

Field Duplicate : W16C101-02

2-Methylnaphthalene	ND ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	0.041 ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	0.046 ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	0.16 ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Diethyl phthalate	ND ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	2.3 ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.7 ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.21 ug/L	0.229	93%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.28 ug/L	0.229	124%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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Project: **Portland Harbor**  
Work Order: **W16C101**

Client: Director's Office  
Received: 03/10/16 14:15

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B16C238</b>										
<b>Blank (B16C238-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					03/14/16 :03/14/16	
<b>LCS (B16C238-BS1)</b>										
Total suspended solids	97	mg/L			100		97% (90-110)		03/14/16 :03/14/16	
<b>Duplicate (B16C238-DUP1) Source: W16C101-01</b>										
Total suspended solids	61	mg/L	2	2		59	4 (20)		03/14/16 :03/14/16	
<b>Duplicate (B16C238-DUP2) Source: W16C126-18</b>										
Total suspended solids	12	mg/L	2	2		12	0 (20)		03/14/16 :03/14/16	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B16C197</b>										
<b>Blank (B16C197-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					03/11/16 :03/11/16	
Cadmium	ND	ug/L	0.100	0.100					03/11/16 :03/11/16	
Chromium	ND	ug/L	0.200	0.200					03/11/16 :03/11/16	
Copper	ND	ug/L	0.200	0.200					03/11/16 :03/11/16	
Lead	ND	ug/L	0.100	0.100					03/11/16 :03/11/16	
Nickel	ND	ug/L	0.200	0.200					03/11/16 :03/11/16	
Silver	ND	ug/L	0.100	0.100					03/11/16 :03/11/16	
Zinc	ND	ug/L	0.500	0.500					03/11/16 :03/11/16	
<b>LCS (B16C197-BS1)</b>										
Arsenic	10.6	ug/L	0.100	0.100	10.0		106% (85-115)		03/11/16 :03/11/16	
Cadmium	10.6	ug/L	0.100	0.100	10.0		106% (85-115)		03/11/16 :03/11/16	
Chromium	10.2	ug/L	0.200	0.200	10.0		102% (85-115)		03/11/16 :03/11/16	
Copper	10.4	ug/L	0.200	0.200	10.0		104% (85-115)		03/11/16 :03/11/16	
Lead	10.6	ug/L	0.100	0.100	10.0		106% (85-115)		03/11/16 :03/11/16	
Nickel	10.4	ug/L	0.200	0.200	10.0		104% (85-115)		03/11/16 :03/11/16	
Silver	10.8	ug/L	0.100	0.100	10.0		108% (85-115)		03/11/16 :03/11/16	
Zinc	52.9	ug/L	0.500	0.500	50.0		106% (85-115)		03/11/16 :03/11/16	
<b>Duplicate (B16C197-DUP2) Source: W16C091-09</b>										
Arsenic	0.275	ug/L	0.100	0.100		0.269	2 (20)		03/11/16 :03/11/16	
Cadmium	ND	ug/L	0.100	0.100		ND	(20)		03/11/16 :03/11/16	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16C101**

**Client: Director's Office**  
**Received: 03/10/16 14:15**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16C197**

<b>Duplicate (B16C197-DUP2)</b>		<b>Source: W16C091-09</b>								
Chromium	0.668	ug/L	0.200	0.200		0.644		4 (20)	03/11/16 :03/11/16	
Copper	5.11	ug/L	0.200	0.200		4.83		6 (20)	03/11/16 :03/11/16	
Lead	2.14	ug/L	0.100	0.100		2.03		5 (20)	03/11/16 :03/11/16	
Nickel	0.621	ug/L	0.200	0.200		0.618		0.4 (20)	03/11/16 :03/11/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	03/11/16 :03/11/16	
Zinc	45.9	ug/L	0.500	0.500		44.3		4 (20)	03/11/16 :03/11/16	

<b>Duplicate (B16C197-DUP3)</b>		<b>Source: W16C092-09</b>								
Arsenic	1.26	ug/L	0.100	0.100		1.28		2 (20)	03/11/16 :03/11/16	
Cadmium	0.142	ug/L	0.100	0.100		0.148		4 (20)	03/11/16 :03/11/16	
Chromium	4.43	ug/L	0.200	0.200		4.55		2 (20)	03/11/16 :03/11/16	
Copper	8.01	ug/L	0.200	0.200		7.85		2 (20)	03/11/16 :03/11/16	
Lead	8.51	ug/L	0.100	0.100		8.69		2 (20)	03/11/16 :03/11/16	
Nickel	3.38	ug/L	0.200	0.200		3.42		1 (20)	03/11/16 :03/11/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	03/11/16 :03/11/16	
Zinc	62.7	ug/L	0.500	0.500		62.6		0.2 (20)	03/11/16 :03/11/16	

<b>Duplicate (B16C197-DUP5)</b>		<b>Source: W16C093-03</b>								
Arsenic	0.175	ug/L	0.100	0.100		0.174		0.8 (20)	03/11/16 :03/11/16	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	03/11/16 :03/11/16	
Chromium	0.308	ug/L	0.200	0.200		0.289		6 (20)	03/11/16 :03/11/16	
Copper	3.21	ug/L	0.200	0.200		3.12		3 (20)	03/11/16 :03/11/16	
Lead	1.70	ug/L	0.100	0.100		1.63		4 (20)	03/11/16 :03/11/16	
Nickel	0.437	ug/L	0.200	0.200		0.422		4 (20)	03/11/16 :03/11/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	03/11/16 :03/11/16	
Zinc	32.3	ug/L	0.500	0.500		31.4		3 (20)	03/11/16 :03/11/16	

<b>Matrix Spike (B16C197-MS1)</b>		<b>Source: W16C091-09</b>								
Arsenic	10.2	ug/L	0.100	0.100	10.0	0.269	99% (70-130)		03/11/16 :03/11/16	
Cadmium	9.91	ug/L	0.100	0.100	10.0	ND	99% (70-130)		03/11/16 :03/11/16	
Chromium	10.3	ug/L	0.200	0.200	10.0	0.644	96% (70-130)		03/11/16 :03/11/16	
Copper	14.7	ug/L	0.200	0.200	10.0	4.83	98% (70-130)		03/11/16 :03/11/16	
Lead	12.1	ug/L	0.100	0.100	10.0	2.03	100% (70-130)		03/11/16 :03/11/16	
Nickel	10.5	ug/L	0.200	0.200	10.0	0.618	99% (70-130)		03/11/16 :03/11/16	
Silver	10.0	ug/L	0.100	0.100	10.0	ND	100% (70-130)		03/11/16 :03/11/16	
Zinc	93.6	ug/L	0.500	0.500	50.0	44.3	99% (70-130)		03/11/16 :03/11/16	

<b>Matrix Spike (B16C197-MS2)</b>		<b>Source: W16C092-09</b>								
Arsenic	10.8	ug/L	0.100	0.100	10.0	1.28	95% (70-130)		03/11/16 :03/11/16	
Cadmium	9.84	ug/L	0.100	0.100	10.0	0.148	97% (70-130)		03/11/16 :03/11/16	
Chromium	14.2	ug/L	0.200	0.200	10.0	4.55	97% (70-130)		03/11/16 :03/11/16	
Copper	16.9	ug/L	0.200	0.200	10.0	7.85	90% (70-130)		03/11/16 :03/11/16	
Lead	18.2	ug/L	0.100	0.100	10.0	8.69	95% (70-130)		03/11/16 :03/11/16	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16C101**

**Client: Director's Office**  
**Received: 03/10/16 14:15**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16C197**

<b>Matrix Spike (B16C197-MS2)</b>		<b>Source: W16C092-09</b>								
Nickel	13.0 ug/L	0.200	0.200	10.0	3.42	96% (70-130)		03/11/16 :03/11/16		
Silver	9.83 ug/L	0.100	0.100	10.0	ND	98% (70-130)		03/11/16 :03/11/16		
Zinc	107 ug/L	0.500	0.500	50.0	62.6	89% (70-130)		03/11/16 :03/11/16		

<b>Matrix Spike (B16C197-MS3)</b>		<b>Source: W16C093-03</b>								
Arsenic	9.73 ug/L	0.100	0.100	10.0	0.174	96% (70-130)		03/11/16 :03/11/16		
Cadmium	9.66 ug/L	0.100	0.100	10.0	ND	97% (70-130)		03/11/16 :03/11/16		
Chromium	9.50 ug/L	0.200	0.200	10.0	0.289	92% (70-130)		03/11/16 :03/11/16		
Copper	12.6 ug/L	0.200	0.200	10.0	3.12	94% (70-130)		03/11/16 :03/11/16		
Lead	11.3 ug/L	0.100	0.100	10.0	1.63	97% (70-130)		03/11/16 :03/11/16		
Nickel	9.85 ug/L	0.200	0.200	10.0	0.422	94% (70-130)		03/11/16 :03/11/16		
Silver	9.93 ug/L	0.100	0.100	10.0	ND	99% (70-130)		03/11/16 :03/11/16		
Zinc	78.6 ug/L	0.500	0.500	50.0	31.4	94% (70-130)		03/11/16 :03/11/16		

**Total Metals by ICPMS - Batch B16C204**

<b>Blank (B16C204-BLK1)</b>										
Mercury	ND ug/L	0.000900	0.000900					03/11/16 :03/14/16		

<b>LCS (B16C204-BS1)</b>										
Mercury	0.00974 ug/L	0.000900	0.000900	0.0100		97% (85-125)		03/11/16 :03/14/16		

<b>Duplicate (B16C204-DUP1)</b>		<b>Source: W16C093-01</b>								
Mercury	0.00526 ug/L	0.00100	0.00100		0.00515		2 (20)	03/11/16 :03/14/16		

<b>Matrix Spike (B16C204-MS1)</b>		<b>Source: W16C093-01</b>								
Mercury	0.0263 ug/L	0.00100	0.00100	0.0222	0.00515	95% (70-130)		03/11/16 :03/14/16		

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**Project: Portland Harbor**  
**Work Order: W16C101**

**Client: Director's Office**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16C276**

**Blank (B16C276-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					03/16/16 :03/17/16	
Acenaphthylene	ND	ug/L	0.020	0.020					03/16/16 :03/17/16	
Anthracene	ND	ug/L	0.020	0.020					03/16/16 :03/17/16	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Chrysene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Fluoranthene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Fluorene	ND	ug/L	0.020	0.020					03/16/16 :03/17/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					03/16/16 :03/17/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					03/16/16 :03/17/16	
Naphthalene	ND	ug/L	0.040	0.040					03/16/16 :03/17/16	
Phenanthrene	ND	ug/L	0.020	0.020					03/16/16 :03/17/16	
Pyrene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					03/16/16 :03/17/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					03/16/16 :03/17/16	
Diethyl phthalate	ND	ug/L	1.0	0.50					03/16/16 :03/17/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					03/16/16 :03/17/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					03/16/16 :03/17/16	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					03/16/16 :03/17/16	

**Surrogate**

2-Methylnaphthalene-d10	0.23	ug/L			0.229		102% (60.4-153)		03/16/16 :03/17/16	
Fluoranthene-d10	0.32	ug/L			0.229		139% (69-149)		03/16/16 :03/17/16	

**LCS (B16C276-BS1)**

Acenaphthene	0.505	ug/L	0.020	0.020	0.457		110% (58.8-155)		03/16/16 :03/17/16	
Acenaphthylene	0.552	ug/L	0.020	0.020	0.457		121% (64-155)		03/16/16 :03/17/16	
Anthracene	0.522	ug/L	0.020	0.020	0.457		114% (76.2-129)		03/16/16 :03/17/16	
Benzo(a)anthracene	0.542	ug/L	0.010	0.010	0.457		118% (72.9-138)		03/16/16 :03/17/16	
Benzo(a)pyrene	0.501	ug/L	0.010	0.010	0.457		110% (75.5-137)		03/16/16 :03/17/16	
Benzo(b)fluoranthene	0.487	ug/L	0.010	0.010	0.457		107% (59.9-160)		03/16/16 :03/17/16	
Benzo(g,h,i)perylene	0.451	ug/L	0.010	0.010	0.457		99% (70.1-134)		03/16/16 :03/17/16	
Benzo(k)fluoranthene	0.459	ug/L	0.010	0.010	0.457		100% (61.1-157)		03/16/16 :03/17/16	
Chrysene	0.499	ug/L	0.010	0.010	0.457		109% (76.7-146)		03/16/16 :03/17/16	
Dibenzo(a,h)anthracene	0.449	ug/L	0.010	0.010	0.457		98% (63.9-140)		03/16/16 :03/17/16	
Fluoranthene	0.573	ug/L	0.010	0.010	0.457		125% (77.5-134)		03/16/16 :03/17/16	
Fluorene	0.518	ug/L	0.020	0.020	0.457		113% (61.2-157)		03/16/16 :03/17/16	

Reported: 04/07/16 13:44

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16C101**

**Client: Director's Office**  
**Received: 03/10/16 14:15**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16C276**

**LCS (B16C276-BS1)**

Indeno(1,2,3-cd)pyrene	0.458	ug/L	0.010	0.010	0.457		100% (68.4-135)		03/16/16 :03/17/16	
1-Methylnaphthalene	0.487	ug/L	0.040	0.040	0.457		106% (79.6-158)		03/16/16 :03/17/16	
2-Methylnaphthalene	0.481	ug/L	0.040	0.040	0.457		105% (76-161)		03/16/16 :03/17/16	
Naphthalene	0.486	ug/L	0.040	0.040	0.457		106% (60.6-164)		03/16/16 :03/17/16	
Phenanthrene	0.498	ug/L	0.020	0.020	0.457		109% (77.4-140)		03/16/16 :03/17/16	
Pyrene	0.582	ug/L	0.010	0.010	0.457		127% (81.1-141)		03/16/16 :03/17/16	
Butyl benzyl phthalate	5.54	ug/L	1.0	0.50	4.57		121% (54.7-176)		03/16/16 :03/17/16	V1
Di-n-butyl phthalate	6.31	ug/L	1.0	0.50	4.57		138% (74.3-149)		03/16/16 :03/17/16	V1
Diethyl phthalate	6.06	ug/L	1.0	0.50	4.57		133% (75.5-173)		03/16/16 :03/17/16	
Dimethyl phthalate	5.80	ug/L	1.0	0.50	4.57		127% (81.6-148)		03/16/16 :03/17/16	
Di-n-octyl phthalate	5.82	ug/L	1.0	0.50	4.57		127% (60.2-155)		03/16/16 :03/17/16	V1
Bis(2-ethylhexyl) phthalate	5.53	ug/L	1.0	0.50	4.57		121% (64.4-162)		03/16/16 :03/17/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.25	ug/L			0.229		109% (60.4-153)		03/16/16 :03/17/16	
Fluoranthene-d10	0.32	ug/L			0.229		140% (69-149)		03/16/16 :03/17/16	

**Duplicate (B16C276-DUP1)**

**Source: W16C092-12**

Acenaphthene	ND	ug/L	0.020	0.020		ND	(50)		03/16/16 :03/17/16	
Acenaphthylene	ND	ug/L	0.020	0.020		ND	(50)		03/16/16 :03/17/16	
Anthracene	0.0211	ug/L	0.020	0.020		ND	(50)		03/16/16 :03/17/16	
Benzo(a)anthracene	0.0171	ug/L	0.010	0.010	0.0103		50 (50)		03/16/16 :03/17/16	M1
Benzo(a)pyrene	0.0200	ug/L	0.010	0.010	0.0143		33 (50)		03/16/16 :03/17/16	
Benzo(b)fluoranthene	0.0371	ug/L	0.010	0.010	0.0297		22 (50)		03/16/16 :03/17/16	
Benzo(g,h,i)perylene	0.0303	ug/L	0.010	0.010	0.0257		16 (50)		03/16/16 :03/17/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010		ND	(50)		03/16/16 :03/17/16	
Chrysene	0.0240	ug/L	0.010	0.010	0.0217		10 (50)		03/16/16 :03/17/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010		ND	(50)		03/16/16 :03/17/16	
Fluoranthene	0.0571	ug/L	0.010	0.010	0.0491		15 (50)		03/16/16 :03/17/16	
Fluorene	ND	ug/L	0.020	0.020		ND	(50)		03/16/16 :03/17/16	
Indeno(1,2,3-cd)pyrene	0.0114	ug/L	0.010	0.010		ND	(50)		03/16/16 :03/17/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040		ND	(50)		03/16/16 :03/17/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040		ND	(50)		03/16/16 :03/17/16	
Naphthalene	ND	ug/L	0.040	0.040		ND	(50)		03/16/16 :03/17/16	
Phenanthrene	0.0297	ug/L	0.020	0.020	0.0286		4 (50)		03/16/16 :03/17/16	
Pyrene	0.0857	ug/L	0.010	0.010	0.0731		16 (50)		03/16/16 :03/17/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50		ND	(50)		03/16/16 :03/17/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50		ND	(50)		03/16/16 :03/17/16	
Diethyl phthalate	ND	ug/L	1.0	0.50		ND	(50)		03/16/16 :03/17/16	
Dimethyl phthalate	2.60	ug/L	1.0	0.50	2.58		0.7 (50)		03/16/16 :03/17/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50		ND	(50)		03/16/16 :03/17/16	
Bis(2-ethylhexyl) phthalate	0.815	ug/L	1.0	0.50	0.894		9 (50)		03/16/16 :03/17/16	J

Reported: 04/07/16 13:44

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16C101**

**Client: Director's Office**  
**Received: 03/10/16 14:15**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16C276**

**Duplicate (B16C276-DUP1)**

**Source: W16C092-12**

**Surrogate**

2-Methylnaphthalene-d10	0.21	ug/L			0.229		94% (60.4-153)		03/16/16 :03/17/16	
Fluoranthene-d10	0.30	ug/L			0.229		130% (69-149)		03/16/16 :03/17/16	

**Matrix Spike (B16C276-MS1)**

**Source: W16C092-12**

Acenaphthene	0.479	ug/L	0.020	0.020	0.457	ND	105% (58.8-155)		03/16/16 :03/17/16	
Acenaphthylene	0.451	ug/L	0.020	0.020	0.457	ND	99% (64-155)		03/16/16 :03/17/16	
Anthracene	0.498	ug/L	0.020	0.020	0.457	ND	109% (76.2-129)		03/16/16 :03/17/16	
Benzo(a)anthracene	0.521	ug/L	0.010	0.010	0.457	0.0103	112% (72.9-138)		03/16/16 :03/17/16	
Benzo(a)pyrene	0.461	ug/L	0.010	0.010	0.457	0.0143	98% (75.5-137)		03/16/16 :03/17/16	
Benzo(b)fluoranthene	0.458	ug/L	0.010	0.010	0.457	0.0297	94% (59.9-160)		03/16/16 :03/17/16	
Benzo(g,h,i)perylene	0.394	ug/L	0.010	0.010	0.457	0.0257	81% (70.1-134)		03/16/16 :03/17/16	
Benzo(k)fluoranthene	0.409	ug/L	0.010	0.010	0.457	ND	89% (61.1-157)		03/16/16 :03/17/16	
Chrysene	0.497	ug/L	0.010	0.010	0.457	0.0217	104% (76.7-146)		03/16/16 :03/17/16	
Dibenzo(a,h)anthracene	0.371	ug/L	0.010	0.010	0.457	ND	81% (63.9-140)		03/16/16 :03/17/16	
Fluoranthene	0.564	ug/L	0.010	0.010	0.457	0.0491	113% (77.5-134)		03/16/16 :03/17/16	
Fluorene	0.479	ug/L	0.020	0.020	0.457	ND	105% (61.2-157)		03/16/16 :03/17/16	
Indeno(1,2,3-cd)pyrene	0.385	ug/L	0.010	0.010	0.457	ND	84% (68.4-135)		03/16/16 :03/17/16	
1-Methylnaphthalene	0.427	ug/L	0.040	0.040	0.457	ND	94% (79.6-159)		03/16/16 :03/17/16	
2-Methylnaphthalene	0.425	ug/L	0.040	0.040	0.457	ND	93% (76-161)		03/16/16 :03/17/16	
Naphthalene	0.458	ug/L	0.040	0.040	0.457	ND	100% (60.6-164)		03/16/16 :03/17/16	
Phenanthrene	0.493	ug/L	0.020	0.020	0.457	0.0286	102% (77.4-140)		03/16/16 :03/17/16	
Pyrene	0.593	ug/L	0.010	0.010	0.457	0.0731	114% (81.1-141)		03/16/16 :03/17/16	
Butyl benzyl phthalate	6.31	ug/L	1.0	0.50	4.57	ND	138% (54.7-176)		03/16/16 :03/17/16	V1
Di-n-butyl phthalate	5.87	ug/L	1.0	0.50	4.57	ND	128% (74.3-149)		03/16/16 :03/17/16	V1
Diethyl phthalate	5.50	ug/L	1.0	0.50	4.57	ND	120% (75.5-173)		03/16/16 :03/17/16	
Dimethyl phthalate	7.97	ug/L	1.0	0.50	4.57	2.58	118% (81.6-148)		03/16/16 :03/17/16	
Di-n-octyl phthalate	4.38	ug/L	1.0	0.50	4.57	ND	96% (60.2-155)		03/16/16 :03/17/16	V1
Bis(2-ethylhexyl) phthalate	5.19	ug/L	1.0	0.50	4.57	0.894	94% (64.4-162)		03/16/16 :03/17/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.22	ug/L			0.229		96% (60.4-153)		03/16/16 :03/17/16	
Fluoranthene-d10	0.29	ug/L			0.229		126% (69-149)		03/16/16 :03/17/16	

Reported: 04/07/16 13:44

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W16C101**

Client: Director's Office  
Received: 03/10/16 14:15

**Qualifiers**

- J Analyte was detected but at a concentration below the reporting limit; the result is an estimate.
- M1 Matrix duplicate precision measurement indicates non-homogeneous sample matrix. Sample result should be considered an estimate.
- V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.

**Definitions**

- |        |   |     |  |
|--------|---|-----|--|
| DET    | Analyte Detected                          | ND  | Analyte Not Detected at or above the reporting limit |
| MRL    | Method Reporting Limit                    | MDL | Method Detection Limit                               |
| NR     | Not Reportable                            | dry | Sample results reported on a dry weight basis        |
| % Rec. | Percent Recovery                          | RPD | Relative Percent Difference                          |
| *      | This analyte is not certified under NELAP |     |  |

Reported: 04/07/16 13:44

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Jennifer Shackelford, Laboratory Coordinator QA/QC







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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

April 07, 2016

**Analytical Report for Service Request No: K1602547**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W16C101**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory March 11, 2016  
For your reference, these analyses have been assigned our service request number **K1602547**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

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Acronyms

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State Certifications, Accreditations, And Licenses

Chain of Custody

Subcontract Lab Results

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
Idaho DHW	<a href="http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx">http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L14-50
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Michigan DEQ	<a href="http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html">http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html</a>	9949
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wisconsin DNR	<a href="http://dnr.wi.gov/">http://dnr.wi.gov/</a>	998386840
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

**SUBCONTRACT ORDER**  
**City of Portland Water Pollution Control Lab**  
**W16C101**

*K1602547*

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

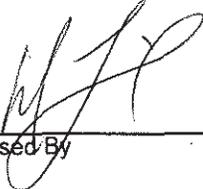
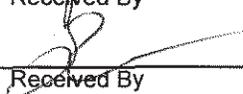
ALS Environmental  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

**WPCL Project Name**  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>	
<input checked="" type="checkbox"/> Standard	
<input type="checkbox"/> Rush _ day(s)	

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W16C101-01</b>	<b>Water</b>	<b>Sampled:03/10/16 03:03</b>		
Out-PCB Congeners 209	03/24/16 17:00	09/06/16 03:03		
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16C101-02</b>	<b>Water</b>	<b>Sampled:03/10/16 00:00</b>		<b>No time given</b>
Out-PCB Congeners 209	03/24/16 17:00	09/06/16 00:00		
<i>Containers Supplied:</i> G amber 1L (A)				

*ALS called 3/11/16 @ 0830 m2*

	<i>3/11/16</i>		<i>ALS 3/11/16 10:50</i>
Released By	Date	Received By	Date
			<i>3/11/16 1510</i>
Released By	Date	Received By	Date



PC H2

### Cooler Receipt and Preservation Form

Client City of PDX Service Request K16 08647  
 Received: 3/11/16 Opened: 3/11/16 By: [Signature] Unloaded: 3/11/16 By: [Signature]

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* Courier *Hand Delivered*  
 2. Samples were received in: (circle) Cooler *Box* *Envelope* *Other* NA  
 3. Were custody seals on coolers? *NA* *Y* N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? *Y* *N* If present, were they signed and dated? *Y* *N*

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
11.8	11.8	—	—	0	328	NA	NA	

4. Packing material: *Inserts* *Baggies* Bubble Wrap *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* \_\_\_\_\_  
 5. Were custody papers properly filled out (ink, signed, etc.)? *NA* Y *N*  
 6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* *NA* Y *N*  
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? *NA* Y *N*  
 8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* *NA* Y *N*  
 9. Were appropriate bottles/containers and volumes received for the tests indicated? *NA* Y *N*  
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* ~~NA~~ *Y* *N*  
 11. Were VOA vials received without headspace? *Indicate in the table below.* NA *Y* *N*  
 12. Was C12/Res negative? *NA* Y *N*

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Report Prepared for:**

Accounts Payable  
ALS Environmental  
1317 South 13th Avenue  
Kelso WA 98626

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Prepared Date:**

April 5, 2016

**Report Information:**

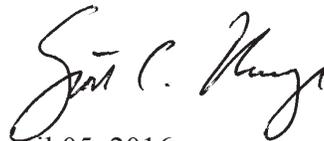
**Pace Project #: 10341471**  
**Sample Receipt Date: 03/15/2016**  
**Client Project #: K1602547**  
**Client Sub PO #: 51K1602547**  
**State Cert #: C755**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



April 05, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.



## **DISCUSSION**

This report presents the results from the analyses performed on two samples submitted by a representative of ALS Environmental. The samples were analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the amount of sample extracted.

The isotopically-labeled PCB internal standards in the sample extracts were recovered at 34-95%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the sample material.

Laboratory spike samples were also prepared with the sample batch using reference material that had been fortified with native standards. The results show that the spiked native compounds were recovered at 96-118%, with relative percent differences of 0.0-5.0%. These results were within the target ranges for this method. Matrix spikes were not prepared with the sample batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE	MN002
California	01155CA	New York (NEL	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia	9952C
Maryland	322	Wisconsin	999407970
Michigan	9909	Wyoming	8TMS-Q
Minnesota	027-053-137		

## REPORT OF LABORATORY ANALYSIS

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Report No.....10341471

# Appendix A

## Sample Management

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

10341471

Project Number: K1602547  
 Project Manager: Howard Holmes  
 L: LAB QAP  
 QAP:

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Lab ID
				Date	Time		
K1602547-001	W16C101-01	1	Water	3/10/16	0303	Pace MN	X
K1602547-002	W16C101-02	1	Water	3/10/16	0000	Pace MN	X

Cl Biphen Cong  
1668A

**Folder Comments:**

~~Report Issues on Wet Weight basis - 668 to WKL only~~  
 Tier II

**Special Instructions/Comments**

Please provide the electronic (PDF and EDD) report to the following e-mail address:  
 ALKLS.Data@alsglobal.com.

*Copy of Portland EDD  
 Full list 209 congeners*

P - Test is On Hold P - Test is Authorized for Prep Only

Inquired By: *DD* 3/14/16 1151 Received By: *[Signature]* 3.15.16 10:00

Airbill Number: *AT*

T = 3.1 °C

<b>Turnaround Requirements</b> RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD Requested FAX Date: _____ Requested Report Date: 03/28/16	<b>Report Requirements</b> I. Results Only _____ II. Results + QC Summaries <input checked="" type="checkbox"/> III. Results + QC and Calibration Summaries _____ IV. Data Validation Report with Raw Data _____ PQL/MDL/ Y EDD Y	<b>Invoice Information</b> PO# 51K1602547 Bill to



# PURCHASE ORDER

FOR SUBCONTRACTED ANALYSES

Service Request: K1602547

**Date:** 3/14/2016  
**Contact:** Howard Holmes  
**Email:** howard.holmes@alsglobal.com

**Company:** Pace Analytical Services  
**Address:** 1700 Elm Street, Suite 200  
Minneapolis MN, 55414  
**Phone:** 612.607.1700

**Bill To:** ALS Environmental  
1317 South 13th Avenue  
Kelso WA, 98626

**Ship To:** ALS Environmental  
ALKLS.Data@alsglobal.com

**Phone:** 1-360-577-7222

**Phone:** 360-501-3364

Item/Description	Quantity	Unit Price
1668A/Cl Biphem Cong	2	[REDACTED]

Comments:

ALS Group USA, Corp.  
www.alsglobal.com  
An ALS Limited Company

**Sample Condition Upon Receipt**

Client Name: **ALS Environmental** Project #: \_\_\_\_\_

WO#: **10341471**  
  
 10341471

Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  SpeedDee  Other: \_\_\_\_\_  
 Tracking Number: **6447 9271 3325**

Custody Seal on Cooler/Box Present?  Yes  No Seals Intact?  Yes  No  
 Optional: Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_

Packing Material:  Bubble Wrap  Bubble Bags  None  Other: **bottle holders** Temp Blank?  Yes  No

Thermometer Used:  151401163  151401164  B88A912167504  B88A0143310098  
 Type of Ice:  Wet  Blue  None  Samples on ice, cooling process has begun

Cooler Temp Read (°C): **3.0** Cooler Temp Corrected (°C): **3.1** Biological Tissue Frozen?  Yes  No  N/A  
 Temp should be above freezing to 6°C Correction Factor: **+0.1** Date and Initials of Person Examining Contents: **KAC 3-15-16**

USDA Regulated Soil (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)?  Yes  No  
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
 If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

		COMMENTS:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <b>WT</b>		
All containers needing acid/base preservation have been checked?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
HeadSpace in VOA Vials (>6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Pace Trip Blank Lot # (if purchased): _____		

**CLIENT NOTIFICATION/RESOLUTION**

Field Data Required?  Yes  No

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Comments/Resolution: \_\_\_\_\_

Project Manager Review: **[Signature]** Date: **3/15/16**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

### REPORT OF LABORATORY ANALYSIS

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Report No.....10341471

# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602547-001		
Lab Sample ID	10341471001		
Filename	P160403A_08		
Injected By	BAL		
Total Amount Extracted	1010 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/10/2016 03:03
ICAL ID	P160403A02	Received	03/15/2016 10:00
CCal Filename(s)	P160403A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/03/2016 17:26

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.765	3.28	2.0	1.01	50
13C-4-MoCB	3	11.485	2.91	2.0	0.685	34
13C-2,2'-DiCB	4	11.724	1.55	2.0	0.894	45
13C-4,4'-DiCB	15	18.372	1.62	2.0	1.55	78
13C-2,2',6-TrCB	19	15.209	1.04	2.0	1.43	72
13C-3,4,4'-TrCB	37	25.972	1.09	2.0	1.61	80
13C-2,2',6,6'-TeCB	54	18.643	0.78	2.0	1.32	66
13C-3,4,4',5'-TeCB	81	33.037	0.82	2.0	1.75	88
13C-3,3',4,4'-TeCB	77	33.641	0.82	2.0	1.71	86
13C-2,2',4,6,6'-PeCB	104	24.613	1.64	2.0	1.46	73
13C-2,3,3',4,4'-PeCB	105	37.218	1.59	2.0	1.67	83
13C-2,3,4,4',5'-PeCB	114	36.548	1.66	2.0	1.72	86
13C-2,3',4,4',5'-PeCB	118	35.994	1.61	2.0	1.73	86
13C-2,3',4,4',5'-PeCB	123	35.659	1.58	2.0	1.80	90
13C-3,3',4,4',5'-PeCB	126	40.405	1.58	2.0	1.74	87
13C-2,2',4,4',6,6'-HxCB	155	30.588	1.33	2.0	1.72	86
13C-HxCB (156/157)	156/157	43.429	1.30	4.0	3.32	83
13C-2,3',4,4',5,5'-HxCB	167	42.271	1.28	2.0	1.65	83
13C-3,3',4,4',5,5'-HxCB	169	46.766	1.30	2.0	1.65	83
13C-2,2',3,4',5,6,6'-HpCB	188	36.480	1.07	2.0	1.81	90
13C-2,3,3',4,4',5,5'-HpCB	189	49.279	1.05	2.0	1.84	92
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.936	0.92	2.0	1.89	95
13C-2,3,3',4,4',5,5',6-OxCB	205	51.973	0.89	2.0	1.64	82
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.892	0.78	2.0	1.45	73
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.718	0.80	2.0	1.63	82
13C--DeCB	209	55.854	0.72	2.0	1.72	86
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.678	1.07	2.0	1.81	90
13C-2,3,3',5,5'-PeCB	111	33.641	1.59	2.0	1.74	87
13C-2,2',3,3',5,5',6-HpCB	178	39.600	1.05	2.0	1.93	96
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.963	1.60	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.624	0.78	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.840	1.65	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.164	1.28	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.456	0.92	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID      K1602547-001  
Lab Sample ID        10341471001  
Filename                P160403A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.247
2		---	---	ND	---	0.247
3		---	---	ND	---	0.247
4		---	---	ND	---	0.247
5		---	---	ND	---	0.247
6		---	---	ND	---	0.247
7		---	---	ND	---	0.247
8		---	---	ND	---	0.247
9		---	---	ND	---	0.247
10		---	---	ND	---	0.247
11		---	---	ND	---	2.42
12	12/13	---	---	ND	---	0.495
13	12/13	---	---	ND	---	0.495
14		---	---	ND	---	0.247
15		---	---	ND	---	0.327
16		---	---	ND	---	0.247
17		---	---	ND	---	0.247
18	18/30	---	---	ND	---	0.495
19		---	---	ND	---	0.247
20	20/28	---	---	ND	---	1.28
21	21/33	---	---	ND	---	1.34
22		---	---	ND	---	0.940
23		---	---	ND	---	0.247
24		---	---	ND	---	0.247
25		---	---	ND	---	0.247
26	26/29	---	---	ND	---	0.495
27		---	---	ND	---	0.247
28	20/28	---	---	ND	---	1.28
29	26/29	---	---	ND	---	0.495
30	18/30	---	---	ND	---	0.495
31		---	---	ND	---	1.29
32		---	---	ND	---	0.247
33	21/33	---	---	ND	---	1.34
34		---	---	ND	---	0.247
35		---	---	ND	---	0.247
36		---	---	ND	---	0.247
37		---	---	ND	---	0.524
38		---	---	ND	---	0.247
39		---	---	ND	---	0.247
40	40/41/71	---	---	ND	---	1.48
41	40/41/71	---	---	ND	---	1.48
42		---	---	ND	---	0.495
43	43/73	---	---	ND	---	0.495
44	44/47/65	---	---	ND	---	1.48
45	45/51	---	---	ND	---	0.989
46		---	---	ND	---	0.495
47	44/47/65	---	---	ND	---	1.48
48		---	---	ND	---	0.495

Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602547-001  
Lab Sample ID 10341471001  
Filename P160403A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.989
50	50/53	---	---	ND	---	0.989
51	45/51	---	---	ND	---	0.989
52		---	---	ND	---	1.52
53	50/53	---	---	ND	---	0.989
54		---	---	ND	---	0.495
55		---	---	ND	---	0.495
56		---	---	ND	---	0.495
57		---	---	ND	---	0.495
58		---	---	ND	---	0.495
59	59/62/75	---	---	ND	---	1.48
60		---	---	ND	---	0.495
61	61/70/74/76	---	---	ND	---	1.98
62	59/62/75	---	---	ND	---	1.48
63		---	---	ND	---	0.495
64		---	---	ND	---	0.495
65	44/47/65	---	---	ND	---	1.48
66		---	---	ND	---	0.831
67		---	---	ND	---	0.495
68		---	---	ND	---	0.495
69	49/69	---	---	ND	---	0.989
70	61/70/74/76	---	---	ND	---	1.98
71	40/41/71	---	---	ND	---	1.48
72		---	---	ND	---	0.495
73	43/73	---	---	ND	---	0.495
74	61/70/74/76	---	---	ND	---	1.98
75	59/62/75	---	---	ND	---	1.48
76	61/70/74/76	---	---	ND	---	1.98
77		---	---	ND	---	0.495
78		---	---	ND	---	0.495
79		---	---	ND	---	0.495
80		---	---	ND	---	0.495
81		---	---	ND	---	0.495
82		---	---	ND	---	0.495
83		---	---	ND	---	0.495
84		---	---	ND	---	0.495
85	85/116/117	---	---	ND	---	1.48
86	86/87/97/108/119/125	---	---	ND	---	2.97
87	86/87/97/108/119/125	---	---	ND	---	2.97
88	88/91	---	---	ND	---	0.989
89		---	---	ND	---	0.495
90	90/101/113	---	---	ND	---	1.48
91	88/91	---	---	ND	---	0.989
92		---	---	ND	---	0.495
93	93/98/100/102	---	---	ND	---	1.98
94		---	---	ND	---	0.495
95		---	---	ND	---	0.940
96		---	---	ND	---	0.495

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
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B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602547-001  
Lab Sample ID 10341471001  
Filename P160403A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.97
98	93/98/100/102	---	---	ND	---	1.98
99		---	---	ND	---	0.495
100	93/98/100/102	---	---	ND	---	1.98
101	90/101/113	---	---	ND	---	1.48
102	93/98/100/102	---	---	ND	---	1.98
103		---	---	ND	---	0.495
104		---	---	ND	---	0.495
105		---	---	ND	---	0.495
106		---	---	ND	---	0.495
107	107/124	---	---	ND	---	0.989
108	86/87/97/108/119/125	---	---	ND	---	2.97
109		---	---	ND	---	0.495
110	110/115	---	---	ND	---	0.989
111		---	---	ND	---	0.495
112		---	---	ND	---	0.495
113	90/101/113	---	---	ND	---	1.48
114		---	---	ND	---	0.495
115	110/115	---	---	ND	---	0.989
116	85/116/117	---	---	ND	---	1.48
117	85/116/117	---	---	ND	---	1.48
118		---	---	ND	---	0.633
119	86/87/97/108/119/125	---	---	ND	---	2.97
120		---	---	ND	---	0.495
121		---	---	ND	---	0.495
122		---	---	ND	---	0.495
123		---	---	ND	---	0.495
124	107/124	---	---	ND	---	0.989
125	86/87/97/108/119/125	---	---	ND	---	2.97
126		---	---	ND	---	0.495
127		---	---	ND	---	0.495
128	128/166	---	---	ND	---	0.989
129	129/138/163	---	---	ND	---	1.48
130		---	---	ND	---	0.495
131		---	---	ND	---	0.495
132		---	---	ND	---	0.495
133		---	---	ND	---	0.495
134	134/143	---	---	ND	---	0.989
135	135/151	---	---	ND	---	0.989
136		---	---	ND	---	0.495
137		---	---	ND	---	0.495
138	129/138/163	---	---	ND	---	1.48
139	139/140	---	---	ND	---	0.989
140	139/140	---	---	ND	---	0.989
141		---	---	ND	---	0.495
142		---	---	ND	---	0.495
143	134/143	---	---	ND	---	0.989
144		---	---	ND	---	0.495

Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602547-001  
 Lab Sample ID        10341471001  
 Filename                P160403A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.495
146		---	---	ND	---	0.495
147	147/149	---	---	ND	---	0.989
148		---	---	ND	---	0.495
149	147/149	---	---	ND	---	0.989
150		---	---	ND	---	0.495
151	135/151	---	---	ND	---	0.989
152		---	---	ND	---	0.495
153	153/168	---	---	ND	---	0.989
154		---	---	ND	---	0.495
155		---	---	ND	---	0.495
156	156/157	---	---	ND	---	0.989
157	156/157	---	---	ND	---	0.989
158		---	---	ND	---	0.495
159		---	---	ND	---	0.495
160		---	---	ND	---	0.495
161		---	---	ND	---	0.495
162		---	---	ND	---	0.495
163	129/138/163	---	---	ND	---	1.48
164		---	---	ND	---	0.495
165		---	---	ND	---	0.495
166	128/166	---	---	ND	---	0.989
167		---	---	ND	---	0.495
168	153/168	---	---	ND	---	0.989
169		---	---	ND	---	0.495
170		---	---	ND	---	0.495
171	171/173	---	---	ND	---	0.989
172		---	---	ND	---	0.495
173	171/173	---	---	ND	---	0.989
174		---	---	ND	---	0.495
175		---	---	ND	---	0.495
176		---	---	ND	---	0.495
177		---	---	ND	---	0.495
178		---	---	ND	---	0.495
179		---	---	ND	---	0.495
180	180/193	---	---	ND	---	0.989
181		---	---	ND	---	0.495
182		---	---	ND	---	0.495
183	183/185	---	---	ND	---	0.989
184		---	---	ND	---	0.495
185	183/185	---	---	ND	---	0.989
186		---	---	ND	---	0.495
187		---	---	ND	---	0.495
188		---	---	ND	---	0.495
189		---	---	ND	---	0.495
190		---	---	ND	---	0.495
191		---	---	ND	---	0.495
192		---	---	ND	---	0.495

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
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 R = Recovery outside of Method 1668A control limits  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602547-001  
 Lab Sample ID        10341471001  
 Filename                P160403A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.989
194		---	---	ND	---	0.742
195		---	---	ND	---	0.742
196		---	---	ND	---	0.742
197	197/200	---	---	ND	---	1.48
198	198/199	---	---	ND	---	1.48
199	198/199	---	---	ND	---	1.48
200	197/200	---	---	ND	---	1.48
201		---	---	ND	---	0.742
202		---	---	ND	---	0.742
203		---	---	ND	---	0.742
204		---	---	ND	---	0.742
205		---	---	ND	---	0.742
206		---	---	ND	---	0.742
207		---	---	ND	---	0.742
208		---	---	ND	---	0.742
209		---	---	ND	---	0.742

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602547-001  
Lab Sample ID             10341471001  
Filename                    P160403A\_08

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602547-002		
Lab Sample ID	10341471002		
Filename	P160403A_09		
Injected By	BAL		
Total Amount Extracted	1010 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/10/2016
ICAL ID	P160403A02	Received	03/15/2016 10:00
CCal Filename(s)	P160403A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/03/2016 18:25

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.753	3.09	2.0	1.07	53
13C-4-MoCB	3	11.460	3.23	2.0	0.757	38
13C-2,2'-DiCB	4	11.700	1.58	2.0	0.948	47
13C-4,4'-DiCB	15	18.360	1.60	2.0	1.59	79
13C-2,2',6-TrCB	19	15.197	1.09	2.0	1.49	74
13C-3,4,4'-TrCB	37	25.972	1.05	2.0	1.53	76
13C-2,2',6,6'-TeCB	54	18.626	0.78	2.0	1.24	62
13C-3,4,4',5'-TeCB	81	33.037	0.80	2.0	1.66	83
13C-3,3',4,4'-TeCB	77	33.624	0.80	2.0	1.63	82
13C-2,2',4,6,6'-PeCB	104	24.596	1.57	2.0	1.49	75
13C-2,3,3',4,4'-PeCB	105	37.185	1.61	2.0	1.66	83
13C-2,3,4,4',5'-PeCB	114	36.531	1.64	2.0	1.73	86
13C-2,3',4,4',5'-PeCB	118	35.977	1.62	2.0	1.79	90
13C-2,3',4,4',5'-PeCB	123	35.642	1.62	2.0	1.77	88
13C-3,3',4,4',5'-PeCB	126	40.388	1.62	2.0	1.79	90
13C-2,2',4,4',6,6'-HxCB	155	30.572	1.29	2.0	1.73	86
13C-HxCB (156/157)	156/157	43.429	1.26	4.0	3.31	83
13C-2,3',4,4',5,5'-HxCB	167	42.255	1.27	2.0	1.65	82
13C-3,3',4,4',5,5'-HxCB	169	46.732	1.28	2.0	1.61	80
13C-2,2',3,4',5,6,6'-HpCB	188	36.464	1.06	2.0	1.84	92
13C-2,3,3',4,4',5,5'-HpCB	189	49.258	1.07	2.0	1.84	92
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.919	0.91	2.0	1.96	98
13C-2,3,3',4,4',5,5',6-OxCB	205	51.952	0.88	2.0	1.67	84
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.892	0.76	2.0	1.48	74
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.719	0.79	2.0	1.70	85
13C--DeCB	209	55.832	0.70	2.0	1.71	86
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.662	1.10	2.0	1.72	86
13C-2,3,3',5,5'-PeCB	111	33.624	1.63	2.0	1.76	88
13C-2,2',3,3',5,5',6-HpCB	178	39.583	1.06	2.0	1.90	95
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.939	1.61	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.607	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.823	1.58	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.147	1.29	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.413	0.90	2.0	NA	NA

Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602547-002  
 Lab Sample ID 10341471002  
 Filename P160403A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.249
2		---	---	ND	---	0.249
3		---	---	ND	---	0.249
4		---	---	ND	---	0.249
5		---	---	ND	---	0.249
6		---	---	ND	---	0.249
7		---	---	ND	---	0.249
8		---	---	ND	---	0.249
9		---	---	ND	---	0.249
10		---	---	ND	---	0.249
11		---	---	ND	---	2.44
12	12/13	---	---	ND	---	0.497
13	12/13	---	---	ND	---	0.497
14		---	---	ND	---	0.249
15		---	---	ND	---	0.328
16		---	---	ND	---	0.249
17		---	---	ND	---	0.249
18	18/30	---	---	ND	---	0.497
19		---	---	ND	---	0.249
20	20/28	---	---	ND	---	1.28
21	21/33	---	---	ND	---	1.34
22		---	---	ND	---	0.945
23		---	---	ND	---	0.249
24		---	---	ND	---	0.249
25		---	---	ND	---	0.249
26	26/29	---	---	ND	---	0.497
27		---	---	ND	---	0.249
28	20/28	---	---	ND	---	1.28
29	26/29	---	---	ND	---	0.497
30	18/30	---	---	ND	---	0.497
31		---	---	ND	---	1.29
32		---	---	ND	---	0.249
33	21/33	---	---	ND	---	1.34
34		---	---	ND	---	0.249
35		---	---	ND	---	0.249
36		---	---	ND	---	0.249
37		25.988	1.02	0.816	---	0.527
38		---	---	ND	---	0.249
39		---	---	ND	---	0.249
40	40/41/71	---	---	ND	---	1.49
41	40/41/71	---	---	ND	---	1.49
42		---	---	ND	---	0.497
43	43/73	---	---	ND	---	0.497
44	44/47/65	---	---	ND	---	1.49
45	45/51	---	---	ND	---	0.995
46		---	---	ND	---	0.497
47	44/47/65	---	---	ND	---	1.49
48		---	---	ND	---	0.497

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602547-002  
Lab Sample ID 10341471002  
Filename P160403A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.995
50	50/53	---	---	ND	---	0.995
51	45/51	---	---	ND	---	0.995
52		---	---	ND	---	1.53
53	50/53	---	---	ND	---	0.995
54		---	---	ND	---	0.497
55		---	---	ND	---	0.497
56		---	---	ND	---	0.497
57		---	---	ND	---	0.497
58		---	---	ND	---	0.497
59	59/62/75	---	---	ND	---	1.49
60		---	---	ND	---	0.497
61	61/70/74/76	---	---	ND	---	1.99
62	59/62/75	---	---	ND	---	1.49
63		---	---	ND	---	0.497
64		---	---	ND	---	0.497
65	44/47/65	---	---	ND	---	1.49
66		---	---	ND	---	0.836
67		---	---	ND	---	0.497
68		---	---	ND	---	0.497
69	49/69	---	---	ND	---	0.995
70	61/70/74/76	---	---	ND	---	1.99
71	40/41/71	---	---	ND	---	1.49
72		---	---	ND	---	0.497
73	43/73	---	---	ND	---	0.497
74	61/70/74/76	---	---	ND	---	1.99
75	59/62/75	---	---	ND	---	1.49
76	61/70/74/76	---	---	ND	---	1.99
77		---	---	ND	---	0.497
78		---	---	ND	---	0.497
79		---	---	ND	---	0.497
80		---	---	ND	---	0.497
81		---	---	ND	---	0.497
82		---	---	ND	---	0.497
83		---	---	ND	---	0.497
84		---	---	ND	---	0.497
85	85/116/117	---	---	ND	---	1.49
86	86/87/97/108/119/125	---	---	ND	---	2.98
87	86/87/97/108/119/125	---	---	ND	---	2.98
88	88/91	---	---	ND	---	0.995
89		---	---	ND	---	0.497
90	90/101/113	---	---	ND	---	1.49
91	88/91	---	---	ND	---	0.995
92		---	---	ND	---	0.497
93	93/98/100/102	---	---	ND	---	1.99
94		---	---	ND	---	0.497
95		---	---	ND	---	0.945
96		---	---	ND	---	0.497

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602547-002  
Lab Sample ID 10341471002  
Filename P160403A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.98
98	93/98/100/102	---	---	ND	---	1.99
99		---	---	ND	---	0.497
100	93/98/100/102	---	---	ND	---	1.99
101	90/101/113	---	---	ND	---	1.49
102	93/98/100/102	---	---	ND	---	1.99
103		---	---	ND	---	0.497
104		---	---	ND	---	0.497
105		---	---	ND	---	0.497
106		---	---	ND	---	0.497
107	107/124	---	---	ND	---	0.995
108	86/87/97/108/119/125	---	---	ND	---	2.98
109		---	---	ND	---	0.497
110	110/115	---	---	ND	---	0.995
111		---	---	ND	---	0.497
112		---	---	ND	---	0.497
113	90/101/113	---	---	ND	---	1.49
114		---	---	ND	---	0.497
115	110/115	---	---	ND	---	0.995
116	85/116/117	---	---	ND	---	1.49
117	85/116/117	---	---	ND	---	1.49
118		---	---	ND	---	0.637
119	86/87/97/108/119/125	---	---	ND	---	2.98
120		---	---	ND	---	0.497
121		---	---	ND	---	0.497
122		---	---	ND	---	0.497
123		---	---	ND	---	0.497
124	107/124	---	---	ND	---	0.995
125	86/87/97/108/119/125	---	---	ND	---	2.98
126		---	---	ND	---	0.497
127		---	---	ND	---	0.497
128	128/166	---	---	ND	---	0.995
129	129/138/163	---	---	ND	---	1.49
130		---	---	ND	---	0.497
131		---	---	ND	---	0.497
132		---	---	ND	---	0.497
133		---	---	ND	---	0.497
134	134/143	---	---	ND	---	0.995
135	135/151	---	---	ND	---	0.995
136		---	---	ND	---	0.497
137		---	---	ND	---	0.497
138	129/138/163	---	---	ND	---	1.49
139	139/140	---	---	ND	---	0.995
140	139/140	---	---	ND	---	0.995
141		---	---	ND	---	0.497
142		---	---	ND	---	0.497
143	134/143	---	---	ND	---	0.995
144		---	---	ND	---	0.497

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
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R = Recovery outside of Method 1668A control limits  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602547-002  
Lab Sample ID 10341471002  
Filename P160403A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.497
146		---	---	ND	---	0.497
147	147/149	---	---	ND	---	0.995
148		---	---	ND	---	0.497
149	147/149	---	---	ND	---	0.995
150		---	---	ND	---	0.497
151	135/151	---	---	ND	---	0.995
152		---	---	ND	---	0.497
153	153/168	---	---	ND	---	0.995
154		---	---	ND	---	0.497
155		---	---	ND	---	0.497
156	156/157	---	---	ND	---	0.995
157	156/157	---	---	ND	---	0.995
158		---	---	ND	---	0.497
159		---	---	ND	---	0.497
160		---	---	ND	---	0.497
161		---	---	ND	---	0.497
162		---	---	ND	---	0.497
163	129/138/163	---	---	ND	---	1.49
164		---	---	ND	---	0.497
165		---	---	ND	---	0.497
166	128/166	---	---	ND	---	0.995
167		---	---	ND	---	0.497
168	153/168	---	---	ND	---	0.995
169		---	---	ND	---	0.497
170		---	---	ND	---	0.497
171	171/173	---	---	ND	---	0.995
172		---	---	ND	---	0.497
173	171/173	---	---	ND	---	0.995
174		---	---	ND	---	0.497
175		---	---	ND	---	0.497
176		---	---	ND	---	0.497
177		---	---	ND	---	0.497
178		---	---	ND	---	0.497
179		---	---	ND	---	0.497
180	180/193	---	---	ND	---	0.995
181		---	---	ND	---	0.497
182		---	---	ND	---	0.497
183	183/185	---	---	ND	---	0.995
184		---	---	ND	---	0.497
185	183/185	---	---	ND	---	0.995
186		---	---	ND	---	0.497
187		---	---	ND	---	0.497
188		---	---	ND	---	0.497
189		---	---	ND	---	0.497
190		---	---	ND	---	0.497
191		---	---	ND	---	0.497
192		---	---	ND	---	0.497

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602547-002  
 Lab Sample ID        10341471002  
 Filename                P160403A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.995
194		---	---	ND	---	0.746
195		---	---	ND	---	0.746
196		---	---	ND	---	0.746
197	197/200	---	---	ND	---	1.49
198	198/199	---	---	ND	---	1.49
199	198/199	---	---	ND	---	1.49
200	197/200	---	---	ND	---	1.49
201		---	---	ND	---	0.746
202		---	---	ND	---	0.746
203		---	---	ND	---	0.746
204		---	---	ND	---	0.746
205		---	---	ND	---	0.746
206		---	---	ND	---	0.746
207		---	---	ND	---	0.746
208		---	---	ND	---	0.746
209		---	---	ND	---	0.746

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

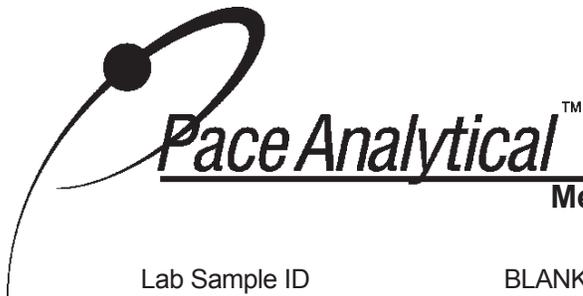
Client Sample ID           K1602547-002  
Lab Sample ID             10341471002  
Filename                    P160403A\_09

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	0.816
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	0.816

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-49620	Matrix	Water
Filename	P160401A_08	Extracted	03/29/2016 10:25
Injected By	CVS	Analyzed	04/01/2016 10:50
Total Amount Extracted	1040 mL	Dilution	3
ICAL ID	P160401A02		
CCal Filename(s)	P160401A_01		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
------------	-------	----	-------	------------	------------	------------

Labeled Analytes

13C-2-MoCB	1	8.705	2.90	2.0	1.72	86
13C-4-MoCB	3	11.293	3.08	2.0	1.77	88
13C-2,2'-DiCB	4	11.557	1.53	2.0	1.81	90
13C-4,4'-DiCB	15	18.324	1.61	2.0	1.30	65
13C-2,2',6-TrCB	19	15.149	1.11	2.0	1.56	78
13C-3,4,4'-TrCB	37	25.938	1.07	2.0	1.46	73
13C-2,2',6,6'-TeCB	54	18.610	0.82	2.0	1.30	65
13C-3,4,4',5-TeCB	81	33.019	0.82	2.0	1.50	75
13C-3,3',4,4'-TeCB	77	33.606	0.80	2.0	1.53	76
13C-2,2',4,6,6'-PeCB	104	24.562	1.67	2.0	1.44	72
13C-2,3,3',4,4'-PeCB	105	37.167	1.62	2.0	1.38	69
13C-2,3,4,4',5-PeCB	114	36.512	1.61	2.0	1.46	73
13C-2,3',4,4',5-PeCB	118	35.942	1.60	2.0	1.45	72
13C-2,3',4,4',5'-PeCB	123	35.624	1.59	2.0	1.43	72
13C-3,3',4,4',5-PeCB	126	40.352	1.61	2.0	1.48	74
13C-2,2',4,4',6,6'-HxCB	155	30.537	1.28	2.0	2.21	111
13C-HxCB (156/157)	156/157	43.410	1.26	4.0	2.97	74
13C-2,3',4,4',5,5'-HxCB	167	42.219	1.27	2.0	1.43	72
13C-3,3',4,4',5,5'-HxCB	169	46.713	1.26	2.0	1.51	76
13C-2,2',3,4',5,6,6'-HpCB	188	36.445	1.06	2.0	1.94	97
13C-2,3,3',4,4',5,5'-HpCB	189	49.233	1.04	2.0	1.65	82
13C-2,2',3,3',5,5',6,6'-OoCB	202	41.900	0.89	2.0	1.88	94
13C-2,3,3',4,4',5,5',6-OoCB	205	51.905	0.88	2.0	1.73	86
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.867	0.81	2.0	1.64	82
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	48.694	0.78	2.0	1.81	90
13C-DeCB	209	55.807	0.67	2.0	1.98	99

Cleanup Standards

13C-2,4,4'-TrCB	28	21.645	1.06	2.0	1.67	83
13C-2,3,3',5,5'-PeCB	111	33.589	1.60	2.0	1.59	80
13C-2,2',3,3',5,5',6-HpCB	178	39.564	1.04	2.0	1.84	92

Recovery Standards

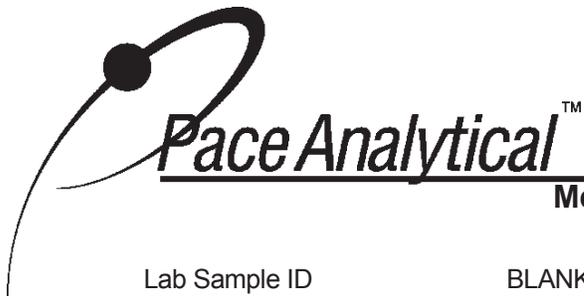
13C-2,5-DiCB	9	13.867	1.63	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.573	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.806	1.62	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.128	1.28	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	51.367	0.90	2.0	NA	NA

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
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ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-49620  
 Filename P160401A\_08

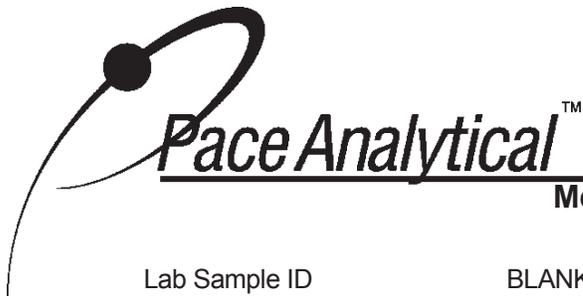
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.241
2		---	---	ND	---	0.241
3		---	---	ND	---	0.241
4		---	---	ND	---	0.241
5		---	---	ND	---	0.241
6		---	---	ND	---	0.241
7		---	---	ND	---	0.241
8		---	---	ND	---	0.241
9		---	---	ND	---	0.241
10		---	---	ND	---	0.241
11		---	---	ND	---	2.36
12	12/13	---	---	ND	---	0.482
13	12/13	---	---	ND	---	0.482
14		---	---	ND	---	0.241
15		---	---	ND	---	0.241
16		---	---	ND	---	0.241
17		---	---	ND	---	0.241
18	18/30	---	---	ND	---	0.482
19		---	---	ND	---	0.241
20	20/28	---	---	ND	---	1.24
21	21/33	---	---	ND	---	1.30
22		---	---	ND	---	0.916
23		---	---	ND	---	0.241
24		---	---	ND	---	0.241
25		---	---	ND	---	0.241
26	26/29	---	---	ND	---	0.482
27		---	---	ND	---	0.241
28	20/28	---	---	ND	---	1.24
29	26/29	---	---	ND	---	0.482
30	18/30	---	---	ND	---	0.482
31		---	---	ND	---	1.25
32		---	---	ND	---	0.241
33	21/33	---	---	ND	---	1.30
34		---	---	ND	---	0.241
35		---	---	ND	---	0.241
36		---	---	ND	---	0.241
37		---	---	ND	---	0.511
38		---	---	ND	---	0.241
39		---	---	ND	---	0.241
40	40/41/71	---	---	ND	---	1.45
41	40/41/71	---	---	ND	---	1.45
42		---	---	ND	---	0.482
43	43/73	---	---	ND	---	0.482
44	44/47/65	---	---	ND	---	1.45
45	45/51	---	---	ND	---	0.965

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
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 RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-49620  
 Filename P160401A\_08

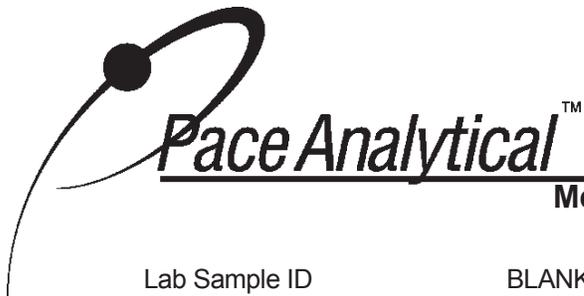
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		--	--	ND	--	0.482
47	44/47/65	--	--	ND	--	1.45
48		--	--	ND	--	0.482
49	49/69	--	--	ND	--	0.965
50	50/53	--	--	ND	--	0.965
51	45/51	--	--	ND	--	0.965
52		--	--	ND	--	1.49
53	50/53	--	--	ND	--	0.965
54		--	--	ND	--	0.482
55		--	--	ND	--	0.482
56		--	--	ND	--	0.482
57		--	--	ND	--	0.482
58		--	--	ND	--	0.482
59	59/62/75	--	--	ND	--	1.45
60		--	--	ND	--	0.482
61	61/70/74/76	--	--	ND	--	1.93
62	59/62/75	--	--	ND	--	1.45
63		--	--	ND	--	0.482
64		--	--	ND	--	0.482
65	44/47/65	--	--	ND	--	1.45
66		--	--	ND	--	0.810
67		--	--	ND	--	0.482
68		--	--	ND	--	0.482
69	49/69	--	--	ND	--	0.965
70	61/70/74/76	--	--	ND	--	1.93
71	40/41/71	--	--	ND	--	1.45
72		--	--	ND	--	0.482
73	43/73	--	--	ND	--	0.482
74	61/70/74/76	--	--	ND	--	1.93
75	59/62/75	--	--	ND	--	1.45
76	61/70/74/76	--	--	ND	--	1.93
77		--	--	ND	--	0.482
78		--	--	ND	--	0.482
79		--	--	ND	--	0.482
80		--	--	ND	--	0.482
81		--	--	ND	--	0.482
82		--	--	ND	--	0.482
83		--	--	ND	--	0.482
84		--	--	ND	--	0.482
85	85/116/117	--	--	ND	--	1.45
86	86/87/97/108/119/125	--	--	ND	--	2.89
87	86/87/97/108/119/125	--	--	ND	--	2.89
88	88/91	--	--	ND	--	0.965
89		--	--	ND	--	0.482
90	90/101/113	--	--	ND	--	1.45

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-49620  
Filename P160401A\_08

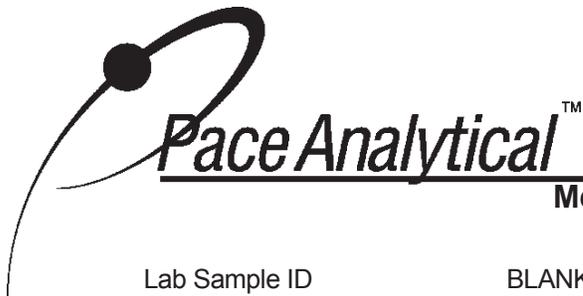
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	--	--	ND	--	0.965
92		--	--	ND	--	0.482
93	93/98/100/102	--	--	ND	--	1.93
94		--	--	ND	--	0.482
95		--	--	ND	--	0.916
96		--	--	ND	--	0.482
97	86/87/97/108/119/125	--	--	ND	--	2.89
98	93/98/100/102	--	--	ND	--	1.93
99		--	--	ND	--	0.482
100	93/98/100/102	--	--	ND	--	1.93
101	90/101/113	--	--	ND	--	1.45
102	93/98/100/102	--	--	ND	--	1.93
103		--	--	ND	--	0.482
104		--	--	ND	--	0.482
105		--	--	ND	--	0.482
106		--	--	ND	--	0.482
107	107/124	--	--	ND	--	0.965
108	86/87/97/108/119/125	--	--	ND	--	2.89
109		--	--	ND	--	0.482
110	110/115	--	--	ND	--	0.965
111		--	--	ND	--	0.482
112		--	--	ND	--	0.482
113	90/101/113	--	--	ND	--	1.45
114		--	--	ND	--	0.482
115	110/115	--	--	ND	--	0.965
116	85/116/117	--	--	ND	--	1.45
117	85/116/117	--	--	ND	--	1.45
118		--	--	ND	--	0.617
119	86/87/97/108/119/125	--	--	ND	--	2.89
120		--	--	ND	--	0.482
121		--	--	ND	--	0.482
122		--	--	ND	--	0.482
123		--	--	ND	--	0.482
124	107/124	--	--	ND	--	0.965
125	86/87/97/108/119/125	--	--	ND	--	2.89
126		--	--	ND	--	0.482
127		--	--	ND	--	0.482
128	128/166	--	--	ND	--	0.965
129	129/138/163	--	--	ND	--	1.45
130		--	--	ND	--	0.482
131		--	--	ND	--	0.482
132		--	--	ND	--	0.482
133		--	--	ND	--	0.482
134	134/143	--	--	ND	--	0.965
135	135/151	--	--	ND	--	0.965

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-49620  
 Filename P160401A\_08

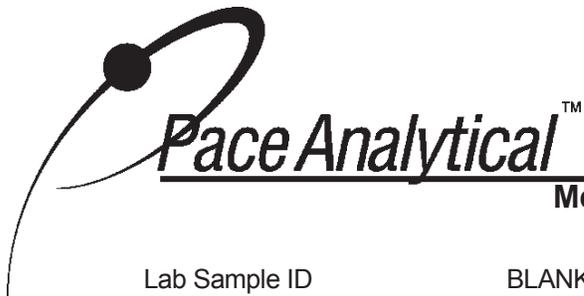
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		--	--	ND	--	0.482
137		--	--	ND	--	0.482
138	129/138/163	--	--	ND	--	1.45
139	139/140	--	--	ND	--	0.965
140	139/140	--	--	ND	--	0.965
141		--	--	ND	--	0.482
142		--	--	ND	--	0.482
143	134/143	--	--	ND	--	0.965
144		--	--	ND	--	0.482
145		--	--	ND	--	0.482
146		--	--	ND	--	0.482
147	147/149	--	--	ND	--	0.965
148		--	--	ND	--	0.482
149	147/149	--	--	ND	--	0.965
150		--	--	ND	--	0.482
151	135/151	--	--	ND	--	0.965
152		--	--	ND	--	0.482
153	153/168	--	--	ND	--	0.965
154		--	--	ND	--	0.482
155		--	--	ND	--	0.482
156	156/157	--	--	ND	--	0.965
157	156/157	--	--	ND	--	0.965
158		--	--	ND	--	0.482
159		--	--	ND	--	0.482
160		--	--	ND	--	0.482
161		--	--	ND	--	0.482
162		--	--	ND	--	0.482
163	129/138/163	--	--	ND	--	1.45
164		--	--	ND	--	0.482
165		--	--	ND	--	0.482
166	128/166	--	--	ND	--	0.965
167		--	--	ND	--	0.482
168	153/168	--	--	ND	--	0.965
169		--	--	ND	--	0.482
170		--	--	ND	--	0.482
171	171/173	--	--	ND	--	0.965
172		--	--	ND	--	0.482
173	171/173	--	--	ND	--	0.965
174		--	--	ND	--	0.482
175		--	--	ND	--	0.482
176		--	--	ND	--	0.482
177		--	--	ND	--	0.482
178		--	--	ND	--	0.482
179		--	--	ND	--	0.482
180	180/193	--	--	ND	--	0.965

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-49620  
 Filename P160401A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		--	--	ND	--	0.482
182		--	--	ND	--	0.482
183	183/185	--	--	ND	--	0.965
184		--	--	ND	--	0.482
185	183/185	--	--	ND	--	0.965
186		--	--	ND	--	0.482
187		--	--	ND	--	0.482
188		--	--	ND	--	0.482
189		--	--	ND	--	0.482
190		--	--	ND	--	0.482
191		--	--	ND	--	0.482
192		--	--	ND	--	0.482
193	180/193	--	--	ND	--	0.965
194		--	--	ND	--	0.723
195		--	--	ND	--	0.723
196		--	--	ND	--	0.723
197	197/200	--	--	ND	--	1.45
198	198/199	--	--	ND	--	1.45
199	198/199	--	--	ND	--	1.45
200	197/200	--	--	ND	--	1.45
201		--	--	ND	--	0.723
202		--	--	ND	--	0.723
203		--	--	ND	--	0.723
204		--	--	ND	--	0.723
205		--	--	ND	--	0.723
206		--	--	ND	--	0.723
207		--	--	ND	--	0.723
208		--	--	ND	--	0.723
209		--	--	ND	--	0.723

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID            CBLKHS  
Lab Sample ID              BLANK-49620  
Filename                      P160401A\_08

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCS-49621	Matrix	Water
Filename	P160401A_03	Dilution	3
Total Amount Extracted	1030 mL	Extracted	03/29/2016 10:25
ICAL ID	P160401A02	Analyzed	04/01/2016 05:55
CCal Filename(s)	P160401A_01	Injected By	CVS
Method Blank ID	BLANK-49620		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	0.980	98	2.0	1.28	64
3	1.0	0.982	98	2.0	1.31	66
4	1.0	1.11	111	2.0	1.32	66
15	1.0	1.04	104	2.0	1.02	51
19	1.0	1.01	101	2.0	1.16	58
37	1.0	0.971	97	2.0	1.16	58
54	1.0	1.08	108	2.0	1.07	53
81	1.0	1.03	103	2.0	1.27	63
77	1.0	1.05	105	2.0	1.27	63
104	1.0	1.11	111	2.0	1.11	56
105	1.0	1.09	109	2.0	1.13	57
114	1.0	1.04	104	2.0	1.19	59
118	1.0	1.11	111	2.0	1.17	59
123	1.0	1.12	112	2.0	1.15	57
126	1.0	1.07	107	2.0	1.20	60
155	1.0	1.05	105	2.0	1.75	88
156/157	2.0	2.14	107	4.0	2.46	62
167	1.0	1.08	108	2.0	1.18	59
169	1.0	1.08	108	2.0	1.25	63
188	1.0	1.15	115	2.0	1.67	84
189	1.0	1.08	108	2.0	1.40	70
202	1.0	1.05	105	2.0	1.58	79
205	1.0	1.11	111	2.0	1.48	74
206	1.0	1.17	117	2.0	1.40	70
208	1.0	1.10	110	2.0	1.56	78
209	1.0	1.03	103	2.0	1.79	90

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

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**Method 1668A Polychlorobiphenyls  
 Laboratory Control Spike Analysis Results**

Lab Sample ID	LCSD-49622	Matrix	Water
Filename	P160401A_04	Dilution	3
Total Amount Extracted	1040 mL	Extracted	03/29/2016 10:25
ICAL ID	P160401A02	Analyzed	04/01/2016 06:54
CCal Filename(s)	P160401A_01	Injected By	CVS
Method Blank ID	BLANK-49620		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	0.968	97	2.0	1.55	78
3	1.0	1.00	100	2.0	1.60	80
4	1.0	1.10	110	2.0	1.63	82
15	1.0	1.05	105	2.0	1.22	61
19	1.0	0.990	99	2.0	1.43	72
37	1.0	0.960	96	2.0	1.38	69
54	1.0	1.05	105	2.0	1.32	66
81	1.0	1.05	105	2.0	1.33	66
77	1.0	1.07	107	2.0	1.34	67
104	1.0	1.08	108	2.0	1.38	69
105	1.0	1.06	106	2.0	1.25	63
114	1.0	1.03	103	2.0	1.31	65
118	1.0	1.09	109	2.0	1.28	64
123	1.0	1.07	107	2.0	1.27	63
126	1.0	1.05	105	2.0	1.30	65
155	1.0	1.01	101	2.0	1.99	99
156/157	2.0	2.05	102	4.0	2.65	66
167	1.0	1.07	107	2.0	1.27	64
169	1.0	1.07	107	2.0	1.31	66
188	1.0	1.15	115	2.0	1.81	91
189	1.0	1.04	104	2.0	1.47	74
202	1.0	1.03	103	2.0	1.73	86
205	1.0	1.08	108	2.0	1.51	76
206	1.0	1.18	118	2.0	1.44	72
208	1.0	1.10	110	2.0	1.64	82
209	1.0	0.984	98	2.0	1.87	93

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
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 ng = Nanograms  
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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client ALS Environmental

Spike 1 ID LCS-49621  
Spike 1 Filename P160401A\_03

Spike 2 ID LCSD-49622  
Spike 2 Filename P160401A\_04

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	98	97	1.0
4-MoCB	3	98	100	2.0
2,2'-DiCB	4	111	110	0.9
4,4'-DiCB	15	104	105	1.0
2,2',6-TrCB	19	101	99	2.0
3,4,4'-TrCB	37	97	96	1.0
2,2',6,6'-TeCB	54	108	105	2.8
3,3',4,4'-TeCB	77	105	107	1.9
3,4,4',5-TeCB	81	103	105	1.9
2,2',4,6,6'-PeCB	104	111	108	2.7
2,3,3',4,4'-PeCB	105	109	106	2.8
2,3,4,4',5-PeCB	114	104	103	1.0
2,3',4,4',5-PeCB	118	111	109	1.8
2,3',4,4',5'-PeCB	123	112	107	4.6
3,3',4,4',5-PeCB	126	107	105	1.9
2,2',4,4',6,6'-HxCB	155	105	101	3.9
(156/157)	156/157	107	102	4.8
2,3',4,4',5,5'-HxCB	167	108	107	0.9
3,3',4,4',5,5'-HxCB	169	108	107	0.9
2,2',3,4',5,6,6'-HpCB	188	115	115	0.0
2,3,3',4,4',5,5'-HpCB	189	108	104	3.8
2,2',3,3',5,5',6,6'-OxCB	202	105	103	1.9
2,3,3',4,4',5,5',6-OxCB	205	111	108	2.7
2,2',3,3',4,4',5,5',6-NoCB	206	117	118	0.9
2,2',3,3',4,5,5',6,6'-NoCB	208	110	110	0.0
Decachlorobiphenyl	209	103	98	5.0

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

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55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# **Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Sampling in City Outfall Basins 16, 17, 19, 44, 45, 52D, 53A, and M2**

**To:** File  
**From:** Andrew Davidson, GSI Water Solutions, Inc.  
**Date:** May 24, 2016

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in March 2016. Ten stormwater grab samples (W16C092-01 through W16C02-10), one field decontamination blank (W16C092-11), and one field duplicate sample (W16C092-12) were collected in Outfall Basins 16, 17, 19, 44, 45, 52D, 53A, and M2 and submitted for analyses. Sample collection dates and laboratory identification numbers are presented in Table 1.

The laboratory analyses for these samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Conductivity – FO SOP 1.03a
  - pH – FO SOP 1.01a
  - Temp – FO SOP 1.05a
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- ALS Environmental – ALS Group USA, Corp (ALS)
  - Organochlorine Pesticides – EPA 8081B

- Pace Analytical Services (Pace)
  - Polychlorinated Biphenyls (PCB) Congeners – EPA 1668A

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with these source control program samples.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method and field decontamination blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control and duplicate laboratory control (LC/DLC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for field duplicate and laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## Chain-of-Custody

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## Analysis Holding Times

The samples were extracted and analyzed within the acceptable holding times for all analyses, with one potential exception. WPCL reports that the sample analysis of PAHs and phthalates for field duplicate sample W16C092-12 may have exceeded the holding time for extraction because the sample collection time was not available. However, as sample W16C092-12 was a duplicate of sample W16C092-06 and was collected on 3/9/2016, it appears that the sample extraction was conducted within the method-specified extraction time of 7 days. The data is not further qualified.

## Method Blanks

Method blanks were analyzed during the subcontracted laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, organochlorine pesticides, and PCB congeners. Two method blanks were processed during the analysis of mercury. No analytes were detected in the method blanks processed during any of the analyses.

## Field Decontamination Blanks

A field decontamination blank (W16C092-11) was processed with the 10 field samples and one field duplicate sample. The field decontamination blank was analyzed for TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. Zinc was detected in the field decontamination blank at a concentration of 1.3 µg/L. However, zinc was detected in all associated field samples at concentrations more than five times the field decontamination blank concentration, and results are not further qualified. No other analytes were detected in the field decontamination blank.

## Surrogate Recoveries

Surrogate recoveries were completed during the analyses of pesticides, PAHs and phthalates. All surrogate recoveries for the field samples, field decontamination blank and all associated QC samples were within control criteria with one exception:

- The surrogates 2-Methylnaphthalene-d10 and Fluoranthene-d10 processed during the analysis of PAHs and phthalates in sample W16C092-05 were below laboratory control criteria. WPCL reports that the low surrogate recovery is likely due to the high level of suspended solids in the sample. Detections of PAHs and phthalates in sample W16C092-05 are flagged J- to indicate that the detections are estimated results that may be biased low. Non-detects of PAHs and phthalates in sample W16C092-05 are flagged UJ to indicate that the reported quantitation limit is approximate and may be inaccurate or imprecise.

## Internal Standard Recoveries

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. Labeled internal standard recoveries were within method-specified target ranges for the samples and the associated QC samples.

## Matrix Spike/Matrix Spike Duplicates

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates. All MS recoveries were within acceptance limits.

## Laboratory Control Sample / Duplicate Laboratory Control Samples

LC samples were processed during the analyses of TSS, total metals, total mercury, organochlorine pesticides, PAHs and phthalates, and PCB congeners. DLC samples were processed during the analysis of PCB congeners and pesticides. LC/DLC sample recoveries and RPDs were within laboratory control limits for all analyses.

## Laboratory Duplicate

WPCL processed two laboratory duplicate samples during the TSS analysis, three laboratory duplicates during the total metals analysis, two laboratory duplicates during the analysis of

mercury, and one duplicate laboratory sample during the analysis of PAHs and phthalates. RPDs were within laboratory acceptance limits for all lab duplicate samples with two exception:

- The RPD for TSS in laboratory duplicate sample B16C224-DUP2 was above the RPD limit of 20 percent. However, WPCL reports that the matrix duplicate control limit is not applicable at concentrations less than 5 times the reporting limit. The sample results are not qualified further.
- The RPD for benzo(a)anthracene in a laboratory duplicate of field duplicate sample W16C092-12 was right at the laboratory control limit of 50 percent. WPCL reports that the associated field duplicate sample result should be considered an estimate (“J” flag).

## Field Duplicate

A field duplicate sample W16C092-12 was collected along with W16C092-06 (53A\_SW1). Both samples were analyzed for TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. Field duplicate detections and RPDs are presented in Table 2. All RPDs were within acceptance criteria with one exception:

- The RPD for zinc was 42 percent. Zinc results for W16C092-12 and W16C092-06 are flagged as estimates (“J” flag).

## Other

WPCL qualified results detected at a concentration below the reporting limit as estimates. WPCL also reports that the continuing calibration verification was high for several PAH compounds. Detected results for these compounds should be considered high estimates (“J+” flag).

Additional issues were observed during the analysis subcontracted analysis of organochlorine pesticides. ALS reports that there were second source exceptions of the Initial Calibration Verification criteria for the compound Endrin Aldehyde. However, the data quality was not affected, and no further corrective action was necessary. The primary evaluation criteria were not met on the confirmation column for decachlorobiphenyl, endrin ketone, and methoxychlor. The results were reported from the column with an acceptable continuing calibration verification. The data quality was not affected, and no further corrective action was necessary. ALS also reports that there was insufficient sample volume received to perform a MS/MSD analysis. A LC/DLC analysis was analyzed and reported in lieu of the MS/MSD for these samples. Lastly, laboratory reporting limits were elevated for several pesticides in the field sample and field decontamination blank due to the presence of non-target background components.

No other anomalies were reported in by WPCL or the subcontracted laboratories. A list of additional data qualifications added during validation is provided in Table 3.

**Table 3. Qualifiers Added or Modified During Validation**

City of Portland

Outfalls 16, 17, 19, 44, 45, 52D, 53A, &amp; M2

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
W16C092-06	Zinc	ug/L	477	J	RPD
W16C092-12	Zinc	ug/L	313	J	RPD
W16C092-01	Bis(2-ethylhexyl) phthalate	ug/L	2.0	J+	CCV
W16C092-02	Bis(2-ethylhexyl) phthalate	ug/L	2.4	J+	CCV
W16C092-03	Bis(2-ethylhexyl) phthalate	ug/L	6.8	J+	CCV
W16C092-04	Bis(2-ethylhexyl) phthalate	ug/L	2.7	J+	CCV
W16C092-05	Acenaphthene	ug/L	0.040	UJ	SBC
W16C092-05	Acenaphthylene	ug/L	0.15	J-	SBC
W16C092-05	Anthracene	ug/L	0.39	J-	SBC
W16C092-05	Benzo(a)anthracene	ug/L	0.23	J-	SBC
W16C092-05	Benzo(a)pyrene	ug/L	0.32	J-	SBC
W16C092-05	Benzo(b)fluoranthene	ug/L	0.41	J-	SBC
W16C092-05	Benzo(g,h,i)perylene	ug/L	0.39	J-	SBC
W16C092-05	Benzo(k)fluoranthene	ug/L	0.11	J-	SBC
W16C092-05	Chrysene	ug/L	0.28	J-	SBC
W16C092-05	Dibenzo(a,h)anthracene	ug/L	0.06	J-	SBC
W16C092-05	Fluoranthene	ug/L	0.54	J-	SBC
W16C092-05	Fluorene	ug/L	0.040	UJ	SBC
W16C092-05	Indeno(1,2,3-cd)pyrene	ug/L	0.24	J-	SBC
W16C092-05	1-Methylnaphthalene	ug/L	0.080	UJ	SBC
W16C092-05	2-Methylnaphthalene	ug/L	0.080	UJ	SBC
W16C092-05	Napthalene	ug/L	0.080	UJ	SBC
W16C092-05	Phenanthrene	ug/L	0.17	J-	SBC
W16C092-05	Pyrene	ug/L	0.73	J-	SBC
W16C092-05	Butyl benzyl phthalate	ug/L	2.0	UJ	SBC
W16C092-05	Di-n-butyl phthalate	ug/L	2.0	UJ	SBC
W16C092-05	Diethyl phthalate	ug/L	2.0	UJ	SBC
W16C092-05	Dimethyl phthalate	ug/L	2.0	UJ	SBC
W16C092-05	Di-n-octyl phthalate	ug/L	2.0	UJ	SBC
W16C092-05	Bis(2-ethylhexyl) phthalate	ug/L	1.9	J-	SBC
W16C092-07	Bis(2-ethylhexyl) phthalate	ug/L	3.3	J+	CCV
W16C092-08	Bis(2-ethylhexyl) phthalate	ug/L	1.4	J+	CCV
W16C092-09	Bis(2-ethylhexyl) phthalate	ug/L	1.3	J+	CCV
W16C092-10	Bis(2-ethylhexyl) phthalate	ug/L	4.8	J+	CCV
W16C092-12	Benzo(a)anthracene	ug/L	0.010	J	RPD

**Notes**

µg/L = micrograms per liter

**Qualifier Definitions**

J = Detection of analyte is considered an estimate with unknown bias

J- = Detection of analyte is considered a low estimate

**Table 3. Qualifiers Added or Modified During Validation**

City of Portland

*Outfalls 16, 17, 19, 44, 45, 52D, 53A, & M2*

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
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J+ = Detection of analyte is considered a high estimate

UJ = reported quantitation limit is approximate and may be inaccurate or imprecise

**Reason Code Definitions**

RPD = The RPD between the results in the sample and sample duplicate exceeded control criteria

CCV = The continuing calibration verification was high and the sample results may be high estimates

SBC = Surrogate below control criteria. Sample result may be low estimate.



City of Portland  
**Water Pollution Control Laboratory**

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April 08, 2016

Linda Scheffler  
Director's Office

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Work Order  
**W16C092**

Project  
**Portland Harbor**

Received  
03/09/16 16:49

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

*Jennifer Shackelford*

Jennifer Shackelford  
Laboratory Coordinator QA/QC





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**LABORATORY ANALYSIS REPORT**

<b>Project:</b>	<b>Portland Harbor</b>	<b>Client:</b>	Director's Office
<b>Work Order:</b>	<b>W16C092</b>	<b>Project Mgr:</b>	Linda Scheffler
<b>Received:</b>	3/9/16 16:49		
<b>Submitted By:</b>	Field Operations		

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
M2_SW1	W16C092-01	Stormwater	Grab	03/09/16 10:10	03/09/16 10:10	
44_SW20	W16C092-02	Stormwater	Grab	03/09/16 10:39	03/09/16 10:39	
45_SW1	W16C092-03	Stormwater	Grab	03/09/16 10:53	03/09/16 10:53	
52D_SW5	W16C092-04	Stormwater	Grab	03/09/16 11:32	03/09/16 11:32	
52D_SW6	W16C092-05	Stormwater	Grab	03/09/16 11:50	03/09/16 11:50	
53A_SW1	W16C092-06	Stormwater	Grab	03/09/16 12:53	03/09/16 12:53	
16_SW1	W16C092-07	Stormwater	Grab	03/09/16 13:50	03/09/16 13:50	
16_SW2	W16C092-08	Stormwater	Grab	03/09/16 14:12	03/09/16 14:12	
17_SW17	W16C092-09	Stormwater	Grab	03/09/16 14:46	03/09/16 14:46	
19_SW2	W16C092-10	Stormwater	Grab	03/09/16 15:40	03/09/16 15:40	
FDBLANK	W16C092-11	Stormwater	Grab	03/09/16 14:08	03/09/16 14:08	
FIELDDUP	W16C092-12	Stormwater	Grab	03/09/16 00:00	03/09/16 00:00	

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field conductivity

M2_SW1 : W16C092-01										
Conductivity*	43	umhos/cm			1	B16C178	03/09/16	03/09/16	FO SOP 1.03a	
44_SW20 : W16C092-02										
Conductivity*	27	umhos/cm			1	B16C178	03/09/16	03/09/16	FO SOP 1.03a	
45_SW1 : W16C092-03										
Conductivity*	30	umhos/cm			1	B16C178	03/09/16	03/09/16	FO SOP 1.03a	
52D_SW5 : W16C092-04										
Conductivity*	110	umhos/cm			1	B16C178	03/09/16	03/09/16	FO SOP 1.03a	
52D_SW6 : W16C092-05										
Conductivity*	142	umhos/cm			1	B16C178	03/09/16	03/09/16	FO SOP 1.03a	
53A_SW1 : W16C092-06										
Conductivity*	65	umhos/cm			1	B16C178	03/09/16	03/09/16	FO SOP 1.03a	
16_SW1 : W16C092-07										
Conductivity*	31	umhos/cm			1	B16C178	03/09/16	03/09/16	FO SOP 1.03a	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16C092**

**Client: Director's Office**  
**Received: 03/09/16 16:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field conductivity

16_SW2 : W16C092-08	Conductivity*	71	umhos/cm			1	B16C178	03/09/16	03/09/16	FO SOP 1.03a
17_SW17 : W16C092-09	Conductivity*	91	umhos/cm			1	B16C178	03/09/16	03/09/16	FO SOP 1.03a
19_SW2 : W16C092-10	Conductivity*	8	umhos/cm			1	B16C178	03/09/16	03/09/16	FO SOP 1.03a

Field pH

M2_SW1 : W16C092-01	pH*	6.1	pH Units			1	B16C178	03/09/16 10:10	03/09/16	FO SOP 1.01a
44_SW20 : W16C092-02	pH*	6.4	pH Units			1	B16C178	03/09/16 10:39	03/09/16	FO SOP 1.01a
45_SW1 : W16C092-03	pH*	6.4	pH Units			1	B16C178	03/09/16 10:53	03/09/16	FO SOP 1.01a
52D_SW5 : W16C092-04	pH*	7.2	pH Units			1	B16C178	03/09/16 11:32	03/09/16	FO SOP 1.01a
52D_SW6 : W16C092-05	pH*	9.3	pH Units			1	B16C178	03/09/16 11:50	03/09/16	FO SOP 1.01a
53A_SW1 : W16C092-06	pH*	7.7	pH Units			1	B16C178	03/09/16 12:53	03/09/16	FO SOP 1.01a
16_SW1 : W16C092-07	pH*	6.9	pH Units			1	B16C178	03/09/16 13:50	03/09/16	FO SOP 1.01a
16_SW2 : W16C092-08	pH*	6.9	pH Units			1	B16C178	03/09/16 14:12	03/09/16	FO SOP 1.01a
17_SW17 : W16C092-09	pH*	7.4	pH Units			1	B16C178	03/09/16 14:46	03/09/16	FO SOP 1.01a
19_SW2 : W16C092-10	pH*	7.7	pH Units			1	B16C178	03/09/16 15:40	03/09/16	FO SOP 1.01a

Field temperature

M2_SW1 : W16C092-01	Temperature*	10.4	°C			1	B16C178	03/09/16 10:10	03/09/16	FO SOP 1.05a
44_SW20 : W16C092-02	Temperature*	10.6	°C			1	B16C178	03/09/16 10:39	03/09/16	FO SOP 1.05a
45_SW1 : W16C092-03	Temperature*	10.2	°C			1	B16C178	03/09/16 10:53	03/09/16	FO SOP 1.05a
52D_SW5 : W16C092-04										

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Work Order: W16C092**

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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field temperature

52D_SW5 : W16C092-04 Temperature*	9.8	°C			1	B16C178	03/09/16 11:32	03/09/16	FO SOP 1.05a	
52D_SW6 : W16C092-05 Temperature*	10.8	°C			1	B16C178	03/09/16 11:50	03/09/16	FO SOP 1.05a	
53A_SW1 : W16C092-06 Temperature*	10.4	°C			1	B16C178	03/09/16 12:53	03/09/16	FO SOP 1.05a	
16_SW1 : W16C092-07 Temperature*	10.4	°C			1	B16C178	03/09/16 13:50	03/09/16	FO SOP 1.05a	
16_SW2 : W16C092-08 Temperature*	10.1	°C			1	B16C178	03/09/16 14:12	03/09/16	FO SOP 1.05a	
17_SW17 : W16C092-09 Temperature*	9.5	°C			1	B16C178	03/09/16 14:46	03/09/16	FO SOP 1.05a	
19_SW2 : W16C092-10 Temperature*	10.1	°C			1	B16C178	03/09/16 15:40	03/09/16	FO SOP 1.05a	

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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**General Chemistry**

**Total Suspended Solids**

M2_SW1 : W16C092-01										
Total suspended solids	44	mg/L	2	2		B16C224	03/12/16	03/13/16	SM 2540D	
44_SW20 : W16C092-02										
Total suspended solids	75	mg/L	2	2		B16C224	03/12/16	03/13/16	SM 2540D	
45_SW1 : W16C092-03										
Total suspended solids	83	mg/L	2	2		B16C224	03/12/16	03/13/16	SM 2540D	
52D_SW5 : W16C092-04										
Total suspended solids	795	mg/L	2	2		B16C224	03/12/16	03/13/16	SM 2540D	
52D_SW6 : W16C092-05										
Total suspended solids	3260	mg/L	2	2		B16C224	03/12/16	03/13/16	SM 2540D	
53A_SW1 : W16C092-06										
Total suspended solids	43	mg/L	2	2		B16C224	03/12/16	03/13/16	SM 2540D	
16_SW1 : W16C092-07										
Total suspended solids	38	mg/L	2	2		B16C224	03/12/16	03/13/16	SM 2540D	
16_SW2 : W16C092-08										
Total suspended solids	ND	mg/L	2	2		B16C224	03/12/16	03/13/16	SM 2540D	
17_SW17 : W16C092-09										
Total suspended solids	58	mg/L	2	2		B16C224	03/12/16	03/13/16	SM 2540D	
19_SW2 : W16C092-10										
Total suspended solids	59	mg/L	2	2		B16C224	03/12/16	03/13/16	SM 2540D	
FDBLANK : W16C092-11										
Total suspended solids	ND	mg/L	2	2		B16C224	03/12/16	03/13/16	SM 2540D	
FIELD DUP : W16C092-12										
Total suspended solids	43	mg/L	2	2		B16C224	03/12/16	03/13/16	SM 2540D	

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**Project: Portland Harbor**  
**Work Order: W16C092**

**Client: Director's Office**  
**Received: 03/09/16 16:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Total Metals**

Total Metals by ICPMS

M2\_SW1 : W16C092-01

Arsenic	0.656	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Cadmium	0.114	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Chromium	2.21	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Copper	9.22	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Lead	4.37	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Mercury	0.00434	ug/L	0.00100	0.00100	1	B16C203	03/11/16	03/14/16	WPCLSOP M-10	
Nickel	1.60	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Zinc	87.9	ug/L	0.500	0.500	1	B16C197	03/11/16	03/11/16	EPA 200.8	

44\_SW20 : W16C092-02

Arsenic	0.875	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Cadmium	0.216	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Chromium	3.42	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Copper	17.7	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Lead	13.7	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Mercury	0.00835	ug/L	0.00100	0.00100	1	B16C203	03/11/16	03/14/16	WPCLSOP M-10	
Nickel	2.62	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Zinc	89.2	ug/L	0.500	0.500	1	B16C197	03/11/16	03/11/16	EPA 200.8	

45\_SW1 : W16C092-03

Arsenic	1.28	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Cadmium	0.205	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Chromium	9.78	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Copper	16.8	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Lead	10.5	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Mercury	0.0145	ug/L	0.00100	0.00100	1	B16C203	03/11/16	03/14/16	WPCLSOP M-10	
Nickel	8.40	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Zinc	207	ug/L	0.500	0.500	1	B16C197	03/11/16	03/11/16	EPA 200.8	

52D\_SW5 : W16C092-04

Arsenic	3.98	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Cadmium	0.881	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Chromium	165	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Copper	66.5	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Lead	86.7	ug/L	1.00	1.00	10	B16C197	03/11/16	03/11/16	EPA 200.8	
Mercury	0.109	ug/L	0.00100	0.00100	1	B16C203	03/11/16	03/14/16	WPCLSOP M-10	
Nickel	15.0	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Silver	0.105	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Zinc	501	ug/L	5.00	5.00	10	B16C197	03/11/16	03/11/16	EPA 200.8	

52D\_SW6 : W16C092-05

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**Project: Portland Harbor**  
**Work Order: W16C092**

**Client: Director's Office**  
**Received: 03/09/16 16:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Total Metals**

Total Metals by ICPMS

52D\_SW6 : W16C092-05

Arsenic	11.2	ug/L	2.00	2.00	20	B16C197	03/11/16	03/11/16	EPA 200.8	
Cadmium	2.55	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Chromium	599	ug/L	4.00	4.00	20	B16C197	03/11/16	03/11/16	EPA 200.8	
Copper	285	ug/L	4.00	4.00	20	B16C197	03/11/16	03/11/16	EPA 200.8	
Lead	293	ug/L	2.00	2.00	20	B16C197	03/11/16	03/11/16	EPA 200.8	
Mercury	0.422	ug/L	0.00450	0.00450	1	B16C203	03/11/16	03/14/16	WPCLSOP M-10	
Nickel	56.4	ug/L	4.00	4.00	20	B16C197	03/11/16	03/11/16	EPA 200.8	
Silver	0.318	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Zinc	1480	ug/L	10.0	10.0	20	B16C197	03/11/16	03/11/16	EPA 200.8	

53A\_SW1 : W16C092-06

Arsenic	1.05	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Cadmium	0.234	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Chromium	14.3	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Copper	9.61	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Lead	9.71	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Mercury	0.0100	ug/L	0.00100	0.00100	1	B16C203	03/11/16	03/14/16	WPCLSOP M-10	
Nickel	2.66	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Silver	0.104	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Zinc	477	ug/L	1.50	1.50	3	B16C197	03/11/16	03/11/16	EPA 200.8	

16\_SW1 : W16C092-07

Arsenic	1.46	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Cadmium	0.230	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Chromium	3.75	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Copper	18.2	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Lead	13.4	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Mercury	0.00998	ug/L	0.00100	0.00100	1	B16C203	03/11/16	03/14/16	WPCLSOP M-10	
Nickel	2.61	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Zinc	112	ug/L	0.500	0.500	1	B16C197	03/11/16	03/11/16	EPA 200.8	

16\_SW2 : W16C092-08

Arsenic	0.218	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Cadmium	0.343	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Chromium	1.30	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Copper	62.7	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Lead	15.8	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Mercury	0.0324	ug/L	0.00100	0.00100	1	B16C203	03/11/16	03/14/16	WPCLSOP M-10	
Nickel	4.96	ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Zinc	70.9	ug/L	0.500	0.500	1	B16C197	03/11/16	03/11/16	EPA 200.8	

17\_SW17 : W16C092-09

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16C092**

**Client: Director's Office**  
**Received: 03/09/16 16:49**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Total Metals**

Total Metals by ICPMS

17\_SW17 : W16C092-09

Arsenic	1.28 ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Cadmium	0.148 ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Chromium	4.55 ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Copper	7.85 ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Lead	8.69 ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Mercury	0.0110 ug/L	0.00100	0.00100	1	B16C204	03/11/16	03/14/16	WPCLSOP M-10	
Nickel	3.42 ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Zinc	62.6 ug/L	0.500	0.500	1	B16C197	03/11/16	03/11/16	EPA 200.8	

19\_SW2 : W16C092-10

Arsenic	0.628 ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Cadmium	0.231 ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Chromium	4.80 ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Copper	54.5 ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Lead	72.6 ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Mercury	0.0747 ug/L	0.00100	0.00100	1	B16C204	03/11/16	03/14/16	WPCLSOP M-10	
Nickel	3.10 ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Zinc	132 ug/L	0.500	0.500	1	B16C197	03/11/16	03/11/16	EPA 200.8	

FDBLANK : W16C092-11

Arsenic	ND ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Cadmium	ND ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Chromium	ND ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Copper	0.347 ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Lead	ND ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Mercury	ND ug/L	0.00100	0.00100	1	B16C204	03/11/16	03/14/16	WPCLSOP M-10	
Nickel	ND ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Zinc	1.30 ug/L	0.500	0.500	1	B16C197	03/11/16	03/11/16	EPA 200.8	Z0

FIELDUP : W16C092-12

Arsenic	1.15 ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Cadmium	0.245 ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Chromium	14.7 ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Copper	10.0 ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Lead	9.81 ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Mercury	0.0101 ug/L	0.00100	0.00100	1	B16C204	03/11/16	03/14/16	WPCLSOP M-10	
Nickel	2.78 ug/L	0.200	0.200	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16C197	03/11/16	03/11/16	EPA 200.8	
Zinc	313 ug/L	1.00	1.00	2	B16C197	03/11/16	03/11/16	EPA 200.8	

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**Project: Portland Harbor**  
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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

M2\_SW1 : W16C092-01

Acenaphthene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	0.022	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.024	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.030	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.054	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.081	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.013	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	0.043	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	0.11	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	0.020	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.025	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	0.069	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	0.20	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.0	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.23	ug/L	0.229	102%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.30	ug/L	0.229	130%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

44\_SW20 : W16C092-02

Acenaphthene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	0.10	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	0.14	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.12	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.098	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.16	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.10	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.042	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	0.12	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.013	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	0.29	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	0.028	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.058	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

44\_SW20 : W16C092-02

2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	0.047	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	0.28	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	0.56	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	J
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.4	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.23	ug/L	0.229	102%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.28	ug/L	0.229	124%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

45\_SW1 : W16C092-03

Acenaphthene	0.051	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	0.59	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	0.50	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.34	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.62	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.86	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.73	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.23	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	0.49	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.10	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	0.86	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.060	0.060	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.49	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	0.043	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	0.18	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	1.2	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	0.50	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	J
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	6.8	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.22	ug/L	0.229	96%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.29	ug/L	0.229	127%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

52D\_SW5 : W16C092-04

Reported: 04/08/16 08:13

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16C092**

**Client: Director's Office**  
**Received: 03/09/16 16:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

52D\_SW5 : W16C092-04

Acenaphthene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	0.14	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	0.27	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.20	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.28	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.37	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.37	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.094	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	0.27	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.049	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	0.51	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.21	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.080	0.080	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.080	0.080	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.080	0.080	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	0.16	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	0.71	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	2.0	1.0	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	2.0	1.0	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	2.0	1.0	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	2.2	ug/L	2.0	1.0	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	2.0	1.0	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.7	ug/L	2.0	1.0	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.23	ug/L	0.229	100%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.18	ug/L	0.229	80%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

52D\_SW6 : W16C092-05

Acenaphthene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	0.15	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	0.39	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.23	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.32	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.41	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.39	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.11	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	0.28	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.056	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	0.54	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.24	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.080	0.080	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

Reported: 04/08/16 08:13

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16C092**

**Client: Director's Office**  
**Received: 03/09/16 16:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

52D\_SW6 : W16C092-05

2-Methylnaphthalene	ND	ug/L	0.080	0.080	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.080	0.080	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	0.17	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	0.73	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	2.0	1.0	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	2.0	1.0	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	2.0	1.0	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	2.0	1.0	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	2.0	1.0	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.9	ug/L	2.0	1.0	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	J
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.10	ug/L	0.229	45%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	SU9
Fluoranthene-d10	0.045	ug/L	0.229	20%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	SU9

53A\_SW1 : W16C092-06

Acenaphthene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	0.026	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.012	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.015	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.034	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.031	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	0.027	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	0.054	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.011	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	0.030	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	0.083	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	2.6	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	0.85	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	J
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.24	ug/L	0.229	104%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.31	ug/L	0.229	136%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

16\_SW1 : W16C092-07

Reported: 04/08/16 08:13

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**Client: Director's Office**  
**Received: 03/09/16 16:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

16\_SW1 : W16C092-07

Acenaphthene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	0.020	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	0.038	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.044	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.053	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.097	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.084	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.020	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	0.070	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	0.16	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	0.023	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.038	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	0.079	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	0.24	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	0.57	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	J
Bis(2-ethylhexyl) phthalate	3.3	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.21	ug/L	0.229	94%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.28	ug/L	0.229	120%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

16\_SW2 : W16C092-08

Acenaphthene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.015	0.015	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

Reported: 04/08/16 08:13

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

16\_SW2 : W16C092-08

2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	0.022	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.4	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.21	ug/L	0.229	92%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.29	ug/L	0.229	125%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

17\_SW17 : W16C092-09

Acenaphthene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	0.022	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.016	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.019	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.022	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	0.013	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	0.039	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	0.022	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	0.062	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.3	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.20	ug/L	0.229	88%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.28	ug/L	0.229	122%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

19\_SW2 : W16C092-10

Reported: 04/08/16 08:13

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16C092**

**Client: Director's Office**  
**Received: 03/09/16 16:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

19\_SW2 : W16C092-10

Acenaphthene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	0.029	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.035	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.041	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.065	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.097	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.016	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	0.063	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	0.16	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	0.026	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.030	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	0.050	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	0.12	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	0.28	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	0.54	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	J
Di-n-octyl phthalate	0.51	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	J
Bis(2-ethylhexyl) phthalate	4.8	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.25	ug/L	0.229	109%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.27	ug/L	0.229	119%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

FDBLANK : W16C092-11

Acenaphthene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16C092**

**Client: Director's Office**  
**Received: 03/09/16 16:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

FDBLANK : W16C092-11

2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.20	ug/L	0.229	86%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.28	ug/L	0.229	123%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

FIELDUP : W16C092-12

Acenaphthene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	H4
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.010	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	M1
Benzo(a)pyrene	0.014	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.030	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.026	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Chrysene	0.022	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene	0.049	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	F0
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Phenanthrene	0.029	ug/L	0.020	0.020	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Pyrene	0.073	ug/L	0.010	0.010	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Dimethyl phthalate	2.6	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	0.89	ug/L	1.0	0.50	1	B16C276	03/16/16	03/17/16	EPA 8270-SIM	J
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.20	ug/L	0.229	90%	60.4-153	B16C276	03/16/16	03/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.28	ug/L	0.229	122%	69-149	B16C276	03/16/16	03/17/16	EPA 8270-SIM	

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**Project: Portland Harbor**  
**Work Order: W16C092**

**Client: Director's Office**  
**Received: 03/09/16 16:49**

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B16C224</b>										
<b>Blank (B16C224-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					03/12/16 :03/13/16	
<b>LCS (B16C224-BS1)</b>										
Total suspended solids	91	mg/L			100		91% (90-110)		03/12/16 :03/13/16	
<b>Duplicate (B16C224-DUP1) Source: W16C092-01</b>										
Total suspended solids	41	mg/L	2	2		44	7 (20)		03/12/16 :03/13/16	
<b>Duplicate (B16C224-DUP2) Source: W16C099-01</b>										
Total suspended solids	2	mg/L	2	2		3	33 (20)		03/12/16 :03/13/16	M8

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B16C197</b>										
<b>Blank (B16C197-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					03/11/16 :03/11/16	
Cadmium	ND	ug/L	0.100	0.100					03/11/16 :03/11/16	
Chromium	ND	ug/L	0.200	0.200					03/11/16 :03/11/16	
Copper	ND	ug/L	0.200	0.200					03/11/16 :03/11/16	
Lead	ND	ug/L	0.100	0.100					03/11/16 :03/11/16	
Nickel	ND	ug/L	0.200	0.200					03/11/16 :03/11/16	
Silver	ND	ug/L	0.100	0.100					03/11/16 :03/11/16	
Zinc	ND	ug/L	0.500	0.500					03/11/16 :03/11/16	
<b>LCS (B16C197-BS1)</b>										
Arsenic	10.6	ug/L	0.100	0.100	10.0		106% (85-115)		03/11/16 :03/11/16	
Cadmium	10.6	ug/L	0.100	0.100	10.0		106% (85-115)		03/11/16 :03/11/16	
Chromium	10.2	ug/L	0.200	0.200	10.0		102% (85-115)		03/11/16 :03/11/16	
Copper	10.4	ug/L	0.200	0.200	10.0		104% (85-115)		03/11/16 :03/11/16	
Lead	10.6	ug/L	0.100	0.100	10.0		106% (85-115)		03/11/16 :03/11/16	
Nickel	10.4	ug/L	0.200	0.200	10.0		104% (85-115)		03/11/16 :03/11/16	
Silver	10.8	ug/L	0.100	0.100	10.0		108% (85-115)		03/11/16 :03/11/16	
Zinc	52.9	ug/L	0.500	0.500	50.0		106% (85-115)		03/11/16 :03/11/16	
<b>Duplicate (B16C197-DUP2) Source: W16C091-09</b>										
Arsenic	0.275	ug/L	0.100	0.100		0.269	2 (20)		03/11/16 :03/11/16	
Cadmium	ND	ug/L	0.100	0.100		ND	(20)		03/11/16 :03/11/16	

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**Work Order: W16C092**

**Client: Director's Office**  
**Received: 03/09/16 16:49**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16C197**

<b>Duplicate (B16C197-DUP2)</b>		<b>Source: W16C091-09</b>								
Chromium	0.668	ug/L	0.200	0.200		0.644		4 (20)	03/11/16 :03/11/16	
Copper	5.11	ug/L	0.200	0.200		4.83		6 (20)	03/11/16 :03/11/16	
Lead	2.14	ug/L	0.100	0.100		2.03		5 (20)	03/11/16 :03/11/16	
Nickel	0.621	ug/L	0.200	0.200		0.618		0.4 (20)	03/11/16 :03/11/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	03/11/16 :03/11/16	
Zinc	45.9	ug/L	0.500	0.500		44.3		4 (20)	03/11/16 :03/11/16	

<b>Duplicate (B16C197-DUP3)</b>		<b>Source: W16C092-09</b>								
Arsenic	1.26	ug/L	0.100	0.100		1.28		2 (20)	03/11/16 :03/11/16	
Cadmium	0.142	ug/L	0.100	0.100		0.148		4 (20)	03/11/16 :03/11/16	
Chromium	4.43	ug/L	0.200	0.200		4.55		2 (20)	03/11/16 :03/11/16	
Copper	8.01	ug/L	0.200	0.200		7.85		2 (20)	03/11/16 :03/11/16	
Lead	8.51	ug/L	0.100	0.100		8.69		2 (20)	03/11/16 :03/11/16	
Nickel	3.38	ug/L	0.200	0.200		3.42		1 (20)	03/11/16 :03/11/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	03/11/16 :03/11/16	
Zinc	62.7	ug/L	0.500	0.500		62.6		0.2 (20)	03/11/16 :03/11/16	

<b>Duplicate (B16C197-DUP5)</b>		<b>Source: W16C093-03</b>								
Arsenic	0.175	ug/L	0.100	0.100		0.174		0.8 (20)	03/11/16 :03/11/16	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	03/11/16 :03/11/16	
Chromium	0.308	ug/L	0.200	0.200		0.289		6 (20)	03/11/16 :03/11/16	
Copper	3.21	ug/L	0.200	0.200		3.12		3 (20)	03/11/16 :03/11/16	
Lead	1.70	ug/L	0.100	0.100		1.63		4 (20)	03/11/16 :03/11/16	
Nickel	0.437	ug/L	0.200	0.200		0.422		4 (20)	03/11/16 :03/11/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	03/11/16 :03/11/16	
Zinc	32.3	ug/L	0.500	0.500		31.4		3 (20)	03/11/16 :03/11/16	

<b>Matrix Spike (B16C197-MS1)</b>		<b>Source: W16C091-09</b>								
Arsenic	10.2	ug/L	0.100	0.100	10.0	0.269	99% (70-130)		03/11/16 :03/11/16	
Cadmium	9.91	ug/L	0.100	0.100	10.0	ND	99% (70-130)		03/11/16 :03/11/16	
Chromium	10.3	ug/L	0.200	0.200	10.0	0.644	96% (70-130)		03/11/16 :03/11/16	
Copper	14.7	ug/L	0.200	0.200	10.0	4.83	98% (70-130)		03/11/16 :03/11/16	
Lead	12.1	ug/L	0.100	0.100	10.0	2.03	100% (70-130)		03/11/16 :03/11/16	
Nickel	10.5	ug/L	0.200	0.200	10.0	0.618	99% (70-130)		03/11/16 :03/11/16	
Silver	10.0	ug/L	0.100	0.100	10.0	ND	100% (70-130)		03/11/16 :03/11/16	
Zinc	93.6	ug/L	0.500	0.500	50.0	44.3	99% (70-130)		03/11/16 :03/11/16	

<b>Matrix Spike (B16C197-MS2)</b>		<b>Source: W16C092-09</b>								
Arsenic	10.8	ug/L	0.100	0.100	10.0	1.28	95% (70-130)		03/11/16 :03/11/16	
Cadmium	9.84	ug/L	0.100	0.100	10.0	0.148	97% (70-130)		03/11/16 :03/11/16	
Chromium	14.2	ug/L	0.200	0.200	10.0	4.55	97% (70-130)		03/11/16 :03/11/16	
Copper	16.9	ug/L	0.200	0.200	10.0	7.85	90% (70-130)		03/11/16 :03/11/16	
Lead	18.2	ug/L	0.100	0.100	10.0	8.69	95% (70-130)		03/11/16 :03/11/16	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16C092**

**Client: Director's Office**  
**Received: 03/09/16 16:49**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16C197**

<b>Matrix Spike (B16C197-MS2)</b>		<b>Source: W16C092-09</b>								
Nickel	13.0	ug/L	0.200	0.200	10.0	3.42	96% (70-130)		03/11/16 :03/11/16	
Silver	9.83	ug/L	0.100	0.100	10.0	ND	98% (70-130)		03/11/16 :03/11/16	
Zinc	107	ug/L	0.500	0.500	50.0	62.6	89% (70-130)		03/11/16 :03/11/16	

<b>Matrix Spike (B16C197-MS3)</b>		<b>Source: W16C093-03</b>								
Arsenic	9.73	ug/L	0.100	0.100	10.0	0.174	96% (70-130)		03/11/16 :03/11/16	
Cadmium	9.66	ug/L	0.100	0.100	10.0	ND	97% (70-130)		03/11/16 :03/11/16	
Chromium	9.50	ug/L	0.200	0.200	10.0	0.289	92% (70-130)		03/11/16 :03/11/16	
Copper	12.6	ug/L	0.200	0.200	10.0	3.12	94% (70-130)		03/11/16 :03/11/16	
Lead	11.3	ug/L	0.100	0.100	10.0	1.63	97% (70-130)		03/11/16 :03/11/16	
Nickel	9.85	ug/L	0.200	0.200	10.0	0.422	94% (70-130)		03/11/16 :03/11/16	
Silver	9.93	ug/L	0.100	0.100	10.0	ND	99% (70-130)		03/11/16 :03/11/16	
Zinc	78.6	ug/L	0.500	0.500	50.0	31.4	94% (70-130)		03/11/16 :03/11/16	

**Total Metals by ICPMS - Batch B16C203**

<b>Blank (B16C203-BLK1)</b>										
Mercury	ND	ug/L	0.000900	0.000900					03/11/16 :03/14/16	

<b>LCS (B16C203-BS1)</b>										
Mercury	0.00979	ug/L	0.000900	0.000900	0.0100		98% (85-125)		03/11/16 :03/14/16	

<b>Duplicate (B16C203-DUP1)</b>		<b>Source: W16C092-01</b>								
Mercury	0.00466	ug/L	0.00100	0.00100		0.00434		7 (20)	03/11/16 :03/14/16	

<b>Matrix Spike (B16C203-MS1)</b>		<b>Source: W16C092-01</b>								
Mercury	0.0258	ug/L	0.00100	0.00100	0.0222	0.00434	96% (70-130)		03/11/16 :03/14/16	

**Total Metals by ICPMS - Batch B16C204**

<b>Blank (B16C204-BLK1)</b>										
Mercury	ND	ug/L	0.000900	0.000900					03/11/16 :03/14/16	

<b>LCS (B16C204-BS1)</b>										
Mercury	0.00974	ug/L	0.000900	0.000900	0.0100		97% (85-125)		03/11/16 :03/14/16	

<b>Duplicate (B16C204-DUP1)</b>		<b>Source: W16C093-01</b>								
Mercury	0.00526	ug/L	0.00100	0.00100		0.00515		2 (20)	03/11/16 :03/14/16	

<b>Matrix Spike (B16C204-MS1)</b>		<b>Source: W16C093-01</b>								
Mercury	0.0263	ug/L	0.00100	0.00100	0.0222	0.00515	95% (70-130)		03/11/16 :03/14/16	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16C092**

**Client: Director's Office**  
**Received: 03/09/16 16:49**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16C276**

**Blank (B16C276-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					03/16/16 :03/17/16	
Acenaphthylene	ND	ug/L	0.020	0.020					03/16/16 :03/17/16	
Anthracene	ND	ug/L	0.020	0.020					03/16/16 :03/17/16	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Chrysene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Fluoranthene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Fluorene	ND	ug/L	0.020	0.020					03/16/16 :03/17/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					03/16/16 :03/17/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					03/16/16 :03/17/16	
Naphthalene	ND	ug/L	0.040	0.040					03/16/16 :03/17/16	
Phenanthrene	ND	ug/L	0.020	0.020					03/16/16 :03/17/16	
Pyrene	ND	ug/L	0.010	0.010					03/16/16 :03/17/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					03/16/16 :03/17/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					03/16/16 :03/17/16	
Diethyl phthalate	ND	ug/L	1.0	0.50					03/16/16 :03/17/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					03/16/16 :03/17/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					03/16/16 :03/17/16	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					03/16/16 :03/17/16	

**Surrogate**

2-Methylnaphthalene-d10	0.23	ug/L			0.229		102% (60.4-153)		03/16/16 :03/17/16	
Fluoranthene-d10	0.32	ug/L			0.229		139% (69-149)		03/16/16 :03/17/16	

**LCS (B16C276-BS1)**

Acenaphthene	0.505	ug/L	0.020	0.020	0.457		110% (58.8-155)		03/16/16 :03/17/16	
Acenaphthylene	0.552	ug/L	0.020	0.020	0.457		121% (64-155)		03/16/16 :03/17/16	
Anthracene	0.522	ug/L	0.020	0.020	0.457		114% (76.2-129)		03/16/16 :03/17/16	
Benzo(a)anthracene	0.542	ug/L	0.010	0.010	0.457		118% (72.9-138)		03/16/16 :03/17/16	
Benzo(a)pyrene	0.501	ug/L	0.010	0.010	0.457		110% (75.5-137)		03/16/16 :03/17/16	
Benzo(b)fluoranthene	0.487	ug/L	0.010	0.010	0.457		107% (59.9-160)		03/16/16 :03/17/16	
Benzo(g,h,i)perylene	0.451	ug/L	0.010	0.010	0.457		99% (70.1-134)		03/16/16 :03/17/16	
Benzo(k)fluoranthene	0.459	ug/L	0.010	0.010	0.457		100% (61.1-157)		03/16/16 :03/17/16	
Chrysene	0.499	ug/L	0.010	0.010	0.457		109% (76.7-146)		03/16/16 :03/17/16	
Dibenzo(a,h)anthracene	0.449	ug/L	0.010	0.010	0.457		98% (63.9-140)		03/16/16 :03/17/16	
Fluoranthene	0.573	ug/L	0.010	0.010	0.457		125% (77.5-134)		03/16/16 :03/17/16	
Fluorene	0.518	ug/L	0.020	0.020	0.457		113% (61.2-157)		03/16/16 :03/17/16	

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**Project: Portland Harbor**  
**Work Order: W16C092**

**Client: Director's Office**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16C276**

**LCS (B16C276-BS1)**

Indeno(1,2,3-cd)pyrene	0.458	ug/L	0.010	0.010	0.457		100% (68.4-135)		03/16/16 :03/17/16	
1-Methylnaphthalene	0.487	ug/L	0.040	0.040	0.457		106% (79.6-158)		03/16/16 :03/17/16	
2-Methylnaphthalene	0.481	ug/L	0.040	0.040	0.457		105% (76-161)		03/16/16 :03/17/16	
Naphthalene	0.486	ug/L	0.040	0.040	0.457		106% (60.6-164)		03/16/16 :03/17/16	
Phenanthrene	0.498	ug/L	0.020	0.020	0.457		109% (77.4-140)		03/16/16 :03/17/16	
Pyrene	0.582	ug/L	0.010	0.010	0.457		127% (81.1-141)		03/16/16 :03/17/16	
Butyl benzyl phthalate	5.54	ug/L	1.0	0.50	4.57		121% (54.7-176)		03/16/16 :03/17/16	V1
Di-n-butyl phthalate	6.31	ug/L	1.0	0.50	4.57		138% (74.3-149)		03/16/16 :03/17/16	V1
Diethyl phthalate	6.06	ug/L	1.0	0.50	4.57		133% (75.5-173)		03/16/16 :03/17/16	
Dimethyl phthalate	5.80	ug/L	1.0	0.50	4.57		127% (81.6-148)		03/16/16 :03/17/16	
Di-n-octyl phthalate	5.82	ug/L	1.0	0.50	4.57		127% (60.2-155)		03/16/16 :03/17/16	V1
Bis(2-ethylhexyl) phthalate	5.53	ug/L	1.0	0.50	4.57		121% (64.4-162)		03/16/16 :03/17/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.25	ug/L			0.229		109% (60.4-153)		03/16/16 :03/17/16	
Fluoranthene-d10	0.32	ug/L			0.229		140% (69-149)		03/16/16 :03/17/16	

**Duplicate (B16C276-DUP1)**

**Source: W16C092-12**

Acenaphthene	ND	ug/L	0.020	0.020		ND	(50)		03/16/16 :03/17/16	
Acenaphthylene	ND	ug/L	0.020	0.020		ND	(50)		03/16/16 :03/17/16	
Anthracene	0.0211	ug/L	0.020	0.020		ND	(50)		03/16/16 :03/17/16	
Benzo(a)anthracene	0.0171	ug/L	0.010	0.010	0.0103		50 (50)		03/16/16 :03/17/16	M1
Benzo(a)pyrene	0.0200	ug/L	0.010	0.010	0.0143		33 (50)		03/16/16 :03/17/16	
Benzo(b)fluoranthene	0.0371	ug/L	0.010	0.010	0.0297		22 (50)		03/16/16 :03/17/16	
Benzo(g,h,i)perylene	0.0303	ug/L	0.010	0.010	0.0257		16 (50)		03/16/16 :03/17/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010		ND	(50)		03/16/16 :03/17/16	
Chrysene	0.0240	ug/L	0.010	0.010	0.0217		10 (50)		03/16/16 :03/17/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010		ND	(50)		03/16/16 :03/17/16	
Fluoranthene	0.0571	ug/L	0.010	0.010	0.0491		15 (50)		03/16/16 :03/17/16	
Fluorene	ND	ug/L	0.020	0.020		ND	(50)		03/16/16 :03/17/16	
Indeno(1,2,3-cd)pyrene	0.0114	ug/L	0.010	0.010		ND	(50)		03/16/16 :03/17/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040		ND	(50)		03/16/16 :03/17/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040		ND	(50)		03/16/16 :03/17/16	
Naphthalene	ND	ug/L	0.040	0.040		ND	(50)		03/16/16 :03/17/16	
Phenanthrene	0.0297	ug/L	0.020	0.020	0.0286		4 (50)		03/16/16 :03/17/16	
Pyrene	0.0857	ug/L	0.010	0.010	0.0731		16 (50)		03/16/16 :03/17/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50		ND	(50)		03/16/16 :03/17/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50		ND	(50)		03/16/16 :03/17/16	
Diethyl phthalate	ND	ug/L	1.0	0.50		ND	(50)		03/16/16 :03/17/16	
Dimethyl phthalate	2.60	ug/L	1.0	0.50	2.58		0.7 (50)		03/16/16 :03/17/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50		ND	(50)		03/16/16 :03/17/16	
Bis(2-ethylhexyl) phthalate	0.815	ug/L	1.0	0.50	0.894		9 (50)		03/16/16 :03/17/16	J

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**Project: Portland Harbor**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Polynuclear Aromatics &amp; Phthalates by GCMS-SIM - Batch B16C276</b>										
<b>Duplicate (B16C276-DUP1)</b>			<b>Source: W16C092-12</b>							
<i>Surrogate</i>										
2-Methylnaphthalene-d10	0.21	ug/L			0.229		94% (60.4-153)		03/16/16 :03/17/16	
Fluoranthene-d10	0.30	ug/L			0.229		130% (69-149)		03/16/16 :03/17/16	
<b>Matrix Spike (B16C276-MS1)</b>			<b>Source: W16C092-12</b>							
Acenaphthene	0.479	ug/L	0.020	0.020	0.457	ND	105% (58.8-155)		03/16/16 :03/17/16	
Acenaphthylene	0.451	ug/L	0.020	0.020	0.457	ND	99% (64-155)		03/16/16 :03/17/16	
Anthracene	0.498	ug/L	0.020	0.020	0.457	ND	109% (76.2-129)		03/16/16 :03/17/16	
Benzo(a)anthracene	0.521	ug/L	0.010	0.010	0.457	0.0103	112% (72.9-138)		03/16/16 :03/17/16	
Benzo(a)pyrene	0.461	ug/L	0.010	0.010	0.457	0.0143	98% (75.5-137)		03/16/16 :03/17/16	
Benzo(b)fluoranthene	0.458	ug/L	0.010	0.010	0.457	0.0297	94% (59.9-160)		03/16/16 :03/17/16	
Benzo(g,h,i)perylene	0.394	ug/L	0.010	0.010	0.457	0.0257	81% (70.1-134)		03/16/16 :03/17/16	
Benzo(k)fluoranthene	0.409	ug/L	0.010	0.010	0.457	ND	89% (61.1-157)		03/16/16 :03/17/16	
Chrysene	0.497	ug/L	0.010	0.010	0.457	0.0217	104% (76.7-146)		03/16/16 :03/17/16	
Dibenzo(a,h)anthracene	0.371	ug/L	0.010	0.010	0.457	ND	81% (63.9-140)		03/16/16 :03/17/16	
Fluoranthene	0.564	ug/L	0.010	0.010	0.457	0.0491	113% (77.5-134)		03/16/16 :03/17/16	
Fluorene	0.479	ug/L	0.020	0.020	0.457	ND	105% (61.2-157)		03/16/16 :03/17/16	
Indeno(1,2,3-cd)pyrene	0.385	ug/L	0.010	0.010	0.457	ND	84% (68.4-135)		03/16/16 :03/17/16	
1-Methylnaphthalene	0.427	ug/L	0.040	0.040	0.457	ND	94% (79.6-159)		03/16/16 :03/17/16	
2-Methylnaphthalene	0.425	ug/L	0.040	0.040	0.457	ND	93% (76-161)		03/16/16 :03/17/16	
Naphthalene	0.458	ug/L	0.040	0.040	0.457	ND	100% (60.6-164)		03/16/16 :03/17/16	
Phenanthrene	0.493	ug/L	0.020	0.020	0.457	0.0286	102% (77.4-140)		03/16/16 :03/17/16	
Pyrene	0.593	ug/L	0.010	0.010	0.457	0.0731	114% (81.1-141)		03/16/16 :03/17/16	
Butyl benzyl phthalate	6.31	ug/L	1.0	0.50	4.57	ND	138% (54.7-176)		03/16/16 :03/17/16	V1
Di-n-butyl phthalate	5.87	ug/L	1.0	0.50	4.57	ND	128% (74.3-149)		03/16/16 :03/17/16	V1
Diethyl phthalate	5.50	ug/L	1.0	0.50	4.57	ND	120% (75.5-173)		03/16/16 :03/17/16	
Dimethyl phthalate	7.97	ug/L	1.0	0.50	4.57	2.58	118% (81.6-148)		03/16/16 :03/17/16	
Di-n-octyl phthalate	4.38	ug/L	1.0	0.50	4.57	ND	96% (60.2-155)		03/16/16 :03/17/16	V1
Bis(2-ethylhexyl) phthalate	5.19	ug/L	1.0	0.50	4.57	0.894	94% (64.4-162)		03/16/16 :03/17/16	V1
<i>Surrogate</i>										
2-Methylnaphthalene-d10	0.22	ug/L			0.229		96% (60.4-153)		03/16/16 :03/17/16	
Fluoranthene-d10	0.29	ug/L			0.229		126% (69-149)		03/16/16 :03/17/16	

Reported: 04/08/16 08:13

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



City of Portland  
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W16C092**

Client: Director's Office  
Received: 03/09/16 16:49

**Qualifiers**

- F0 Analyte was detected in the duplicate of this sample.
- H4 Compliance with holding time requirement could not be verified because sample collection time was not available.
- J Analyte was detected but at a concentration below the reporting limit; the result is an estimate.
- M1 Matrix duplicate precision measurement indicates non-homogeneous sample matrix. Sample result should be considered an estimate.
- M8 The matrix duplicate control limit is not applicable at concentrations less than 5 times the reporting limit.
- SU9 Low surrogate recovery is likely due to the high level of suspended solids in the sample.
- V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.
- Z0 Result was confirmed by re-analysis of a separate aliquot.

**Definitions**

- |        |   |     |  |
|--------|---|-----|--|
| DET    | Analyte Detected                          | ND  | Analyte Not Detected at or above the reporting limit |
| MRL    | Method Reporting Limit                    | MDL | Method Detection Limit                               |
| NR     | Not Reportable                            | dry | Sample results reported on a dry weight basis        |
| % Rec. | Percent Recovery                          | RPD | Relative Percent Difference                          |
| *      | This analyte is not certified under NELAP |     |  |

Reported: 04/08/16 08:13

Jennifer Shackelford, Laboratory Coordinator QA/QC

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody



Bureau of Environmental Services

Client Name: Director's Office Matrix: Stormwater  
 Project Name: Portland Harbor

Date: 3/8/16  
 Work Order #: W16C092  
 Collected By: MJS, JSM

Requested Analyses

Lab Number	2016 Stormwater Outfall Monitoring COC			Sample Type	TSS	Total Metals (As, Cd, Cr, Cu, Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs + phthalates (low-level)	Pesticides (Low-level)	Conductivity (umhos/cm) Meter: Smartroll 2+3	pH (pH units) Meter: Smartroll 2+3	Temperature (Deg C) Meter: Smartroll 2+3	# of Containers	Remarks
	Location ID	Sample Date	Sample Time												
01	M2_SW1	3/9/2016	1010	G	•	•	•	•	•	•	43	6.1	10.4		SW-M2-AAM169 5949 N BASIN AVE DS OF MH
02	44_SW20	3/9/2016	1039	G	•	•	•	•	•	•	27	6.4	10.6		SW-44-ABC352 931 N River St, DS of MH
03	45_SW1	3/9/2016	1053	G	•	•	•	•	•	•	30	6.4	10.2		SW-45-ABC319 N Essex & River, DS of MH
04	52D_SW5	3/9/2016	1132	G	•	•	•	•	•	•	110	7.2	9.8		SW-52D-APT249 9930 N Burgard Way, at MH
05	52D_SW6	3/9/2016	1150	G	•	•	•	•	•	•	142	9.3	10.8		SW-52D-APT252-Surface Container Mgmt Swale Ret. Swale
06	53A_SW1	3/9/2016	1253	G	•	•	•	•	•	•	65	7.7	10.4		SW-53A-AAA170 13939 N Rivergate Blvd, at MH
07	16_SW1	3/9/2016	1350	G	•	•	•	•	•	•	31	6.9	10.4		SW-16-AXX408 3551 NW Front Ave, DS of MH
08	16_SW2	3/9/2016	1412	G	•	•	•	•	•	•	71	6.9	10.1		SW-16-ANH937-SE 2615 NW Industrial St, US in 12"
09	SW17 17_TSW#	3/9/2016	1446	G	•	•	•	•	•	•	91	7.4	9.5		SW17-AAT596 3721 NW Front Ave, Vault Outlet
10	19_SW2	3/9/2016	1540	G	•	•	•	•	•	•	8	7.7	10.1		SW-19-CALBAG Calbag SMH, 4927 NW Front Ave

Received By: [Signature] Date: 3/9/16 Time: 1649  
 Reinquished By: [Signature] Date: 3/9/16 Time: 1649  
 Received By: [Signature] Date: 3/9/16 Time: 1649  
 Reinquished By: [Signature] Date: 3/9/16 Time: 1649



**WPCL Cooler Receipt Form**

Work Order Number: W16C092

Cooler Receipt Form Filled Out By: mz

Project: Portland Harbor

Sample transport: Samples received on ice  Courier \_\_\_\_\_

Directly from field \_\_\_\_\_

Temperature (°C) 8

	Yes	No	NA
Is the COC present and signed?	<input checked="" type="checkbox"/>		
Are sample bottles intact?			
Do the COC and sample labels match?			
Are the appropriate containers used?			
Are samples appropriately preserved?			
Do VOA vials have Headspace?			
Are samples received within holding times?			

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	<u>1501753</u>	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
<u>3/9/16</u>	<u>1720</u>	<u>mz</u>	<u>W16C092(01-12)</u>	<u>C</u>	<u>1</u>	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

April 07, 2016

**Analytical Report for Service Request No: K1602473**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W16C092**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory March 10, 2016  
For your reference, these analyses have been assigned our service request number **K1602473**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
Idaho DHW	<a href="http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx">http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L14-50
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Michigan DEQ	<a href="http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html">http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html</a>	9949
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wisconsin DNR	<a href="http://dnr.wi.gov/">http://dnr.wi.gov/</a>	998386840
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS ENVIRONMENTAL

**Client:** Portland, City of  
**Project:** Portland Harbor/ W16C092  
**Sample Matrix:** Water

**Service Request No.:** K1602473  
**Date Received:** 03/10/16

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

#### Sample Receipt

Twelve water samples were received for analysis at ALS Environmental on 03/10/16. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### Organochlorine Pesticides by EPA Method 8081

##### **Second Source Exceptions:**

The analysis of Chlorinated Pesticides by EPA 8081 requires the use of dual column confirmation. When the Initial Calibration Verification (ICV) criteria are met for both columns, the lower of the two sample results is generally reported. The criteria were not met for Endrin Aldehyde in CAL 14410. The data quality was not affected. No further corrective action was necessary.

##### **Calibration Verification Exceptions:**

The analysis of Chlorinated Pesticides by EPA 8081B requires the use of dual column confirmation. When the Continuing Calibration Verification (CCV) criterion is met for both columns, the lower of the two sample results is generally reported. The primary evaluation criteria were not met on the confirmation column for Decachlorobiphenyl, Endrin Ketone and Methoxychlor. The results were reported from the column with an acceptable CCV. The data quality was not affected. No further corrective action was necessary.

##### **Matrix Spike Recovery Exceptions:**

Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD for these samples.

##### **Elevated Detection Limits:**

The reporting limit is elevated for several analytes in both field samples. The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compounds at the reporting limit. The results are flagged to indicate the matrix interference.

No other anomalies associated with the analysis of these samples were observed.

Approved by \_\_\_\_\_



**Chlorinated Biphenyl Congeners by EPA Method 1668C**

The analysis for PCB Congeners was performed at Pace Analytical in Minneapolis, MN. The data for this analysis is included in the corresponding section of this report.

Approved by 



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

**SUBCONTRACT ORDER**  
**City of Portland Water Pollution Control Lab**  
**W16C092**

K1602473

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

ALS Environmental  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

WPCL Project Name  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>	
<input checked="" type="checkbox"/> Standard	
<input type="checkbox"/> Rush _ day(s)	

Analysis	Due	Expires	Laboratory ID	Comments
----------	-----	---------	---------------	----------

<b>Sample ID: W16C092-01</b>	<b>Water</b>	<b>Sampled:03/09/16 10:10</b>		
Out-PCB Congeners 209	03/23/16 17:00	09/05/16 10:10		
<i>Containers Supplied:</i> G amber 1L (A)				

<b>Sample ID: W16C092-02</b>	<b>Water</b>	<b>Sampled:03/09/16 10:39</b>		
<del>Out-Pesticides Chlor LL</del>	03/23/16 17:00	03/16/16 10:39		* Report to MDL *
Out-PCB Congeners 209	03/23/16 17:00	09/05/16 10:39		
<i>Containers Supplied:</i> G amber 1L (A)      G amber 1L (E)				

<b>Sample ID: W16C092-03</b>	<b>Water</b>	<b>Sampled:03/09/16 10:53</b>		
Out-PCB Congeners 209	03/23/16 17:00	09/05/16 10:53		
<i>Containers Supplied:</i> G amber 1L (A)				

<b>Sample ID: W16C092-04</b>	<b>Water</b>	<b>Sampled:03/09/16 11:32</b>		
Out-PCB Congeners 209	03/23/16 17:00	09/05/16 11:32		
<i>Containers Supplied:</i> G amber 1L (A)				

<b>Sample ID: W16C092-05</b>	<b>Water</b>	<b>Sampled:03/09/16 11:50</b>		
Out-PCB Congeners 209	03/23/16 17:00	09/05/16 11:50		
<i>Containers Supplied:</i> G amber 1L (A)				

<i>Kristen Thomas</i>	<i>3/10/16</i>	<i>Jeff ALS</i>	<i>3/10/16</i>	<i>1145</i>
Released By	Date	Received By	Date	
		<i>[Signature]</i>	<i>3/10/16</i>	<i>1340</i>
Released By	Date	Received By	Date	

**SUBCONTRACT ORDER**  
**City of Portland Water Pollution Control Lab**  
**W16C092**

K1602473

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W16C092-06</b>				
Out-PCB Congeners 209	Water	03/23/16 17:00	09/05/16 12:53	Sampled:03/09/16 12:53
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16C092-07</b>				
Out-PCB Congeners 209	Water	03/23/16 17:00	09/05/16 13:50	Sampled:03/09/16 13:50
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16C092-08</b>				
Out-PCB Congeners 209	Water	03/23/16 17:00	09/05/16 14:12	Sampled:03/09/16 14:12
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16C092-09</b>				
Out-Pesticides Chlor LL	Water	03/23/16 17:00	03/16/16 14:46	Sampled:03/09/16 14:46
Out-PCB Congeners 209	Water	03/23/16 17:00	09/05/16 14:46	Sampled:03/09/16 14:46
<i>Containers Supplied:</i> G amber 1L (A)      G amber 1L (E)				
<b>Sample ID: W16C092-10</b>				
Out-PCB Congeners 209	Water	03/23/16 17:00	09/05/16 15:40	Sampled:03/09/16 15:40
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16C092-11</b>				
Out-PCB Congeners 209	Water	03/23/16 17:00	09/05/16 14:08	Sampled:03/09/16 14:08
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16C092-12</b>				
Out-PCB Congeners 209	Water	03/23/16 17:00	09/05/16 00:00	Sampled:03/09/16 00:00
<i>Containers Supplied:</i> G amber 1L (A)				

Kurt Thomas	3/10/16	Dwyer ALS 3-10-16	1145
Released By	Date	Received By	Date
		[Signature]	3/10/16 1340
Released By	Date	Received By	Date



PC H2

### Cooler Receipt and Preservation Form

Client City of PDX Service Request K16 02473  
 Received: 3/10/10 Opened: 3/10/10 By: [Signature] Unloaded: 3/10/10 By: [Signature]

- Samples were received via?  Mail  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- Samples were received in: (circle)  Cooler  Box  Envelope  Other \_\_\_\_\_ NA
- Were custody seals on coolers? NA Y  N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
5.0	5.1	-	-	-0.2	323	NA		NA	
2.7	2.4	-	-	-0.3	317				

- Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves \_\_\_\_\_
- Were custody papers properly filled out (ink, signed, etc.)? NA  Y N
- Did all bottles arrive in good condition (unbroken)? Indicate in the table below. NA  Y N
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y N
- Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA  Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y N
- Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below  NA Y N
- Were VOA vials received without headspace? Indicate in the table below.  NA Y N
- Was C12/Res negative? NA  Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Organochlorine Pesticides

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W16C092  
**Sample Matrix:** Water

**Service Request:** K1602473  
**Date Collected:** 03/09/2016  
**Date Received:** 03/10/2016

Organochlorine Pesticides

**Sample Name:** W16C092-02  
**Lab Code:** K1602473-002  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	Ui	1.1	0.55	1	03/16/16	03/18/16	KWG1602066	
beta-BHC	ND	U	1.1	0.48	1	03/16/16	03/18/16	KWG1602066	
gamma-BHC (Lindane)	ND	Ui	1.3	1.3	1	03/16/16	03/18/16	KWG1602066	
delta-BHC	ND	U	1.1	0.21	1	03/16/16	03/18/16	KWG1602066	
Heptachlor	ND	U	1.1	0.14	1	03/16/16	03/18/16	KWG1602066	
Aldrin	ND	U	1.1	0.21	1	03/16/16	03/18/16	KWG1602066	
Heptachlor Epoxide	ND	U	1.1	0.71	1	03/16/16	03/18/16	KWG1602066	
gamma-Chlordane†	ND	U	1.1	0.22	1	03/16/16	03/18/16	KWG1602066	
Endosulfan I	ND	U	1.1	0.16	1	03/16/16	03/18/16	KWG1602066	
alpha-Chlordane	ND	Ui	2.4	2.4	1	03/16/16	03/18/16	KWG1602066	
Dieldrin	ND	U	1.1	0.24	1	03/16/16	03/18/16	KWG1602066	
4,4'-DDE	ND	U	1.1	0.12	1	03/16/16	03/18/16	KWG1602066	
Endrin	ND	Ui	1.1	0.59	1	03/16/16	03/18/16	KWG1602066	
Endosulfan II	ND	U	1.1	0.21	1	03/16/16	03/18/16	KWG1602066	
4,4'-DDD	ND	U	1.1	0.29	1	03/16/16	03/18/16	KWG1602066	
Endrin Aldehyde	ND	Ui	3.8	3.8	1	03/16/16	03/18/16	KWG1602066	
Endosulfan Sulfate	ND	U	1.1	0.86	1	03/16/16	03/18/16	KWG1602066	
4,4'-DDT	ND	Ui	3.4	3.4	1	03/16/16	03/18/16	KWG1602066	
Endrin Ketone	ND	U	1.1	0.29	1	03/16/16	03/18/16	KWG1602066	
Methoxychlor	ND	U	1.1	0.23	1	03/16/16	03/18/16	KWG1602066	
Toxaphene	ND	U	52	20	1	03/16/16	03/18/16	KWG1602066	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	60	20-106	03/18/16	Acceptable
Decachlorobiphenyl	86	19-127	03/18/16	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments: \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W16C092  
**Sample Matrix:** Water

**Service Request:** K1602473  
**Date Collected:** 03/09/2016  
**Date Received:** 03/10/2016

**Organochlorine Pesticides**

**Sample Name:** W16C092-09  
**Lab Code:** K1602473-009  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	Ui	1.0	0.41	1	03/16/16	03/18/16	KWG1602066	
beta-BHC	ND	U	1.0	0.47	1	03/16/16	03/18/16	KWG1602066	
gamma-BHC (Lindane)	ND	U	1.0	0.22	1	03/16/16	03/18/16	KWG1602066	
delta-BHC	ND	U	1.0	0.20	1	03/16/16	03/18/16	KWG1602066	
Heptachlor	ND	Ui	1.3	1.3	1	03/16/16	03/18/16	KWG1602066	
Aldrin	ND	Ui	1.4	1.4	1	03/16/16	03/18/16	KWG1602066	
Heptachlor Epoxide	ND	U	1.0	0.69	1	03/16/16	03/18/16	KWG1602066	
gamma-Chlordane†	ND	U	1.0	0.21	1	03/16/16	03/18/16	KWG1602066	
Endosulfan I	ND	U	1.0	0.15	1	03/16/16	03/18/16	KWG1602066	
alpha-Chlordane	ND	U	1.0	0.17	1	03/16/16	03/18/16	KWG1602066	
Dieldrin	ND	U	1.0	0.23	1	03/16/16	03/18/16	KWG1602066	
4,4'-DDE	ND	U	1.0	0.11	1	03/16/16	03/18/16	KWG1602066	
Endrin	ND	Ui	1.0	0.25	1	03/16/16	03/18/16	KWG1602066	
Endosulfan II	ND	U	1.0	0.20	1	03/16/16	03/18/16	KWG1602066	
4,4'-DDD	ND	U	1.0	0.28	1	03/16/16	03/18/16	KWG1602066	
Endrin Aldehyde	ND	Ui	1.7	1.7	1	03/16/16	03/18/16	KWG1602066	
Endosulfan Sulfate	ND	U	1.0	0.84	1	03/16/16	03/18/16	KWG1602066	
4,4'-DDT	ND	Ui	2.1	2.1	1	03/16/16	03/18/16	KWG1602066	
Endrin Ketone	ND	U	1.0	0.28	1	03/16/16	03/18/16	KWG1602066	
Methoxychlor	ND	U	1.0	0.22	1	03/16/16	03/18/16	KWG1602066	
Toxaphene	ND	U	50	19	1	03/16/16	03/18/16	KWG1602066	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	101	20-106	03/18/16	Acceptable
Decachlorobiphenyl	80	19-127	03/18/16	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W16C092  
**Sample Matrix:** Water

**Service Request:** K1602473  
**Date Collected:** NA  
**Date Received:** NA

Organochlorine Pesticides

**Sample Name:** Method Blank  
**Lab Code:** KWG1602066-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	1.0	0.19	1	03/16/16	03/18/16	KWG1602066	
beta-BHC	ND	U	1.0	0.47	1	03/16/16	03/18/16	KWG1602066	
gamma-BHC (Lindane)	ND	U	1.0	0.22	1	03/16/16	03/18/16	KWG1602066	
delta-BHC	ND	U	1.0	0.20	1	03/16/16	03/18/16	KWG1602066	
Heptachlor	ND	U	1.0	0.13	1	03/16/16	03/18/16	KWG1602066	
Aldrin	ND	U	1.0	0.20	1	03/16/16	03/18/16	KWG1602066	
Heptachlor Epoxide	ND	U	1.0	0.69	1	03/16/16	03/18/16	KWG1602066	
gamma-Chlordane†	ND	U	1.0	0.21	1	03/16/16	03/18/16	KWG1602066	
Endosulfan I	ND	U	1.0	0.15	1	03/16/16	03/18/16	KWG1602066	
alpha-Chlordane	ND	U	1.0	0.17	1	03/16/16	03/18/16	KWG1602066	
Dieldrin	ND	U	1.0	0.23	1	03/16/16	03/18/16	KWG1602066	
4,4'-DDE	ND	U	1.0	0.11	1	03/16/16	03/18/16	KWG1602066	
Endrin	ND	U	1.0	0.18	1	03/16/16	03/18/16	KWG1602066	
Endosulfan II	ND	U	1.0	0.20	1	03/16/16	03/18/16	KWG1602066	
4,4'-DDD	ND	U	1.0	0.28	1	03/16/16	03/18/16	KWG1602066	
Endrin Aldehyde	ND	U	1.0	0.22	1	03/16/16	03/18/16	KWG1602066	
Endosulfan Sulfate	ND	U	1.0	0.84	1	03/16/16	03/18/16	KWG1602066	
4,4'-DDT	ND	U	1.0	0.30	1	03/16/16	03/18/16	KWG1602066	
Endrin Ketone	ND	U	1.0	0.28	1	03/16/16	03/18/16	KWG1602066	
Methoxychlor	ND	U	1.0	0.22	1	03/16/16	03/18/16	KWG1602066	
Toxaphene	ND	U	50	19	1	03/16/16	03/18/16	KWG1602066	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	86	20-106	03/18/16	Acceptable
Decachlorobiphenyl	80	19-127	03/18/16	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

**Comments:** \_\_\_\_\_

**Client:** Portland, City of  
**Project:** Portland Harbor/W16C092  
**Sample Matrix:** Water

**Service Request:** K1602473

**Surrogate Recovery Summary  
 Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>	<u>Sur2</u>
W16C092-02	K1602473-002	60	86
W16C092-09	K1602473-009	101	80
Method Blank	KWG1602066-5	86	80
Lab Control Sample	KWG1602066-1	91	91
Duplicate Lab Control Sample	KWG1602066-2	80	116

**Surrogate Recovery Control Limits (%)**

---

Sur1 = Tetrachloro-m-xylene	20-106
Sur2 = Decachlorobiphenyl	19-127

---

Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.

**Client:** Portland, City of  
**Project:** Portland Harbor/W16C092  
**Sample Matrix:** Water

**Service Request:** K1602473  
**Date Extracted:** 03/16/2016  
**Date Analyzed:** 03/18/2016

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1602066

Analyte Name	Lab Control Sample KWG1602066-1 Lab Control Spike			Duplicate Lab Control Sample KWG1602066-2 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
alpha-BHC	8.13	10.0	81	8.07	10.0	81	36-122	1	30
beta-BHC	7.71	10.0	77	7.81	10.0	78	42-125	1	30
gamma-BHC (Lindane)	8.14	10.0	81	8.35	10.0	84	44-117	3	30
delta-BHC	8.06	10.0	81	8.48	10.0	85	48-123	5	30
Heptachlor	7.56	10.0	76	8.04	10.0	80	40-115	6	30
Aldrin	6.49	10.0	65	7.94	10.0	79	10-102	20	30
Heptachlor Epoxide	7.68	10.0	77	8.30	10.0	83	49-109	8	30
gamma-Chlordane	7.10	10.0	71	7.57	10.0	76	47-113	6	30
Endosulfan I	6.43	10.0	64	6.99	10.0	70	35-115	8	30
alpha-Chlordane	7.07	10.0	71	7.94	10.0	79	45-115	12	30
Dieldrin	7.01	10.0	70	7.80	10.0	78	50-115	11	30
4,4'-DDE	7.47	10.0	75	8.49	10.0	85	41-116	13	30
Endrin	8.05	10.0	81	8.58	10.0	86	48-126	6	30
Endosulfan II	6.50	10.0	65	7.47	10.0	75	28-128	14	30
4,4'-DDD	7.11	10.0	71	8.40	10.0	84	33-132	17	30
Endrin Aldehyde	6.76	10.0	68	7.20	10.0	72	27-104	6	30
Endosulfan Sulfate	7.13	10.0	71	7.84	10.0	78	38-118	9	30
4,4'-DDT	7.99	10.0	80	8.82	10.0	88	42-143	10	30
Endrin Ketone	7.14	10.0	71	7.60	10.0	76	30-124	6	30
Methoxychlor	8.65	10.0	87	9.65	10.0	97	43-143	11	30
Toxaphene	274	400	68	270	400	67	36-137	2	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Report Prepared for:**

Accounts Payable  
ALS Environmental  
1317 South 13th Avenue  
Kelso WA 98626

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Prepared Date:**

April 5, 2016

**Report Information:**

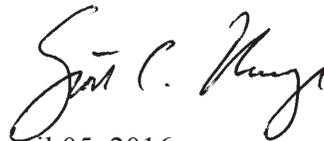
**Pace Project #: 10341468**  
**Sample Receipt Date: 03/15/2016**  
**Client Project #: K1602473**  
**Client Sub PO #: 51K1602473**  
**State Cert #: C755**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



April 05, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.

## **DISCUSSION**

This report presents the results from the analyses performed on twelve samples submitted by a representative of ALS Environmental. The samples were analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the amount of sample extracted.

The isotopically-labeled PCB internal standards in the sample extracts were recovered at 35-116%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the sample material.

Laboratory spike samples were also prepared with the sample batch using reference material that had been fortified with native standards. The results show that the spiked native compounds were recovered at 96-118%, with relative percent differences of 0.0-5.0%. These results were within the target ranges for this method. Matrix spikes were not prepared with the sample batch.

## **REPORT OF LABORATORY ANALYSIS**

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without the written consent of Pace Analytical Services, Inc.

## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia	9952C
Maryland	322	Wisconsin	999407970
Michigan	9909	Wyoming	8TMS-Q
Minnesota	027-053-137		

## REPORT OF LABORATORY ANALYSIS

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# Appendix A

## Sample Management

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

10341468

Project Number: K1602473  
 Project Manager: Howard Holmes  
 QAP: LAB QAP

Cl Biphem Cong  
 1668A

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Lab ID
				Date	Time		
K1602473-001	W16C092-01	1	Water	3/9/16	1010	Pace MN	X 001
K1602473-002	W16C092-02	1	Water	3/9/16	1039	Pace MN	X 002
K1602473-003	W16C092-03	1	Water	3/9/16	1053	Pace MN	X 003
K1602473-004	W16C092-04	1	Water	3/9/16	1132	Pace MN	X 004
K1602473-005	W16C092-05	1	Water	3/9/16	1150	Pace MN	X 005
K1602473-006	W16C092-06	1	Water	3/9/16	1253	Pace MN	X 006
K1602473-007	W16C092-07	1	Water	3/9/16	1350	Pace MN	X 007 <sup>3151</sup>
K1602473-008	W16C092-08	1	Water	3/9/16	1412	Pace MN	X 008
K1602473-009	W16C092-09	1	Water	3/9/16	1446	Pace MN	X 009
K1602473-010	W16C092-10	1	Water	3/9/16	1540	Pace MN	X 010
K1602473-011	W16C092-11	1	Water	3/9/16	1408	Pace MN	X 011
K1602473-012	W16C092-12	1	Water	3/9/16	0000	Pace MN	X 012



<b>Special Instructions/Comments</b> Please provide the electronic (PDF and EDD) report to the following e-mail address: ALKLS.Data@alsglobal.com.  <i>City of Portland EDD</i> <i>Full list 209 containers</i>	<b>Turnaround Requirements</b> RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD	<b>Report Requirements</b> I. Results Only II. Results + QC Summaries III. Results + QC and Calibration Summaries IV. Data Validation Report with Raw Data	<b>Invoice Information</b> PO# 51K1602473 Bill to
	Requested FAX Date: _____ Requested Report Date: 03/25/16	PQL/MDL/J Y EDD Y	

H - Test is On Hold P - Test is Authorized for Prep Only

Relinquished By: HO 3/4/16 1151 Received By: [Signature] 3-15-16 Airbill Number: 10:00  
 T = 3.0C 84.1°C



**PURCHASE ORDER**  
FOR SUBCONTRACTED ANALYSES

Service Request: K1602473

Date: 3/10/2016  
Contact: Howard Holmes  
Email: howard.holmes@alsglobal.com

Company: Pace Analytical Services  
Address: 1700 Elm Street, Suite 200  
Minneapolis MN, 55414  
Phone: 612.607.1700

Bill To: ALS Environmental  
1317 South 13th Avenue  
Kelso WA, 98626

Ship To: ALS Environmental  
ALKLS.Data@alsglobal.com

Phone: 1-360-577-7222

Phone: 360-501-3364

Item/Description	Quantity	Unit Price
1668A/Cl Biphen Cong	12	

Comments:

[Empty rectangular box for comments]

ALS Group USA, Corp.  
www.alsglobal.com  
An ALS Limited Company

**Sample Condition Upon Receipt**

Client Name: ALS Environmental

Project #: **WO#: 10341468**



Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  Speedee  Other: \_\_\_\_\_

Tracking Number: 6447 9271 3325  
6447 9271 3336

Custody Seal on Cooler/Box Present?  Yes  No      Seals Intact?  Yes  No      Optional: Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_

Packing Material:  Bubble Wrap  Bubble Bags  None  Other: bottle holders      Temp Blank?  Yes  No

Thermometer Used:  151401163  B88A912167504  151401164  B88A0143310098      Type of Ice:  Wet  Blue  None  Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.0, 4.0      Cooler Temp Corrected (°C): 3.1, 4.1      Biological Tissue Frozen?  Yes  No  N/A  
Temp should be above freezing to 6°C      Correction Factor: +0.1      Date and Initials of Person Examining Contents: KAC 3-15-16

USDA Regulated Soil (  N/A, water sample)  
Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)?  Yes  No  
Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
**If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.**

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_      Field Data Required?  Yes  No  
Comments/Resolution: \_\_\_\_\_

Project Manager Review: [Signature]      Date: 3/15/16  
Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

## REPORT OF LABORATORY ANALYSIS

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# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602473-001		
Lab Sample ID	10341468001		
Filename	P160401A_11		
Injected By	CVS		
Total Amount Extracted	1010 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/09/2016 10:10
ICAL ID	P160401A02	Received	03/15/2016 10:00
CCal Filename(s)	P160401A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/01/2016 14:38

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.741	3.23	2.0	1.45	73
13C-4-MoCB	3	11.329	3.01	2.0	1.57	79
13C-2,2'-DiCB	4	11.604	1.56	2.0	1.59	79
13C-4,4'-DiCB	15	18.360	1.65	2.0	1.29	64
13C-2,2',6-TrCB	19	15.172	1.05	2.0	1.43	72
13C-3,4,4'-TrCB	37	25.970	1.15	2.0	1.54	77
13C-2,2',6,6'-TeCB	54	18.609	0.82	2.0	0.835	42
13C-3,4,4',5'-TeCB	81	33.034	0.82	2.0	1.63	81
13C-3,3',4,4'-TeCB	77	33.604	0.80	2.0	1.65	82
13C-2,2',4,6,6'-PeCB	104	24.595	1.66	2.0	1.52	76
13C-2,3,3',4,4'-PeCB	105	37.198	1.60	2.0	1.41	71
13C-2,3,4,4',5'-PeCB	114	36.544	1.60	2.0	1.47	74
13C-2,3',4,4',5'-PeCB	118	35.974	1.56	2.0	1.49	74
13C-2,3',4,4',5'-PeCB	123	35.639	1.57	2.0	1.48	74
13C-3,3',4,4',5'-PeCB	126	40.368	1.61	2.0	1.50	75
13C-2,2',4,4',6,6'-HxCB	155	30.569	1.22	2.0	2.00	100
13C-HxCB (156/157)	156/157	43.425	1.26	4.0	2.72	68
13C-2,3',4,4',5,5'-HxCB	167	42.234	1.29	2.0	1.37	69
13C-3,3',4,4',5,5'-HxCB	169	46.745	1.26	2.0	1.33	66
13C-2,2',3,4',5,6,6'-HpCB	188	36.444	1.06	2.0	2.26	113
13C-2,3,3',4,4',5,5'-HpCB	189	49.275	1.03	2.0	1.64	82
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.932	0.91	2.0	2.22	111
13C-2,3,3',4,4',5,5',6-OxCB	205	51.947	0.88	2.0	1.66	83
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.887	0.80	2.0	1.62	81
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.693	0.80	2.0	1.85	92
13C--DeCB	209	55.827	0.72	2.0	2.00	100
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.661	1.06	2.0	1.68	84
13C-2,3,3',5,5'-PeCB	111	33.621	1.62	2.0	1.80	90
13C-2,2',3,3',5,5',6-HpCB	178	39.579	1.10	2.0	2.04	102
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.903	1.56	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.606	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.821	1.62	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.144	1.28	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.409	0.93	2.0	NA	NA

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-001  
 Lab Sample ID 10341468001  
 Filename P160401A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.248
2		---	---	ND	---	0.248
3		---	---	ND	---	0.248
4		---	---	ND	---	0.248
5		---	---	ND	---	0.248
6		---	---	ND	---	0.248
7		---	---	ND	---	0.248
8		---	---	ND	---	0.248
9		---	---	ND	---	0.248
10		---	---	ND	---	0.248
11		---	---	ND	---	2.43
12	12/13	---	---	ND	---	0.496
13	12/13	---	---	ND	---	0.496
14		---	---	ND	---	0.248
15		---	---	ND	---	0.327
16		---	---	ND	---	0.248
17		---	---	ND	---	0.248
18	18/30	---	---	ND	---	0.496
19		---	---	ND	---	0.248
20	20/28	---	---	ND	---	1.28
21	21/33	---	---	ND	---	1.34
22		---	---	ND	---	0.942
23		---	---	ND	---	0.248
24		---	---	ND	---	0.248
25		---	---	ND	---	0.248
26	26/29	---	---	ND	---	0.496
27		---	---	ND	---	0.248
28	20/28	---	---	ND	---	1.28
29	26/29	---	---	ND	---	0.496
30	18/30	---	---	ND	---	0.496
31		---	---	ND	---	1.29
32		---	---	ND	---	0.248
33	21/33	---	---	ND	---	1.34
34		---	---	ND	---	0.248
35		---	---	ND	---	0.248
36		---	---	ND	---	0.248
37		---	---	ND	---	0.525
38		---	---	ND	---	0.248
39		---	---	ND	---	0.248
40	40/41/71	---	---	ND	---	1.49
41	40/41/71	---	---	ND	---	1.49
42		---	---	ND	---	0.496
43	43/73	---	---	ND	---	0.496
44	44/47/65	---	---	ND	---	1.49
45	45/51	---	---	ND	---	0.991
46		---	---	ND	---	0.496
47	44/47/65	---	---	ND	---	1.49
48		---	---	ND	---	0.496

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-001  
 Lab Sample ID 10341468001  
 Filename P160401A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.991
50	50/53	---	---	ND	---	0.991
51	45/51	---	---	ND	---	0.991
52		---	---	ND	---	1.53
53	50/53	---	---	ND	---	0.991
54		---	---	ND	---	0.496
55		---	---	ND	---	0.496
56		---	---	ND	---	0.496
57		---	---	ND	---	0.496
58		---	---	ND	---	0.496
59	59/62/75	---	---	ND	---	1.49
60		---	---	ND	---	0.496
61	61/70/74/76	---	---	ND	---	1.98
62	59/62/75	---	---	ND	---	1.49
63		---	---	ND	---	0.496
64		---	---	ND	---	0.496
65	44/47/65	---	---	ND	---	1.49
66		---	---	ND	---	0.833
67		---	---	ND	---	0.496
68		---	---	ND	---	0.496
69	49/69	---	---	ND	---	0.991
70	61/70/74/76	---	---	ND	---	1.98
71	40/41/71	---	---	ND	---	1.49
72		---	---	ND	---	0.496
73	43/73	---	---	ND	---	0.496
74	61/70/74/76	---	---	ND	---	1.98
75	59/62/75	---	---	ND	---	1.49
76	61/70/74/76	---	---	ND	---	1.98
77		---	---	ND	---	0.496
78		---	---	ND	---	0.496
79		---	---	ND	---	0.496
80		---	---	ND	---	0.496
81		---	---	ND	---	0.496
82		---	---	ND	---	0.496
83		---	---	ND	---	0.496
84		---	---	ND	---	0.496
85	85/116/117	---	---	ND	---	1.49
86	86/87/97/108/119/125	---	---	ND	---	2.97
87	86/87/97/108/119/125	---	---	ND	---	2.97
88	88/91	---	---	ND	---	0.991
89		---	---	ND	---	0.496
90	90/101/113	---	---	ND	---	1.49
91	88/91	---	---	ND	---	0.991
92		---	---	ND	---	0.496
93	93/98/100/102	---	---	ND	---	1.98
94		---	---	ND	---	0.496
95		---	---	ND	---	0.942
96		---	---	ND	---	0.496

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
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 Sample Analysis Results**

Client Sample ID           K1602473-001  
 Lab Sample ID             10341468001  
 Filename                    P160401A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.97
98	93/98/100/102	---	---	ND	---	1.98
99		---	---	ND	---	0.496
100	93/98/100/102	---	---	ND	---	1.98
101	90/101/113	---	---	ND	---	1.49
102	93/98/100/102	---	---	ND	---	1.98
103		---	---	ND	---	0.496
104		---	---	ND	---	0.496
105		---	---	ND	---	0.496
106		---	---	ND	---	0.496
107	107/124	---	---	ND	---	0.991
108	86/87/97/108/119/125	---	---	ND	---	2.97
109		---	---	ND	---	0.496
110	110/115	---	---	ND	---	0.991
111		---	---	ND	---	0.496
112		---	---	ND	---	0.496
113	90/101/113	---	---	ND	---	1.49
114		---	---	ND	---	0.496
115	110/115	---	---	ND	---	0.991
116	85/116/117	---	---	ND	---	1.49
117	85/116/117	---	---	ND	---	1.49
118		---	---	ND	---	0.634
119	86/87/97/108/119/125	---	---	ND	---	2.97
120		---	---	ND	---	0.496
121		---	---	ND	---	0.496
122		---	---	ND	---	0.496
123		---	---	ND	---	0.496
124	107/124	---	---	ND	---	0.991
125	86/87/97/108/119/125	---	---	ND	---	2.97
126		---	---	ND	---	0.496
127		---	---	ND	---	0.496
128	128/166	---	---	ND	---	0.991
129	129/138/163	---	---	ND	---	1.49
130		---	---	ND	---	0.496
131		---	---	ND	---	0.496
132		---	---	ND	---	0.496
133		---	---	ND	---	0.496
134	134/143	---	---	ND	---	0.991
135	135/151	---	---	ND	---	0.991
136		---	---	ND	---	0.496
137		---	---	ND	---	0.496
138	129/138/163	---	---	ND	---	1.49
139	139/140	---	---	ND	---	0.991
140	139/140	---	---	ND	---	0.991
141		---	---	ND	---	0.496
142		---	---	ND	---	0.496
143	134/143	---	---	ND	---	0.991
144		---	---	ND	---	0.496

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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 Sample Analysis Results**

Client Sample ID K1602473-001  
 Lab Sample ID 10341468001  
 Filename P160401A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.496
146		---	---	ND	---	0.496
147	147/149	---	---	ND	---	0.991
148		---	---	ND	---	0.496
149	147/149	---	---	ND	---	0.991
150		---	---	ND	---	0.496
151	135/151	---	---	ND	---	0.991
152		---	---	ND	---	0.496
153	153/168	---	---	ND	---	0.991
154		---	---	ND	---	0.496
155		---	---	ND	---	0.496
156	156/157	---	---	ND	---	0.991
157	156/157	---	---	ND	---	0.991
158		---	---	ND	---	0.496
159		---	---	ND	---	0.496
160		---	---	ND	---	0.496
161		---	---	ND	---	0.496
162		---	---	ND	---	0.496
163	129/138/163	---	---	ND	---	1.49
164		---	---	ND	---	0.496
165		---	---	ND	---	0.496
166	128/166	---	---	ND	---	0.991
167		---	---	ND	---	0.496
168	153/168	---	---	ND	---	0.991
169		---	---	ND	---	0.496
170		---	---	ND	---	0.496
171	171/173	---	---	ND	---	0.991
172		---	---	ND	---	0.496
173	171/173	---	---	ND	---	0.991
174		---	---	ND	---	0.496
175		---	---	ND	---	0.496
176		---	---	ND	---	0.496
177		---	---	ND	---	0.496
178		---	---	ND	---	0.496
179		---	---	ND	---	0.496
180	180/193	---	---	ND	---	0.991
181		---	---	ND	---	0.496
182		---	---	ND	---	0.496
183	183/185	---	---	ND	---	0.991
184		---	---	ND	---	0.496
185	183/185	---	---	ND	---	0.991
186		---	---	ND	---	0.496
187		---	---	ND	---	0.496
188		---	---	ND	---	0.496
189		---	---	ND	---	0.496
190		---	---	ND	---	0.496
191		---	---	ND	---	0.496
192		---	---	ND	---	0.496

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602473-001  
 Lab Sample ID        10341468001  
 Filename                P160401A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.991
194		---	---	ND	---	0.743
195		---	---	ND	---	0.743
196		---	---	ND	---	0.743
197	197/200	---	---	ND	---	1.49
198	198/199	---	---	ND	---	1.49
199	198/199	---	---	ND	---	1.49
200	197/200	---	---	ND	---	1.49
201		---	---	ND	---	0.743
202		---	---	ND	---	0.743
203		---	---	ND	---	0.743
204		---	---	ND	---	0.743
205		---	---	ND	---	0.743
206		---	---	ND	---	0.743
207		---	---	ND	---	0.743
208		---	---	ND	---	0.743
209		---	---	ND	---	0.743

Conc = Concentration  
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 A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-001  
Lab Sample ID             10341468001  
Filename                    P160401A\_11

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602473-002		
Lab Sample ID	10341468002		
Filename	P160401A_12		
Injected By	CVS		
Total Amount Extracted	1020 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/09/2016 10:39
ICAL ID	P160401A02	Received	03/15/2016 10:00
CCal Filename(s)	P160401A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/01/2016 15:35

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.717	3.07	2.0	1.50	75
13C-4-MoCB	3	11.305	3.05	2.0	1.64	82
13C-2,2'-DiCB	4	11.557	1.56	2.0	1.66	83
13C-4,4'-DiCB	15	18.336	1.60	2.0	1.38	69
13C-2,2',6-TrCB	19	15.149	1.10	2.0	1.49	74
13C-3,4,4'-TrCB	37	25.954	1.03	2.0	1.56	78
13C-2,2',6,6'-TeCB	54	18.610	0.81	2.0	1.37	69
13C-3,4,4',5'-TeCB	81	33.019	0.77	2.0	1.69	85
13C-3,3',4,4'-TeCB	77	33.623	0.79	2.0	1.72	86
13C-2,2',4,6,6'-PeCB	104	24.579	1.76	2.0	1.38	69
13C-2,3,3',4,4'-PeCB	105	37.183	1.58	2.0	1.36	68
13C-2,3,4,4',5'-PeCB	114	36.529	1.59	2.0	1.41	70
13C-2,3',4,4',5'-PeCB	118	35.976	1.56	2.0	1.45	72
13C-2,3',4,4',5'-PeCB	123	35.640	1.58	2.0	1.44	72
13C-3,3',4,4',5'-PeCB	126	40.386	1.55	2.0	1.43	72
13C-2,2',4,4',6,6'-HxCB	155	30.571	1.27	2.0	1.97	99
13C-HxCB (156/157)	156/157	43.443	1.26	4.0	2.56	64
13C-2,3',4,4',5,5'-HxCB	167	42.236	1.30	2.0	1.29	64
13C-3,3',4,4',5,5'-HxCB	169	46.746	1.22	2.0	1.23	62
13C-2,2',3,4',5,6,6'-HpCB	188	36.462	1.08	2.0	2.32	116
13C-2,3,3',4,4',5,5'-HpCB	189	49.254	1.07	2.0	1.60	80
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.917	0.93	2.0	2.23	112
13C-2,3,3',4,4',5,5',6-OxCB	205	51.949	0.88	2.0	1.58	79
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.888	0.77	2.0	1.53	77
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.715	0.80	2.0	1.83	91
13C--DeCB	209	55.806	0.73	2.0	1.89	94
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.645	1.04	2.0	1.73	87
13C-2,3,3',5,5'-PeCB	111	33.606	1.63	2.0	1.78	89
13C-2,2',3,3',5,5',6-HpCB	178	39.581	1.05	2.0	1.98	99
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.879	1.58	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.590	0.81	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.822	1.60	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.145	1.28	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.431	0.87	2.0	NA	NA

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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-002  
 Lab Sample ID 10341468002  
 Filename P160401A\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.246
2		---	---	ND	---	0.246
3		---	---	ND	---	0.246
4		---	---	ND	---	0.246
5		---	---	ND	---	0.246
6		---	---	ND	---	0.246
7		---	---	ND	---	0.246
8		---	---	ND	---	0.246
9		---	---	ND	---	0.246
10		---	---	ND	---	0.246
11		---	---	ND	---	2.41
12	12/13	---	---	ND	---	0.492
13	12/13	---	---	ND	---	0.492
14		---	---	ND	---	0.246
15		---	---	ND	---	0.325
16		---	---	ND	---	0.246
17		---	---	ND	---	0.246
18	18/30	---	---	ND	---	0.492
19		---	---	ND	---	0.246
20	20/28	---	---	ND	---	1.27
21	21/33	---	---	ND	---	1.33
22		---	---	ND	---	0.936
23		---	---	ND	---	0.246
24		---	---	ND	---	0.246
25		---	---	ND	---	0.246
26	26/29	---	---	ND	---	0.492
27		---	---	ND	---	0.246
28	20/28	---	---	ND	---	1.27
29	26/29	---	---	ND	---	0.492
30	18/30	---	---	ND	---	0.492
31		---	---	ND	---	1.28
32		---	---	ND	---	0.246
33	21/33	---	---	ND	---	1.33
34		---	---	ND	---	0.246
35		---	---	ND	---	0.246
36		---	---	ND	---	0.246
37		25.988	0.99	0.735	---	0.522
38		---	---	ND	---	0.246
39		---	---	ND	---	0.246
40	40/41/71	---	---	ND	---	1.48
41	40/41/71	---	---	ND	---	1.48
42		---	---	ND	---	0.492
43	43/73	---	---	ND	---	0.492
44	44/47/65	---	---	ND	---	1.48
45	45/51	---	---	ND	---	0.985
46		---	---	ND	---	0.492
47	44/47/65	---	---	ND	---	1.48
48		---	---	ND	---	0.492

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-002  
Lab Sample ID 10341468002  
Filename P160401A\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.985
50	50/53	---	---	ND	---	0.985
51	45/51	---	---	ND	---	0.985
52		---	---	ND	---	1.52
53	50/53	---	---	ND	---	0.985
54		---	---	ND	---	0.492
55		---	---	ND	---	0.492
56		29.732	0.75	0.864	---	0.492
57		---	---	ND	---	0.492
58		---	---	ND	---	0.492
59	59/62/75	---	---	ND	---	1.48
60		---	---	ND	---	0.492
61	61/70/74/76	28.693	0.75	2.12	---	1.97
62	59/62/75	---	---	ND	---	1.48
63		---	---	ND	---	0.492
64		---	---	ND	---	0.492
65	44/47/65	---	---	ND	---	1.48
66		29.062	0.75	1.23	---	0.827
67		---	---	ND	---	0.492
68		---	---	ND	---	0.492
69	49/69	---	---	ND	---	0.985
70	61/70/74/76	28.693	0.75	(2.12)	---	1.97
71	40/41/71	---	---	ND	---	1.48
72		---	---	ND	---	0.492
73	43/73	---	---	ND	---	0.492
74	61/70/74/76	28.693	0.75	(2.12)	---	1.97
75	59/62/75	---	---	ND	---	1.48
76	61/70/74/76	28.693	0.75	(2.12)	---	1.97
77		---	---	ND	---	0.492
78		---	---	ND	---	0.492
79		---	---	ND	---	0.492
80		---	---	ND	---	0.492
81		---	---	ND	---	0.492
82		---	---	ND	---	0.492
83		---	---	ND	---	0.492
84		---	---	ND	---	0.492
85	85/116/117	---	---	ND	---	1.48
86	86/87/97/108/119/125	---	---	ND	---	2.95
87	86/87/97/108/119/125	---	---	ND	---	2.95
88	88/91	---	---	ND	---	0.985
89		---	---	ND	---	0.492
90	90/101/113	---	---	ND	---	1.48
91	88/91	---	---	ND	---	0.985
92		---	---	ND	---	0.492
93	93/98/100/102	---	---	ND	---	1.97
94		---	---	ND	---	0.492
95		---	---	ND	---	0.936
96		---	---	ND	---	0.492

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-002  
Lab Sample ID 10341468002  
Filename P160401A\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.95
98	93/98/100/102	---	---	ND	---	1.97
99		31.459	1.61	0.523	---	0.492
100	93/98/100/102	---	---	ND	---	1.97
101	90/101/113	---	---	ND	---	1.48
102	93/98/100/102	---	---	ND	---	1.97
103		---	---	ND	---	0.492
104		---	---	ND	---	0.492
105		37.200	1.54	0.832	---	0.492
106		---	---	ND	---	0.492
107	107/124	---	---	ND	---	0.985
108	86/87/97/108/119/125	---	---	ND	---	2.95
109		---	---	ND	---	0.492
110	110/115	32.885	1.58	2.54	---	0.985
111		---	---	ND	---	0.492
112		---	---	ND	---	0.492
113	90/101/113	---	---	ND	---	1.48
114		---	---	ND	---	0.492
115	110/115	32.885	1.58	(2.54)	---	0.985
116	85/116/117	---	---	ND	---	1.48
117	85/116/117	---	---	ND	---	1.48
118		36.009	1.54	1.63	---	0.630
119	86/87/97/108/119/125	---	---	ND	---	2.95
120		---	---	ND	---	0.492
121		---	---	ND	---	0.492
122		---	---	ND	---	0.492
123		---	---	ND	---	0.492
124	107/124	---	---	ND	---	0.985
125	86/87/97/108/119/125	---	---	ND	---	2.95
126		---	---	ND	---	0.492
127		---	---	ND	---	0.492
128	128/166	---	---	ND	---	0.985
129	129/138/163	39.178	1.25	2.92	---	1.48
130		---	---	ND	---	0.492
131		---	---	ND	---	0.492
132		36.076	1.23	0.937	---	0.492
133		---	---	ND	---	0.492
134	134/143	---	---	ND	---	0.985
135	135/151	---	---	ND	---	0.985
136		---	---	ND	---	0.492
137		---	---	ND	---	0.492
138	129/138/163	39.178	1.25	(2.92)	---	1.48
139	139/140	---	---	ND	---	0.985
140	139/140	---	---	ND	---	0.985
141		---	---	ND	---	0.492
142		---	---	ND	---	0.492
143	134/143	---	---	ND	---	0.985
144		---	---	ND	---	0.492

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-002  
 Lab Sample ID 10341468002  
 Filename P160401A\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.492
146		---	---	ND	---	0.492
147	147/149	34.785	1.22	1.82	---	0.985
148		---	---	ND	---	0.492
149	147/149	34.785	1.22	(1.82)	---	0.985
150		---	---	ND	---	0.492
151	135/151	---	---	ND	---	0.985
152		---	---	ND	---	0.492
153	153/168	37.887	1.25	1.84	---	0.985
154		---	---	ND	---	0.492
155		---	---	ND	---	0.492
156	156/157	---	---	ND	---	0.985
157	156/157	---	---	ND	---	0.985
158		---	---	ND	---	0.492
159		---	---	ND	---	0.492
160		---	---	ND	---	0.492
161		---	---	ND	---	0.492
162		---	---	ND	---	0.492
163	129/138/163	39.178	1.25	(2.92)	---	1.48
164		---	---	ND	---	0.492
165		---	---	ND	---	0.492
166	128/166	---	---	ND	---	0.985
167		---	---	ND	---	0.492
168	153/168	37.887	1.25	(1.84)	---	0.985
169		---	---	ND	---	0.492
170		46.109	1.09	0.499	---	0.492
171	171/173	---	---	ND	---	0.985
172		---	---	ND	---	0.492
173	171/173	---	---	ND	---	0.985
174		41.414	1.04	0.596	---	0.492
175		---	---	ND	---	0.492
176		---	---	ND	---	0.492
177		---	---	ND	---	0.492
178		---	---	ND	---	0.492
179		---	---	ND	---	0.492
180	180/193	44.818	1.04	1.22	---	0.985
181		---	---	ND	---	0.492
182		---	---	ND	---	0.492
183	183/185	---	---	ND	---	0.985
184		---	---	ND	---	0.492
185	183/185	---	---	ND	---	0.985
186		---	---	ND	---	0.492
187		40.537	1.11	0.729	---	0.492
188		---	---	ND	---	0.492
189		---	---	ND	---	0.492
190		---	---	ND	---	0.492
191		---	---	ND	---	0.492
192		---	---	ND	---	0.492

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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602473-002  
 Lab Sample ID        10341468002  
 Filename                P160401A\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	44.818	1.04	(1.22)	---	0.985
194		---	---	ND	---	0.739
195		---	---	ND	---	0.739
196		---	---	ND	---	0.739
197	197/200	---	---	ND	---	1.48
198	198/199	---	---	ND	---	1.48
199	198/199	---	---	ND	---	1.48
200	197/200	---	---	ND	---	1.48
201		---	---	ND	---	0.739
202		---	---	ND	---	0.739
203		---	---	ND	---	0.739
204		---	---	ND	---	0.739
205		---	---	ND	---	0.739
206		---	---	ND	---	0.739
207		---	---	ND	---	0.739
208		---	---	ND	---	0.739
209		---	---	ND	---	0.739

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-002  
Lab Sample ID             10341468002  
Filename                    P160401A\_12

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	0.735
Total Tetrachloro Biphenyls	4.21
Total Pentachloro Biphenyls	5.53
Total Hexachloro Biphenyls	7.51
Total Heptachloro Biphenyls	3.04
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	21.0

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602473-003		
Lab Sample ID	10341468003		
Filename	P160403A_10		
Injected By	BAL		
Total Amount Extracted	1030 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/09/2016 10:53
ICAL ID	P160403A02	Received	03/15/2016 10:00
CCal Filename(s)	P160403A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/03/2016 19:24

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.705	3.08	2.0	1.23	61
13C-4-MoCB	3	11.305	2.96	2.0	1.35	67
13C-2,2'-DiCB	4	11.568	1.58	2.0	1.45	72
13C-4,4'-DiCB	15	18.348	1.63	2.0	1.52	76
13C-2,2',6-TrCB	19	15.161	1.16	2.0	1.51	76
13C-3,4,4'-TrCB	37	25.972	1.12	2.0	1.61	81
13C-2,2',6,6'-TeCB	54	18.626	0.81	2.0	1.36	68
13C-3,4,4',5'-TeCB	81	33.055	0.78	2.0	1.72	86
13C-3,3',4,4'-TeCB	77	33.625	0.78	2.0	1.72	86
13C-2,2',4,6,6'-PeCB	104	24.597	1.59	2.0	1.60	80
13C-2,3,3',4,4'-PeCB	105	37.202	1.63	2.0	1.76	88
13C-2,3,4,4',5'-PeCB	114	36.548	1.58	2.0	1.78	89
13C-2,3',4,4',5'-PeCB	118	35.995	1.58	2.0	1.87	93
13C-2,3',4,4',5'-PeCB	123	35.659	1.64	2.0	1.84	92
13C-3,3',4,4',5'-PeCB	126	40.405	1.58	2.0	1.85	93
13C-2,2',4,4',6,6'-HxCB	155	30.572	1.30	2.0	1.72	86
13C-HxCB (156/157)	156/157	43.446	1.28	4.0	3.46	86
13C-2,3',4,4',5,5'-HxCB	167	42.255	1.28	2.0	1.74	87
13C-3,3',4,4',5,5'-HxCB	169	46.767	1.27	2.0	1.70	85
13C-2,2',3,4',5,6,6'-HpCB	188	36.465	1.05	2.0	1.95	97
13C-2,3,3',4,4',5,5'-HpCB	189	49.280	1.07	2.0	1.94	97
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.937	0.90	2.0	2.07	103
13C-2,3,3',4,4',5,5',6-OxCB	205	51.974	0.91	2.0	1.69	85
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.936	0.79	2.0	1.54	77
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.741	0.78	2.0	1.75	88
13C--DeCB	209	55.876	0.70	2.0	1.77	89
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.662	1.12	2.0	1.75	88
13C-2,3,3',5,5'-PeCB	111	33.625	1.62	2.0	1.80	90
13C-2,2',3,3',5,5',6-HpCB	178	39.600	1.06	2.0	1.94	97
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.879	1.59	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.607	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.824	1.62	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.165	1.28	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.436	0.92	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-003  
 Lab Sample ID 10341468003  
 Filename P160403A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.243
2		---	---	ND	---	0.243
3		---	---	ND	---	0.243
4		---	---	ND	---	0.243
5		---	---	ND	---	0.243
6		---	---	ND	---	0.243
7		---	---	ND	---	0.243
8		---	---	ND	---	0.243
9		---	---	ND	---	0.243
10		---	---	ND	---	0.243
11		---	---	ND	---	2.38
12	12/13	---	---	ND	---	0.486
13	12/13	---	---	ND	---	0.486
14		---	---	ND	---	0.243
15		---	---	ND	---	0.321
16		---	---	ND	---	0.243
17		---	---	ND	---	0.243
18	18/30	---	---	ND	---	0.486
19		---	---	ND	---	0.243
20	20/28	---	---	ND	---	1.25
21	21/33	---	---	ND	---	1.31
22		---	---	ND	---	0.923
23		---	---	ND	---	0.243
24		---	---	ND	---	0.243
25		---	---	ND	---	0.243
26	26/29	---	---	ND	---	0.486
27		---	---	ND	---	0.243
28	20/28	---	---	ND	---	1.25
29	26/29	---	---	ND	---	0.486
30	18/30	---	---	ND	---	0.486
31		---	---	ND	---	1.26
32		---	---	ND	---	0.243
33	21/33	---	---	ND	---	1.31
34		---	---	ND	---	0.243
35		---	---	ND	---	0.243
36		---	---	ND	---	0.243
37		---	---	ND	---	0.515
38		---	---	ND	---	0.243
39		---	---	ND	---	0.243
40	40/41/71	---	---	ND	---	1.46
41	40/41/71	---	---	ND	---	1.46
42		---	---	ND	---	0.486
43	43/73	---	---	ND	---	0.486
44	44/47/65	---	---	ND	---	1.46
45	45/51	---	---	ND	---	0.971
46		---	---	ND	---	0.486
47	44/47/65	---	---	ND	---	1.46
48		---	---	ND	---	0.486

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-003  
 Lab Sample ID 10341468003  
 Filename P160403A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.971
50	50/53	---	---	ND	---	0.971
51	45/51	---	---	ND	---	0.971
52		---	---	ND	---	1.50
53	50/53	---	---	ND	---	0.971
54		---	---	ND	---	0.486
55		---	---	ND	---	0.486
56		---	---	ND	---	0.486
57		---	---	ND	---	0.486
58		---	---	ND	---	0.486
59	59/62/75	---	---	ND	---	1.46
60		---	---	ND	---	0.486
61	61/70/74/76	---	---	ND	---	1.94
62	59/62/75	---	---	ND	---	1.46
63		---	---	ND	---	0.486
64		---	---	ND	---	0.486
65	44/47/65	---	---	ND	---	1.46
66		---	---	ND	---	0.816
67		---	---	ND	---	0.486
68		---	---	ND	---	0.486
69	49/69	---	---	ND	---	0.971
70	61/70/74/76	---	---	ND	---	1.94
71	40/41/71	---	---	ND	---	1.46
72		---	---	ND	---	0.486
73	43/73	---	---	ND	---	0.486
74	61/70/74/76	---	---	ND	---	1.94
75	59/62/75	---	---	ND	---	1.46
76	61/70/74/76	---	---	ND	---	1.94
77		---	---	ND	---	0.486
78		---	---	ND	---	0.486
79		---	---	ND	---	0.486
80		---	---	ND	---	0.486
81		---	---	ND	---	0.486
82		---	---	ND	---	0.486
83		---	---	ND	---	0.486
84		---	---	ND	---	0.486
85	85/116/117	---	---	ND	---	1.46
86	86/87/97/108/119/125	---	---	ND	---	2.91
87	86/87/97/108/119/125	---	---	ND	---	2.91
88	88/91	---	---	ND	---	0.971
89		---	---	ND	---	0.486
90	90/101/113	---	---	ND	---	1.46
91	88/91	---	---	ND	---	0.971
92		---	---	ND	---	0.486
93	93/98/100/102	---	---	ND	---	1.94
94		---	---	ND	---	0.486
95		---	---	ND	---	0.923
96		---	---	ND	---	0.486

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-003  
Lab Sample ID 10341468003  
Filename P160403A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.91
98	93/98/100/102	---	---	ND	---	1.94
99		---	---	ND	---	0.486
100	93/98/100/102	---	---	ND	---	1.94
101	90/101/113	---	---	ND	---	1.46
102	93/98/100/102	---	---	ND	---	1.94
103		---	---	ND	---	0.486
104		---	---	ND	---	0.486
105		---	---	ND	---	0.486
106		---	---	ND	---	0.486
107	107/124	---	---	ND	---	0.971
108	86/87/97/108/119/125	---	---	ND	---	2.91
109		---	---	ND	---	0.486
110	110/115	---	---	ND	---	0.971
111		---	---	ND	---	0.486
112		---	---	ND	---	0.486
113	90/101/113	---	---	ND	---	1.46
114		---	---	ND	---	0.486
115	110/115	---	---	ND	---	0.971
116	85/116/117	---	---	ND	---	1.46
117	85/116/117	---	---	ND	---	1.46
118		---	---	ND	---	0.622
119	86/87/97/108/119/125	---	---	ND	---	2.91
120		---	---	ND	---	0.486
121		---	---	ND	---	0.486
122		---	---	ND	---	0.486
123		---	---	ND	---	0.486
124	107/124	---	---	ND	---	0.971
125	86/87/97/108/119/125	---	---	ND	---	2.91
126		---	---	ND	---	0.486
127		---	---	ND	---	0.486
128	128/166	---	---	ND	---	0.971
129	129/138/163	---	---	ND	---	1.46
130		---	---	ND	---	0.486
131		---	---	ND	---	0.486
132		---	---	ND	---	0.486
133		---	---	ND	---	0.486
134	134/143	---	---	ND	---	0.971
135	135/151	---	---	ND	---	0.971
136		---	---	ND	---	0.486
137		---	---	ND	---	0.486
138	129/138/163	---	---	ND	---	1.46
139	139/140	---	---	ND	---	0.971
140	139/140	---	---	ND	---	0.971
141		---	---	ND	---	0.486
142		---	---	ND	---	0.486
143	134/143	---	---	ND	---	0.971
144		---	---	ND	---	0.486

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
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RT = Retention Time  
I = Interference  
ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602473-003  
 Lab Sample ID        10341468003  
 Filename                P160403A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.486
146		---	---	ND	---	0.486
147	147/149	---	---	ND	---	0.971
148		---	---	ND	---	0.486
149	147/149	---	---	ND	---	0.971
150		---	---	ND	---	0.486
151	135/151	---	---	ND	---	0.971
152		---	---	ND	---	0.486
153	153/168	---	---	ND	---	0.971
154		---	---	ND	---	0.486
155		---	---	ND	---	0.486
156	156/157	---	---	ND	---	0.971
157	156/157	---	---	ND	---	0.971
158		---	---	ND	---	0.486
159		---	---	ND	---	0.486
160		---	---	ND	---	0.486
161		---	---	ND	---	0.486
162		---	---	ND	---	0.486
163	129/138/163	---	---	ND	---	1.46
164		---	---	ND	---	0.486
165		---	---	ND	---	0.486
166	128/166	---	---	ND	---	0.971
167		---	---	ND	---	0.486
168	153/168	---	---	ND	---	0.971
169		---	---	ND	---	0.486
170		---	---	ND	---	0.486
171	171/173	---	---	ND	---	0.971
172		---	---	ND	---	0.486
173	171/173	---	---	ND	---	0.971
174		---	---	ND	---	0.486
175		---	---	ND	---	0.486
176		---	---	ND	---	0.486
177		---	---	ND	---	0.486
178		---	---	ND	---	0.486
179		---	---	ND	---	0.486
180	180/193	---	---	ND	---	0.971
181		---	---	ND	---	0.486
182		---	---	ND	---	0.486
183	183/185	---	---	ND	---	0.971
184		---	---	ND	---	0.486
185	183/185	---	---	ND	---	0.971
186		---	---	ND	---	0.486
187		---	---	ND	---	0.486
188		---	---	ND	---	0.486
189		---	---	ND	---	0.486
190		---	---	ND	---	0.486
191		---	---	ND	---	0.486
192		---	---	ND	---	0.486

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID           K1602473-003  
 Lab Sample ID             10341468003  
 Filename                    P160403A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.971
194		---	---	ND	---	0.728
195		---	---	ND	---	0.728
196		---	---	ND	---	0.728
197	197/200	---	---	ND	---	1.46
198	198/199	---	---	ND	---	1.46
199	198/199	---	---	ND	---	1.46
200	197/200	---	---	ND	---	1.46
201		---	---	ND	---	0.728
202		---	---	ND	---	0.728
203		---	---	ND	---	0.728
204		---	---	ND	---	0.728
205		---	---	ND	---	0.728
206		---	---	ND	---	0.728
207		---	---	ND	---	0.728
208		---	---	ND	---	0.728
209		---	---	ND	---	0.728

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
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ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-003  
Lab Sample ID             10341468003  
Filename                    P160403A\_10

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602473-004		
Lab Sample ID	10341468004		
Filename	P160403A_11		
Injected By	BAL		
Total Amount Extracted	997 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/09/2016 11:32
ICAL ID	P160403A02	Received	03/15/2016 10:00
CCal Filename(s)	P160403A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/03/2016 20:23

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.693	3.12	2.0	1.22	61
13C-4-MoCB	3	11.293	3.17	2.0	1.32	66
13C-2,2'-DiCB	4	11.556	1.53	2.0	1.42	71
13C-4,4'-DiCB	15	18.336	1.61	2.0	1.52	76
13C-2,2',6-TrCB	19	15.161	1.09	2.0	1.48	74
13C-3,4,4'-TrCB	37	25.955	1.12	2.0	1.53	77
13C-2,2',6,6'-TeCB	54	18.610	0.81	2.0	1.32	66
13C-3,4,4',5'-TeCB	81	33.037	0.79	2.0	1.73	86
13C-3,3',4,4'-TeCB	77	33.624	0.80	2.0	1.69	85
13C-2,2',4,6,6'-PeCB	104	24.580	1.59	2.0	1.55	78
13C-2,3,3',4,4'-PeCB	105	37.202	1.60	2.0	1.69	85
13C-2,3,4,4',5'-PeCB	114	36.548	1.59	2.0	1.73	86
13C-2,3',4,4',5'-PeCB	118	35.994	1.63	2.0	1.81	91
13C-2,3',4,4',5'-PeCB	123	35.642	1.63	2.0	1.82	91
13C-3,3',4,4',5'-PeCB	126	40.388	1.61	2.0	1.80	90
13C-2,2',4,4',6,6'-HxCB	155	30.555	1.29	2.0	1.63	82
13C-HxCB (156/157)	156/157	43.445	1.26	4.0	3.26	82
13C-2,3',4,4',5,5'-HxCB	167	42.255	1.31	2.0	1.63	82
13C-3,3',4,4',5,5'-HxCB	169	46.766	1.28	2.0	1.57	79
13C-2,2',3,4',5,6,6'-HpCB	188	36.464	1.06	2.0	1.94	97
13C-2,3,3',4,4',5,5'-HpCB	189	49.300	1.03	2.0	1.86	93
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.936	0.92	2.0	2.02	101
13C-2,3,3',4,4',5,5',6-OxCB	205	51.973	0.88	2.0	1.65	83
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.935	0.79	2.0	1.49	74
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.740	0.78	2.0	1.68	84
13C--DeCB	209	55.875	0.72	2.0	1.66	83
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.645	1.06	2.0	1.73	86
13C-2,3,3',5,5'-PeCB	111	33.624	1.59	2.0	1.76	88
13C-2,2',3,3',5,5',6-HpCB	178	39.583	1.07	2.0	1.83	92
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.879	1.61	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.590	0.81	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.823	1.63	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.164	1.28	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.456	0.92	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-004  
Lab Sample ID 10341468004  
Filename P160403A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.251
2		---	---	ND	---	0.251
3		---	---	ND	---	0.251
4		---	---	ND	---	0.251
5		---	---	ND	---	0.251
6		---	---	ND	---	0.251
7		---	---	ND	---	0.251
8		---	---	ND	---	0.251
9		---	---	ND	---	0.251
10		---	---	ND	---	0.251
11		---	---	ND	---	2.46
12	12/13	---	---	ND	---	0.501
13	12/13	---	---	ND	---	0.501
14		---	---	ND	---	0.251
15		18.360	1.56	0.647	---	0.331
16		18.264	1.05	0.369	---	0.251
17		17.749	1.12	0.408	---	0.251
18	18/30	17.282	1.08	0.927	---	0.501
19		---	---	ND	---	0.251
20	20/28	21.678	1.02	2.06	---	1.29
21	21/33	---	---	ND	---	1.35
22		---	---	ND	---	0.952
23		---	---	ND	---	0.251
24		---	---	ND	---	0.251
25		---	---	ND	---	0.251
26	26/29	---	---	ND	---	0.501
27		---	---	ND	---	0.251
28	20/28	21.678	1.02	(2.06)	---	1.29
29	26/29	---	---	ND	---	0.501
30	18/30	17.282	1.08	(0.927)	---	0.501
31		---	---	ND	---	1.30
32		18.844	1.00	0.532	---	0.251
33	21/33	---	---	ND	---	1.35
34		---	---	ND	---	0.251
35		---	---	ND	---	0.251
36		---	---	ND	---	0.251
37		25.988	1.04	0.793	---	0.531
38		---	---	ND	---	0.251
39		---	---	ND	---	0.251
40	40/41/71	25.753	0.80	1.60	---	1.50
41	40/41/71	25.753	0.80	(1.60)	---	1.50
42		25.234	0.82	0.880	---	0.501
43	43/73	---	---	ND	---	0.501
44	44/47/65	24.663	0.81	3.57	---	1.50
45	45/51	---	---	ND	---	1.00
46		---	---	ND	---	0.501
47	44/47/65	24.663	0.81	(3.57)	---	1.50
48		---	---	ND	---	0.501

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-004  
Lab Sample ID 10341468004  
Filename P160403A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	24.143	0.80	2.03	---	1.00
50	50/53	---	---	ND	---	1.00
51	45/51	---	---	ND	---	1.00
52		23.607	0.80	5.44	---	1.54
53	50/53	---	---	ND	---	1.00
54		---	---	ND	---	0.501
55		---	---	ND	---	0.501
56		29.750	0.76	1.06	---	0.501
57		---	---	ND	---	0.501
58		---	---	ND	---	0.501
59	59/62/75	---	---	ND	---	1.50
60		---	---	ND	---	0.501
61	61/70/74/76	28.694	0.76	4.50	---	2.01
62	59/62/75	---	---	ND	---	1.50
63		---	---	ND	---	0.501
64		26.005	0.76	1.54	---	0.501
65	44/47/65	24.663	0.81	(3.57)	---	1.50
66		29.046	0.75	2.49	---	0.842
67		---	---	ND	---	0.501
68		---	---	ND	---	0.501
69	49/69	24.143	0.80	(2.03)	---	1.00
70	61/70/74/76	28.694	0.76	(4.50)	---	2.01
71	40/41/71	25.753	0.80	(1.60)	---	1.50
72		---	---	ND	---	0.501
73	43/73	---	---	ND	---	0.501
74	61/70/74/76	28.694	0.76	(4.50)	---	2.01
75	59/62/75	---	---	ND	---	1.50
76	61/70/74/76	28.694	0.76	(4.50)	---	2.01
77		---	---	ND	---	0.501
78		---	---	ND	---	0.501
79		---	---	ND	---	0.501
80		---	---	ND	---	0.501
81		---	---	ND	---	0.501
82		33.205	1.60	1.11	---	0.501
83		---	---	ND	---	0.501
84		28.895	1.61	2.51	---	0.501
85	85/116/117	32.702	1.58	1.60	---	1.50
86	86/87/97/108/119/125	32.064	1.58	7.25	---	3.01
87	86/87/97/108/119/125	32.064	1.58	(7.25)	---	3.01
88	88/91	28.677	1.53	1.33	---	1.00
89		---	---	ND	---	0.501
90	90/101/113	30.840	1.57	10.2	---	1.50
91	88/91	28.677	1.53	(1.33)	---	1.00
92		30.236	1.56	2.04	---	0.501
93	93/98/100/102	---	---	ND	---	2.01
94		---	---	ND	---	0.501
95		27.754	1.60	7.92	---	0.952
96		---	---	ND	---	0.501

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-004  
Lab Sample ID 10341468004  
Filename P160403A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	32.064	1.58	(7.25)	---	3.01
98	93/98/100/102	---	---	ND	---	2.01
99		31.461	1.56	4.91	---	0.501
100	93/98/100/102	---	---	ND	---	2.01
101	90/101/113	30.840	1.57	(10.2)	---	1.50
102	93/98/100/102	---	---	ND	---	2.01
103		---	---	ND	---	0.501
104		---	---	ND	---	0.501
105		37.235	1.54	3.94	---	0.501
106		---	---	ND	---	0.501
107	107/124	---	---	ND	---	1.00
108	86/87/97/108/119/125	32.064	1.58	(7.25)	---	3.01
109		35.541	1.60	0.619	---	0.501
110	110/115	32.903	1.58	16.5	---	1.00
111		---	---	ND	---	0.501
112		---	---	ND	---	0.501
113	90/101/113	30.840	1.57	(10.2)	---	1.50
114		---	---	ND	---	0.501
115	110/115	32.903	1.58	(16.5)	---	1.00
116	85/116/117	32.702	1.58	(1.60)	---	1.50
117	85/116/117	32.702	1.58	(1.60)	---	1.50
118		36.011	1.57	10.6	---	0.642
119	86/87/97/108/119/125	32.064	1.58	(7.25)	---	3.01
120		---	---	ND	---	0.501
121		---	---	ND	---	0.501
122		---	---	ND	---	0.501
123		---	---	ND	---	0.501
124	107/124	---	---	ND	---	1.00
125	86/87/97/108/119/125	32.064	1.58	(7.25)	---	3.01
126		---	---	ND	---	0.501
127		---	---	ND	---	0.501
128	128/166	40.488	1.27	2.82	---	1.00
129	129/138/163	39.197	1.24	18.3	---	1.50
130		38.527	1.24	0.953	---	0.501
131		---	---	ND	---	0.501
132		36.078	1.26	6.10	---	0.501
133		---	---	ND	---	0.501
134	134/143	---	---	ND	---	1.00
135	135/151	33.842	1.27	4.78	---	1.00
136		31.326	1.25	1.80	---	0.501
137		38.728	1.19	0.627	---	0.501
138	129/138/163	39.197	1.24	(18.3)	---	1.50
139	139/140	---	---	ND	---	1.00
140	139/140	---	---	ND	---	1.00
141		38.107	1.29	2.57	---	0.501
142		---	---	ND	---	0.501
143	134/143	---	---	ND	---	1.00
144		34.412	1.23	0.625	---	0.501

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-004  
 Lab Sample ID 10341468004  
 Filename P160403A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.501
146		37.269	1.28	2.21	---	0.501
147	147/149	34.786	1.26	11.9	---	1.00
148		---	---	ND	---	0.501
149	147/149	34.786	1.26	(11.9)	---	1.00
150		---	---	ND	---	0.501
151	135/151	33.842	1.27	(4.78)	---	1.00
152		---	---	ND	---	0.501
153	153/168	37.906	1.23	13.5	---	1.00
154		---	---	ND	---	0.501
155		---	---	ND	---	0.501
156	156/157	43.462	1.25	1.94	---	1.00
157	156/157	43.462	1.25	(1.94)	---	1.00
158		39.600	1.25	1.56	---	0.501
159		---	---	ND	---	0.501
160		---	---	ND	---	0.501
161		---	---	ND	---	0.501
162		---	---	ND	---	0.501
163	129/138/163	39.197	1.24	(18.3)	---	1.50
164		38.862	1.27	1.15	---	0.501
165		---	---	ND	---	0.501
166	128/166	40.488	1.27	(2.82)	---	1.00
167		42.271	1.24	0.775	---	0.501
168	153/168	37.906	1.23	(13.5)	---	1.00
169		---	---	ND	---	0.501
170		46.129	1.06	3.92	---	0.501
171	171/173	42.523	1.05	1.21	---	1.00
172		44.183	1.05	0.660	---	0.501
173	171/173	42.523	1.05	(1.21)	---	1.00
174		41.416	1.09	3.99	---	0.501
175		---	---	ND	---	0.501
176		37.738	1.03	0.518	---	0.501
177		41.869	1.03	2.40	---	0.501
178		39.633	1.04	0.818	---	0.501
179		36.816	1.04	1.72	---	0.501
180	180/193	44.837	1.06	9.74	---	1.00
181		---	---	ND	---	0.501
182		---	---	ND	---	0.501
183	183/185	41.181	1.00	3.13	---	1.00
184		---	---	ND	---	0.501
185	183/185	41.181	1.00	(3.13)	---	1.00
186		---	---	ND	---	0.501
187		40.556	1.02	5.60	---	0.501
188		---	---	ND	---	0.501
189		---	---	ND	---	0.501
190		46.699	1.05	0.895	---	0.501
191		---	---	ND	---	0.501
192		---	---	ND	---	0.501

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602473-004  
 Lab Sample ID        10341468004  
 Filename                P160403A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	44.837	1.06	(9.74)	---	1.00
194		51.478	0.91	2.81	---	0.752
195		49.042	0.90	0.945	---	0.752
196		47.487	0.87	1.45	---	0.752
197	197/200	---	---	ND	---	1.50
198	198/199	46.816	0.89	3.60	---	1.50
199	198/199	46.816	0.89	(3.60)	---	1.50
200	197/200	---	---	ND	---	1.50
201		---	---	ND	---	0.752
202		---	---	ND	---	0.752
203		47.688	0.90	2.12	---	0.752
204		---	---	ND	---	0.752
205		---	---	ND	---	0.752
206		53.978	0.77	2.04	---	0.752
207		---	---	ND	---	0.752
208		---	---	ND	---	0.752
209		---	---	ND	---	0.752

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-004  
Lab Sample ID             10341468004  
Filename                    P160403A\_11

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	0.647
Total Trichloro Biphenyls	5.08
Total Tetrachloro Biphenyls	23.1
Total Pentachloro Biphenyls	70.6
Total Hexachloro Biphenyls	71.6
Total Heptachloro Biphenyls	34.6
Total Octachloro Biphenyls	10.9
Total Nonachloro Biphenyls	2.04
Decachloro Biphenyls	ND
Total PCBs	219

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602473-005		
Lab Sample ID	10341468005		
Filename	P160403A_12		
Injected By	BAL		
Total Amount Extracted	1030 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/09/2016 11:50
ICAL ID	P160403A02	Received	03/15/2016 10:00
CCal Filename(s)	P160403A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/03/2016 21:22

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.717	3.28	2.0	0.724	36
13C-4-MoCB	3	11.305	3.06	2.0	0.829	41
13C-2,2'-DiCB	4	11.580	1.57	2.0	0.871	44
13C-4,4'-DiCB	15	18.360	1.55	2.0	0.942	47
13C-2,2',6-TrCB	19	15.172	1.12	2.0	0.893	45
13C-3,4,4'-TrCB	37	25.988	1.08	2.0	0.959	48
13C-2,2',6,6'-TeCB	54	18.626	0.80	2.0	0.852	43
13C-3,4,4',5'-TeCB	81	33.054	0.79	2.0	1.02	51
13C-3,3',4,4'-TeCB	77	33.658	0.81	2.0	1.02	51
13C-2,2',4,6,6'-PeCB	104	24.596	1.59	2.0	0.953	48
13C-2,3,3',4,4'-PeCB	105	37.235	1.56	2.0	1.04	52
13C-2,3,4,4',5'-PeCB	114	36.564	1.64	2.0	1.07	53
13C-2,3',4,4',5'-PeCB	118	36.011	1.60	2.0	1.13	56
13C-2,3',4,4',5'-PeCB	123	35.659	1.59	2.0	1.13	57
13C-3,3',4,4',5'-PeCB	126	40.439	1.61	2.0	1.09	54
13C-2,2',4,4',6,6'-HxCB	155	30.588	1.26	2.0	1.01	50
13C-HxCB (156/157)	156/157	43.496	1.28	4.0	1.88	47
13C-2,3',4,4',5,5'-HxCB	167	42.289	1.28	2.0	0.962	48
13C-3,3',4,4',5,5'-HxCB	169	46.817	1.25	2.0	0.889	44
13C-2,2',3,4',5,6,6'-HpCB	188	36.498	1.07	2.0	1.22	61
13C-2,3,3',4,4',5,5'-HpCB	189	49.344	1.05	2.0	1.11	56
13C-2,2',3,3',5,5',6'-OxCB	202	41.970	0.87	2.0	1.30	65
13C-2,3,3',4,4',5,5',6'-OxCB	205	52.017	0.90	2.0	0.974	49
13C-2,2',3,3',4,4',5,5',6'-NoCB	206	54.000	0.79	2.0	0.907	45
13C-2,2',3,3',4,4',5,5',6'-NoCB	208	48.784	0.79	2.0	1.04	52
13C--DeCB	209	55.940	0.74	2.0	1.03	52
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.661	1.11	2.0	1.41	70
13C-2,3,3',5,5'-PeCB	111	33.658	1.66	2.0	1.38	69
13C-2,2',3,3',5,5',6'-HpCB	178	39.634	1.06	2.0	1.44	72
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.891	1.59	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.607	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.840	1.69	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.198	1.27	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.500	0.88	2.0	NA	NA

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-005  
Lab Sample ID 10341468005  
Filename P160403A\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.243
2		---	---	ND	---	0.243
3		---	---	ND	---	0.243
4		11.592	1.41	0.598	---	0.243
5		---	---	ND	---	0.243
6		---	---	ND	---	0.243
7		---	---	ND	---	0.243
8		14.873	1.57	0.852	---	0.243
9		---	---	ND	---	0.243
10		---	---	ND	---	0.243
11		---	---	ND	---	2.38
12	12/13	---	---	ND	---	0.486
13	12/13	---	---	ND	---	0.486
14		---	---	ND	---	0.243
15		18.383	1.51	2.08	---	0.321
16		18.264	0.99	1.12	---	0.243
17		17.772	1.08	1.30	---	0.243
18	18/30	17.305	1.05	2.94	---	0.486
19		15.184	1.03	0.727	---	0.243
20	20/28	21.695	1.01	6.46	---	1.25
21	21/33	21.930	0.99	1.56	---	1.31
22		22.365	1.00	1.65	---	0.924
23		---	---	ND	---	0.243
24		---	---	ND	---	0.243
25		21.024	1.00	0.383	---	0.243
26	26/29	20.756	1.00	0.830	---	0.486
27		18.000	1.07	0.401	---	0.243
28	20/28	21.695	1.01	(6.46)	---	1.25
29	26/29	20.756	1.00	(0.830)	---	0.486
30	18/30	17.305	1.05	(2.94)	---	0.486
31		21.359	1.01	3.69	---	1.26
32		18.861	1.01	1.70	---	0.243
33	21/33	21.930	0.99	(1.56)	---	1.31
34		---	---	ND	---	0.243
35		---	---	ND	---	0.243
36		---	---	ND	---	0.243
37		26.005	1.00	2.39	---	0.515
38		---	---	ND	---	0.243
39		---	---	ND	---	0.243
40	40/41/71	25.770	0.79	4.89	---	1.46
41	40/41/71	25.770	0.79	(4.89)	---	1.46
42		25.250	0.81	2.67	---	0.486
43	43/73	---	---	ND	---	0.486
44	44/47/65	24.697	0.81	10.9	---	1.46
45	45/51	21.762	0.79	1.86	---	0.973
46		22.080	0.78	0.585	---	0.486
47	44/47/65	24.697	0.81	(10.9)	---	1.46
48		24.445	0.79	1.22	---	0.486

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-005  
Lab Sample ID 10341468005  
Filename P160403A\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	24.160	0.82	6.29	---	0.973
50	50/53	21.024	0.79	1.42	---	0.973
51	45/51	21.762	0.79	(1.86)	---	0.973
52		23.640	0.80	16.6	---	1.50
53	50/53	21.024	0.79	(1.42)	---	0.973
54		---	---	ND	---	0.486
55		---	---	ND	---	0.486
56		29.767	0.74	3.37	---	0.486
57		---	---	ND	---	0.486
58		---	---	ND	---	0.486
59	59/62/75	---	---	ND	---	1.46
60		30.018	0.74	1.02	---	0.486
61	61/70/74/76	28.710	0.75	13.7	---	1.95
62	59/62/75	---	---	ND	---	1.46
63		---	---	ND	---	0.486
64		26.022	0.79	4.66	---	0.486
65	44/47/65	24.697	0.81	(10.9)	---	1.46
66		29.079	0.76	7.90	---	0.817
67		---	---	ND	---	0.486
68		---	---	ND	---	0.486
69	49/69	24.160	0.82	(6.29)	---	0.973
70	61/70/74/76	28.710	0.75	(13.7)	---	1.95
71	40/41/71	25.770	0.79	(4.89)	---	1.46
72		---	---	ND	---	0.486
73	43/73	---	---	ND	---	0.486
74	61/70/74/76	28.710	0.75	(13.7)	---	1.95
75	59/62/75	---	---	ND	---	1.46
76	61/70/74/76	28.710	0.75	(13.7)	---	1.95
77		33.658	0.76	1.08	---	0.486
78		---	---	ND	---	0.486
79		---	---	ND	---	0.486
80		---	---	ND	---	0.486
81		---	---	ND	---	0.486
82		33.238	1.62	3.31	---	0.486
83		31.343	1.47	1.71	---	0.486
84		28.911	1.61	7.58	---	0.486
85	85/116/117	32.735	1.58	4.91	---	1.46
86	86/87/97/108/119/125	32.081	1.57	20.8	---	2.92
87	86/87/97/108/119/125	32.081	1.57	(20.8)	---	2.92
88	88/91	28.693	1.60	4.01	---	0.973
89		---	---	ND	---	0.486
90	90/101/113	30.874	1.58	30.1	---	1.46
91	88/91	28.693	1.60	(4.01)	---	0.973
92		30.253	1.59	5.91	---	0.486
93	93/98/100/102	---	---	ND	---	1.95
94		---	---	ND	---	0.486
95		27.771	1.57	23.5	---	0.924
96		---	---	ND	---	0.486

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-005  
Lab Sample ID 10341468005  
Filename P160403A\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	32.081	1.57	(20.8)	---	2.92
98	93/98/100/102	---	---	ND	---	1.95
99		31.477	1.63	14.2	---	0.486
100	93/98/100/102	---	---	ND	---	1.95
101	90/101/113	30.874	1.58	(30.1)	---	1.46
102	93/98/100/102	---	---	ND	---	1.95
103		---	---	ND	---	0.486
104		---	---	ND	---	0.486
105		37.252	1.54	11.6	---	0.486
106		---	---	ND	---	0.486
107	107/124	35.323	1.57	1.11	---	0.973
108	86/87/97/108/119/125	32.081	1.57	(20.8)	---	2.92
109		35.575	1.52	1.81	---	0.486
110	110/115	32.920	1.58	46.7	---	0.973
111		---	---	ND	---	0.486
112		---	---	ND	---	0.486
113	90/101/113	30.874	1.58	(30.1)	---	1.46
114		---	---	ND	---	0.486
115	110/115	32.920	1.58	(46.7)	---	0.973
116	85/116/117	32.735	1.58	(4.91)	---	1.46
117	85/116/117	32.735	1.58	(4.91)	---	1.46
118		36.044	1.53	31.0	---	0.622
119	86/87/97/108/119/125	32.081	1.57	(20.8)	---	2.92
120		---	---	ND	---	0.486
121		---	---	ND	---	0.486
122		---	---	ND	---	0.486
123		35.692	1.56	0.587	---	0.486
124	107/124	35.323	1.57	(1.11)	---	0.973
125	86/87/97/108/119/125	32.081	1.57	(20.8)	---	2.92
126		---	---	ND	---	0.486
127		---	---	ND	---	0.486
128	128/166	40.523	1.22	8.13	---	0.973
129	129/138/163	39.215	1.25	53.8	---	1.46
130		38.543	1.27	2.84	---	0.486
131		35.659	1.24	0.677	---	0.486
132		36.112	1.24	18.0	---	0.486
133		36.648	1.21	0.600	---	0.486
134	134/143	35.021	1.28	2.44	---	0.973
135	135/151	33.859	1.28	14.2	---	0.973
136		31.343	1.26	5.17	---	0.486
137		38.778	1.34	2.49	---	0.486
138	129/138/163	39.215	1.25	(53.8)	---	1.46
139	139/140	---	---	ND	---	0.973
140	139/140	---	---	ND	---	0.973
141		38.124	1.15	7.68	---	0.486
142		---	---	ND	---	0.486
143	134/143	35.021	1.28	(2.44)	---	0.973
144		34.446	1.37	1.82	---	0.486

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-005  
Lab Sample ID 10341468005  
Filename P160403A\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.486
146		37.302	1.25	6.62	---	0.486
147	147/149	34.803	1.24	36.6	---	0.973
148		---	---	ND	---	0.486
149	147/149	34.803	1.24	(36.6)	---	0.973
150		---	---	ND	---	0.486
151	135/151	33.859	1.28	(14.2)	---	0.973
152		---	---	ND	---	0.486
153	153/168	37.940	1.29	39.5	---	0.973
154		---	---	ND	---	0.486
155		---	---	ND	---	0.486
156	156/157	43.496	1.21	5.72	---	0.973
157	156/157	43.496	1.21	(5.72)	---	0.973
158		39.634	1.26	4.68	---	0.486
159		---	---	ND	---	0.486
160		---	---	ND	---	0.486
161		---	---	ND	---	0.486
162		---	---	ND	---	0.486
163	129/138/163	39.215	1.25	(53.8)	---	1.46
164		38.896	1.26	3.04	---	0.486
165		---	---	ND	---	0.486
166	128/166	40.523	1.22	(8.13)	---	0.973
167		42.322	1.23	2.25	---	0.486
168	153/168	37.940	1.29	(39.5)	---	0.973
169		---	---	ND	---	0.486
170		46.163	1.04	11.2	---	0.486
171	171/173	42.557	1.06	3.54	---	0.973
172		44.217	1.02	1.93	---	0.486
173	171/173	42.557	1.06	(3.54)	---	0.973
174		41.450	1.01	11.6	---	0.486
175		---	---	ND	---	0.486
176		37.755	1.07	1.57	---	0.486
177		41.903	1.03	7.05	---	0.486
178		39.650	1.06	2.44	---	0.486
179		36.849	1.05	5.17	---	0.486
180	180/193	44.871	1.04	28.1	---	0.973
181		---	---	ND	---	0.486
182		---	---	ND	---	0.486
183	183/185	41.232	1.10	9.67	---	0.973
184		---	---	ND	---	0.486
185	183/185	41.232	1.10	(9.67)	---	0.973
186		---	---	ND	---	0.486
187		40.573	1.05	16.5	---	0.486
188		---	---	ND	---	0.486
189		49.387	1.02	0.528	---	0.486
190		46.716	1.06	2.53	---	0.486
191		---	---	ND	---	0.486
192		---	---	ND	---	0.486

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-005  
Lab Sample ID 10341468005  
Filename P160403A\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	44.871	1.04	(28.1)	---	0.973
194		51.521	0.91	8.07	---	0.729
195		49.085	0.89	2.59	---	0.729
196		47.521	0.89	4.23	---	0.729
197	197/200	---	---	ND	---	1.46
198	198/199	46.850	0.90	10.4	---	1.46
199	198/199	46.850	0.90	(10.4)	---	1.46
200	197/200	---	---	ND	---	1.46
201		42.959	0.93	1.24	---	0.729
202		42.004	0.90	2.15	---	0.729
203		47.722	0.90	6.22	---	0.729
204		---	---	ND	---	0.729
205		---	---	ND	---	0.729
206		54.000	0.79	6.26	---	0.729
207		---	---	ND	---	0.729
208		48.784	0.79	1.42	---	0.729
209		55.940	0.76	0.842	---	0.729

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-005  
Lab Sample ID             10341468005  
Filename                    P160403A\_12

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	3.53
Total Trichloro Biphenyls	25.2
Total Tetrachloro Biphenyls	78.2
Total Pentachloro Biphenyls	209
Total Hexachloro Biphenyls	216
Total Heptachloro Biphenyls	102
Total Octachloro Biphenyls	34.9
Total Nonachloro Biphenyls	7.68
Decachloro Biphenyls	0.842
Total PCBs	677

ND = Not Detected

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602473-006		
Lab Sample ID	10341468006		
Filename	P160403A_13		
Injected By	BAL		
Total Amount Extracted	942 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/09/2016 12:53
ICAL ID	P160403A02	Received	03/15/2016 10:00
CCal Filename(s)	P160403A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/03/2016 22:21

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.717	3.07	2.0	1.14	57
13C-4-MoCB	3	11.317	2.98	2.0	1.31	65
13C-2,2'-DiCB	4	11.580	1.60	2.0	1.42	71
13C-4,4'-DiCB	15	18.360	1.63	2.0	1.49	74
13C-2,2',6-TrCB	19	15.172	1.09	2.0	1.43	71
13C-3,4,4'-TrCB	37	25.972	1.08	2.0	1.42	71
13C-2,2',6,6'-TeCB	54	18.626	0.80	2.0	1.30	65
13C-3,4,4',5'-TeCB	81	33.054	0.79	2.0	1.62	81
13C-3,3',4,4'-TeCB	77	33.641	0.79	2.0	1.62	81
13C-2,2',4,6,6'-PeCB	104	24.597	1.56	2.0	1.51	75
13C-2,3,3',4,4'-PeCB	105	37.218	1.60	2.0	1.65	82
13C-2,3,4,4',5'-PeCB	114	36.548	1.64	2.0	1.70	85
13C-2,3',4,4',5'-PeCB	118	36.011	1.60	2.0	1.74	87
13C-2,3',4,4',5'-PeCB	123	35.659	1.63	2.0	1.75	87
13C-3,3',4,4',5'-PeCB	126	40.405	1.59	2.0	1.76	88
13C-2,2',4,4',6,6'-HxCB	155	30.572	1.28	2.0	1.59	79
13C-HxCB (156/157)	156/157	43.445	1.30	4.0	3.10	77
13C-2,3',4,4',5,5'-HxCB	167	42.255	1.29	2.0	1.57	79
13C-3,3',4,4',5,5'-HxCB	169	46.766	1.29	2.0	1.50	75
13C-2,2',3,4',5,6,6'-HpCB	188	36.481	1.05	2.0	1.86	93
13C-2,3,3',4,4',5,5'-HpCB	189	49.279	1.07	2.0	1.70	85
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.936	0.93	2.0	1.94	97
13C-2,3,3',4,4',5,5',6-OxCB	205	51.952	0.91	2.0	1.53	76
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.914	0.81	2.0	1.40	70
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.719	0.77	2.0	1.60	80
13C--DeCB	209	55.854	0.73	2.0	1.63	81
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.678	1.09	2.0	1.58	79
13C-2,3,3',5,5'-PeCB	111	33.641	1.66	2.0	1.67	84
13C-2,2',3,3',5,5',6-HpCB	178	39.600	1.05	2.0	1.76	88
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.891	1.61	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.607	0.82	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.823	1.65	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.181	1.28	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.435	0.89	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-006  
Lab Sample ID 10341468006  
Filename P160403A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.265
2		---	---	ND	---	0.265
3		---	---	ND	---	0.265
4		---	---	ND	---	0.265
5		---	---	ND	---	0.265
6		---	---	ND	---	0.265
7		---	---	ND	---	0.265
8		---	---	ND	---	0.265
9		---	---	ND	---	0.265
10		---	---	ND	---	0.265
11		---	---	ND	---	2.60
12	12/13	---	---	ND	---	0.531
13	12/13	---	---	ND	---	0.531
14		---	---	ND	---	0.265
15		---	---	ND	---	0.350
16		---	---	ND	---	0.265
17		---	---	ND	---	0.265
18	18/30	---	---	ND	---	0.531
19		---	---	ND	---	0.265
20	20/28	---	---	ND	---	1.37
21	21/33	---	---	ND	---	1.43
22		---	---	ND	---	1.01
23		---	---	ND	---	0.265
24		---	---	ND	---	0.265
25		---	---	ND	---	0.265
26	26/29	---	---	ND	---	0.531
27		---	---	ND	---	0.265
28	20/28	---	---	ND	---	1.37
29	26/29	---	---	ND	---	0.531
30	18/30	---	---	ND	---	0.531
31		---	---	ND	---	1.38
32		---	---	ND	---	0.265
33	21/33	---	---	ND	---	1.43
34		---	---	ND	---	0.265
35		---	---	ND	---	0.265
36		---	---	ND	---	0.265
37		---	---	ND	---	0.562
38		---	---	ND	---	0.265
39		---	---	ND	---	0.265
40	40/41/71	---	---	ND	---	1.59
41	40/41/71	---	---	ND	---	1.59
42		---	---	ND	---	0.531
43	43/73	---	---	ND	---	0.531
44	44/47/65	---	---	ND	---	1.59
45	45/51	---	---	ND	---	1.06
46		---	---	ND	---	0.531
47	44/47/65	---	---	ND	---	1.59
48		---	---	ND	---	0.531

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-006  
 Lab Sample ID 10341468006  
 Filename P160403A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.06
50	50/53	---	---	ND	---	1.06
51	45/51	---	---	ND	---	1.06
52		---	---	ND	---	1.63
53	50/53	---	---	ND	---	1.06
54		---	---	ND	---	0.531
55		---	---	ND	---	0.531
56		---	---	ND	---	0.531
57		---	---	ND	---	0.531
58		---	---	ND	---	0.531
59	59/62/75	---	---	ND	---	1.59
60		---	---	ND	---	0.531
61	61/70/74/76	---	---	ND	---	2.12
62	59/62/75	---	---	ND	---	1.59
63		---	---	ND	---	0.531
64		---	---	ND	---	0.531
65	44/47/65	---	---	ND	---	1.59
66		---	---	ND	---	0.891
67		---	---	ND	---	0.531
68		---	---	ND	---	0.531
69	49/69	---	---	ND	---	1.06
70	61/70/74/76	---	---	ND	---	2.12
71	40/41/71	---	---	ND	---	1.59
72		---	---	ND	---	0.531
73	43/73	---	---	ND	---	0.531
74	61/70/74/76	---	---	ND	---	2.12
75	59/62/75	---	---	ND	---	1.59
76	61/70/74/76	---	---	ND	---	2.12
77		---	---	ND	---	0.531
78		---	---	ND	---	0.531
79		---	---	ND	---	0.531
80		---	---	ND	---	0.531
81		---	---	ND	---	0.531
82		---	---	ND	---	0.531
83		---	---	ND	---	0.531
84		---	---	ND	---	0.531
85	85/116/117	---	---	ND	---	1.59
86	86/87/97/108/119/125	---	---	ND	---	3.18
87	86/87/97/108/119/125	---	---	ND	---	3.18
88	88/91	---	---	ND	---	1.06
89		---	---	ND	---	0.531
90	90/101/113	---	---	ND	---	1.59
91	88/91	---	---	ND	---	1.06
92		---	---	ND	---	0.531
93	93/98/100/102	---	---	ND	---	2.12
94		---	---	ND	---	0.531
95		---	---	ND	---	1.01
96		---	---	ND	---	0.531

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-006  
 Lab Sample ID 10341468006  
 Filename P160403A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.18
98	93/98/100/102	---	---	ND	---	2.12
99		---	---	ND	---	0.531
100	93/98/100/102	---	---	ND	---	2.12
101	90/101/113	---	---	ND	---	1.59
102	93/98/100/102	---	---	ND	---	2.12
103		---	---	ND	---	0.531
104		---	---	ND	---	0.531
105		---	---	ND	---	0.531
106		---	---	ND	---	0.531
107	107/124	---	---	ND	---	1.06
108	86/87/97/108/119/125	---	---	ND	---	3.18
109		---	---	ND	---	0.531
110	110/115	---	---	ND	---	1.06
111		---	---	ND	---	0.531
112		---	---	ND	---	0.531
113	90/101/113	---	---	ND	---	1.59
114		---	---	ND	---	0.531
115	110/115	---	---	ND	---	1.06
116	85/116/117	---	---	ND	---	1.59
117	85/116/117	---	---	ND	---	1.59
118		---	---	ND	---	0.679
119	86/87/97/108/119/125	---	---	ND	---	3.18
120		---	---	ND	---	0.531
121		---	---	ND	---	0.531
122		---	---	ND	---	0.531
123		---	---	ND	---	0.531
124	107/124	---	---	ND	---	1.06
125	86/87/97/108/119/125	---	---	ND	---	3.18
126		---	---	ND	---	0.531
127		---	---	ND	---	0.531
128	128/166	---	---	ND	---	1.06
129	129/138/163	---	---	ND	---	1.59
130		---	---	ND	---	0.531
131		---	---	ND	---	0.531
132		---	---	ND	---	0.531
133		---	---	ND	---	0.531
134	134/143	---	---	ND	---	1.06
135	135/151	---	---	ND	---	1.06
136		---	---	ND	---	0.531
137		---	---	ND	---	0.531
138	129/138/163	---	---	ND	---	1.59
139	139/140	---	---	ND	---	1.06
140	139/140	---	---	ND	---	1.06
141		---	---	ND	---	0.531
142		---	---	ND	---	0.531
143	134/143	---	---	ND	---	1.06
144		---	---	ND	---	0.531

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-006  
 Lab Sample ID 10341468006  
 Filename P160403A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.531
146		---	---	ND	---	0.531
147	147/149	---	---	ND	---	1.06
148		---	---	ND	---	0.531
149	147/149	---	---	ND	---	1.06
150		---	---	ND	---	0.531
151	135/151	---	---	ND	---	1.06
152		---	---	ND	---	0.531
153	153/168	---	---	ND	---	1.06
154		---	---	ND	---	0.531
155		---	---	ND	---	0.531
156	156/157	---	---	ND	---	1.06
157	156/157	---	---	ND	---	1.06
158		---	---	ND	---	0.531
159		---	---	ND	---	0.531
160		---	---	ND	---	0.531
161		---	---	ND	---	0.531
162		---	---	ND	---	0.531
163	129/138/163	---	---	ND	---	1.59
164		---	---	ND	---	0.531
165		---	---	ND	---	0.531
166	128/166	---	---	ND	---	1.06
167		---	---	ND	---	0.531
168	153/168	---	---	ND	---	1.06
169		---	---	ND	---	0.531
170		---	---	ND	---	0.531
171	171/173	---	---	ND	---	1.06
172		---	---	ND	---	0.531
173	171/173	---	---	ND	---	1.06
174		---	---	ND	---	0.531
175		---	---	ND	---	0.531
176		---	---	ND	---	0.531
177		---	---	ND	---	0.531
178		---	---	ND	---	0.531
179		---	---	ND	---	0.531
180	180/193	---	---	ND	---	1.06
181		---	---	ND	---	0.531
182		---	---	ND	---	0.531
183	183/185	---	---	ND	---	1.06
184		---	---	ND	---	0.531
185	183/185	---	---	ND	---	1.06
186		---	---	ND	---	0.531
187		---	---	ND	---	0.531
188		---	---	ND	---	0.531
189		---	---	ND	---	0.531
190		---	---	ND	---	0.531
191		---	---	ND	---	0.531
192		---	---	ND	---	0.531

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602473-006  
 Lab Sample ID        10341468006  
 Filename                P160403A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.06
194		---	---	ND	---	0.796
195		---	---	ND	---	0.796
196		---	---	ND	---	0.796
197	197/200	---	---	ND	---	1.59
198	198/199	---	---	ND	---	1.59
199	198/199	---	---	ND	---	1.59
200	197/200	---	---	ND	---	1.59
201		---	---	ND	---	0.796
202		---	---	ND	---	0.796
203		---	---	ND	---	0.796
204		---	---	ND	---	0.796
205		---	---	ND	---	0.796
206		---	---	ND	---	0.796
207		---	---	ND	---	0.796
208		---	---	ND	---	0.796
209		---	---	ND	---	0.796

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-006  
Lab Sample ID             10341468006  
Filename                    P160403A\_13

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602473-007		
Lab Sample ID	10341468007		
Filename	P160404A_04		
Injected By	BAL		
Total Amount Extracted	961 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/09/2016 13:50
ICAL ID	P160404A02	Received	03/15/2016 10:00
CCal Filename(s)	P160404A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/04/2016 03:16

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.693	2.81	2.0	1.25	63
13C-4-MoCB	3	11.281	3.05	2.0	1.38	69
13C-2,2'-DiCB	4	11.544	1.61	2.0	1.44	72
13C-4,4'-DiCB	15	18.312	1.59	2.0	1.53	77
13C-2,2',6-TrCB	19	15.125	1.09	2.0	1.47	74
13C-3,4,4'-TrCB	37	25.921	1.05	2.0	1.49	75
13C-2,2',6,6'-TeCB	54	18.593	0.80	2.0	1.23	61
13C-3,4,4',5'-TeCB	81	33.004	0.79	2.0	1.59	79
13C-3,3',4,4'-TeCB	77	33.590	0.79	2.0	1.59	80
13C-2,2',4,6,6'-PeCB	104	24.563	1.63	2.0	1.57	78
13C-2,3,3',4,4'-PeCB	105	37.185	1.60	2.0	1.60	80
13C-2,3,4,4',5'-PeCB	114	36.514	1.59	2.0	1.65	83
13C-2,3',4,4',5'-PeCB	118	35.960	1.59	2.0	1.71	86
13C-2,3',4,4',5'-PeCB	123	35.608	1.61	2.0	1.68	84
13C-3,3',4,4',5'-PeCB	126	40.354	1.64	2.0	1.69	85
13C-2,2',4,4',6,6'-HxCB	155	30.538	1.31	2.0	1.67	83
13C-HxCB (156/157)	156/157	43.411	1.28	4.0	3.08	77
13C-2,3',4,4',5,5'-HxCB	167	42.221	1.32	2.0	1.54	77
13C-3,3',4,4',5,5'-HxCB	169	46.732	1.29	2.0	1.49	74
13C-2,2',3,4',5,6,6'-HpCB	188	36.430	1.06	2.0	1.90	95
13C-2,3,3',4,4',5,5'-HpCB	189	49.257	1.06	2.0	1.77	88
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.902	0.92	2.0	1.98	99
13C-2,3,3',4,4',5,5',6-OxCB	205	51.930	0.88	2.0	1.58	79
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.870	0.78	2.0	1.42	71
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.697	0.80	2.0	1.66	83
13C--DeCB	209	55.832	0.69	2.0	1.64	82
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.628	1.10	2.0	1.62	81
13C-2,3,3',5,5'-PeCB	111	33.590	1.65	2.0	1.61	81
13C-2,2',3,3',5,5',6-HpCB	178	39.566	1.06	2.0	1.70	85
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.855	1.61	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.557	0.79	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.773	1.62	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.130	1.31	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.413	0.88	2.0	NA	NA

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 ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-007  
 Lab Sample ID 10341468007  
 Filename P160404A\_04

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.260
2		---	---	ND	---	0.260
3		---	---	ND	---	0.260
4		---	---	ND	---	0.260
5		---	---	ND	---	0.260
6		---	---	ND	---	0.260
7		---	---	ND	---	0.260
8		---	---	ND	---	0.260
9		---	---	ND	---	0.260
10		---	---	ND	---	0.260
11		---	---	ND	---	2.55
12	12/13	---	---	ND	---	0.520
13	12/13	---	---	ND	---	0.520
14		---	---	ND	---	0.260
15		---	---	ND	---	0.343
16		---	---	ND	---	0.260
17		---	---	ND	---	0.260
18	18/30	---	---	ND	---	0.520
19		---	---	ND	---	0.260
20	20/28	---	---	ND	---	1.34
21	21/33	---	---	ND	---	1.40
22		---	---	ND	---	0.988
23		---	---	ND	---	0.260
24		---	---	ND	---	0.260
25		---	---	ND	---	0.260
26	26/29	---	---	ND	---	0.520
27		---	---	ND	---	0.260
28	20/28	---	---	ND	---	1.34
29	26/29	---	---	ND	---	0.520
30	18/30	---	---	ND	---	0.520
31		---	---	ND	---	1.35
32		---	---	ND	---	0.260
33	21/33	---	---	ND	---	1.40
34		---	---	ND	---	0.260
35		---	---	ND	---	0.260
36		---	---	ND	---	0.260
37		---	---	ND	---	0.551
38		---	---	ND	---	0.260
39		---	---	ND	---	0.260
40	40/41/71	---	---	ND	---	1.56
41	40/41/71	---	---	ND	---	1.56
42		---	---	ND	---	0.520
43	43/73	---	---	ND	---	0.520
44	44/47/65	---	---	ND	---	1.56
45	45/51	---	---	ND	---	1.04
46		---	---	ND	---	0.520
47	44/47/65	---	---	ND	---	1.56
48		---	---	ND	---	0.520

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-007  
 Lab Sample ID 10341468007  
 Filename P160404A\_04

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.04
50	50/53	---	---	ND	---	1.04
51	45/51	---	---	ND	---	1.04
52		---	---	ND	---	1.60
53	50/53	---	---	ND	---	1.04
54		---	---	ND	---	0.520
55		---	---	ND	---	0.520
56		---	---	ND	---	0.520
57		---	---	ND	---	0.520
58		---	---	ND	---	0.520
59	59/62/75	---	---	ND	---	1.56
60		---	---	ND	---	0.520
61	61/70/74/76	---	---	ND	---	2.08
62	59/62/75	---	---	ND	---	1.56
63		---	---	ND	---	0.520
64		---	---	ND	---	0.520
65	44/47/65	---	---	ND	---	1.56
66		---	---	ND	---	0.874
67		---	---	ND	---	0.520
68		---	---	ND	---	0.520
69	49/69	---	---	ND	---	1.04
70	61/70/74/76	---	---	ND	---	2.08
71	40/41/71	---	---	ND	---	1.56
72		---	---	ND	---	0.520
73	43/73	---	---	ND	---	0.520
74	61/70/74/76	---	---	ND	---	2.08
75	59/62/75	---	---	ND	---	1.56
76	61/70/74/76	---	---	ND	---	2.08
77		---	---	ND	---	0.520
78		---	---	ND	---	0.520
79		---	---	ND	---	0.520
80		---	---	ND	---	0.520
81		---	---	ND	---	0.520
82		---	---	ND	---	0.520
83		---	---	ND	---	0.520
84		---	---	ND	---	0.520
85	85/116/117	---	---	ND	---	1.56
86	86/87/97/108/119/125	---	---	ND	---	3.12
87	86/87/97/108/119/125	---	---	ND	---	3.12
88	88/91	---	---	ND	---	1.04
89		---	---	ND	---	0.520
90	90/101/113	---	---	ND	---	1.56
91	88/91	---	---	ND	---	1.04
92		---	---	ND	---	0.520
93	93/98/100/102	---	---	ND	---	2.08
94		---	---	ND	---	0.520
95		---	---	ND	---	0.988
96		---	---	ND	---	0.520

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-007  
Lab Sample ID 10341468007  
Filename P160404A\_04

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.12
98	93/98/100/102	---	---	ND	---	2.08
99		---	---	ND	---	0.520
100	93/98/100/102	---	---	ND	---	2.08
101	90/101/113	---	---	ND	---	1.56
102	93/98/100/102	---	---	ND	---	2.08
103		---	---	ND	---	0.520
104		---	---	ND	---	0.520
105		---	---	ND	---	0.520
106		---	---	ND	---	0.520
107	107/124	---	---	ND	---	1.04
108	86/87/97/108/119/125	---	---	ND	---	3.12
109		---	---	ND	---	0.520
110	110/115	32.869	1.58	1.39	---	1.04
111		---	---	ND	---	0.520
112		---	---	ND	---	0.520
113	90/101/113	---	---	ND	---	1.56
114		---	---	ND	---	0.520
115	110/115	32.869	1.58	(1.39)	---	1.04
116	85/116/117	---	---	ND	---	1.56
117	85/116/117	---	---	ND	---	1.56
118		35.977	1.58	0.992	---	0.666
119	86/87/97/108/119/125	---	---	ND	---	3.12
120		---	---	ND	---	0.520
121		---	---	ND	---	0.520
122		---	---	ND	---	0.520
123		---	---	ND	---	0.520
124	107/124	---	---	ND	---	1.04
125	86/87/97/108/119/125	---	---	ND	---	3.12
126		---	---	ND	---	0.520
127		---	---	ND	---	0.520
128	128/166	---	---	ND	---	1.04
129	129/138/163	39.164	1.28	3.11	---	1.56
130		---	---	ND	---	0.520
131		---	---	ND	---	0.520
132		36.044	1.27	0.925	---	0.520
133		---	---	ND	---	0.520
134	134/143	---	---	ND	---	1.04
135	135/151	---	---	ND	---	1.04
136		---	---	ND	---	0.520
137		---	---	ND	---	0.520
138	129/138/163	39.164	1.28	(3.11)	---	1.56
139	139/140	---	---	ND	---	1.04
140	139/140	---	---	ND	---	1.04
141		38.057	1.27	0.616	---	0.520
142		---	---	ND	---	0.520
143	134/143	---	---	ND	---	1.04
144		---	---	ND	---	0.520

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-007  
Lab Sample ID 10341468007  
Filename P160404A\_04

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.520
146		---	---	ND	---	0.520
147	147/149	34.770	1.25	2.27	---	1.04
148		---	---	ND	---	0.520
149	147/149	34.770	1.25	(2.27)	---	1.04
150		---	---	ND	---	0.520
151	135/151	---	---	ND	---	1.04
152		---	---	ND	---	0.520
153	153/168	37.872	1.24	2.68	---	1.04
154		---	---	ND	---	0.520
155		---	---	ND	---	0.520
156	156/157	---	---	ND	---	1.04
157	156/157	---	---	ND	---	1.04
158		---	---	ND	---	0.520
159		---	---	ND	---	0.520
160		---	---	ND	---	0.520
161		---	---	ND	---	0.520
162		---	---	ND	---	0.520
163	129/138/163	39.164	1.28	(3.11)	---	1.56
164		---	---	ND	---	0.520
165		---	---	ND	---	0.520
166	128/166	---	---	ND	---	1.04
167		---	---	ND	---	0.520
168	153/168	37.872	1.24	(2.68)	---	1.04
169		---	---	ND	---	0.520
170		46.078	1.07	1.05	---	0.520
171	171/173	---	---	ND	---	1.04
172		---	---	ND	---	0.520
173	171/173	---	---	ND	---	1.04
174		41.382	0.98	1.19	---	0.520
175		---	---	ND	---	0.520
176		---	---	ND	---	0.520
177		41.835	0.97	0.633	---	0.520
178		---	---	ND	---	0.520
179		---	---	ND	---	0.520
180	180/193	44.803	1.08	2.84	---	1.04
181		---	---	ND	---	0.520
182		---	---	ND	---	0.520
183	183/185	---	---	ND	---	1.04
184		---	---	ND	---	0.520
185	183/185	---	---	ND	---	1.04
186		---	---	ND	---	0.520
187		40.522	1.06	1.58	---	0.520
188		---	---	ND	---	0.520
189		---	---	ND	---	0.520
190		---	---	ND	---	0.520
191		---	---	ND	---	0.520
192		---	---	ND	---	0.520

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-007  
 Lab Sample ID 10341468007  
 Filename P160404A\_04

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	44.803	1.08	(2.84)	---	1.04
194		51.413	0.94	0.821	---	0.780
195		---	---	ND	---	0.780
196		---	---	ND	---	0.780
197	197/200	---	---	ND	---	1.56
198	198/199	---	---	ND	---	1.56
199	198/199	---	---	ND	---	1.56
200	197/200	---	---	ND	---	1.56
201		---	---	ND	---	0.780
202		---	---	ND	---	0.780
203		47.654	0.89	0.789	---	0.780
204		---	---	ND	---	0.780
205		---	---	ND	---	0.780
206		53.913	0.77	0.999	---	0.780
207		---	---	ND	---	0.780
208		---	---	ND	---	0.780
209		---	---	ND	---	0.780

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-007  
Lab Sample ID             10341468007  
Filename                    P160404A\_04

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	2.38
Total Hexachloro Biphenyls	9.60
Total Heptachloro Biphenyls	7.29
Total Octachloro Biphenyls	1.61
Total Nonachloro Biphenyls	0.999
Decachloro Biphenyls	ND
Total PCBs	21.9

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602473-008		
Lab Sample ID	10341468008		
Filename	P160404A_05		
Injected By	BAL		
Total Amount Extracted	905 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/09/2016 14:12
ICAL ID	P160404A02	Received	03/15/2016 10:00
CCal Filename(s)	P160404A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/04/2016 04:15

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.705	2.98	2.0	1.15	58
13C-4-MoCB	3	11.293	3.14	2.0	1.29	64
13C-2,2'-DiCB	4	11.557	1.59	2.0	1.34	67
13C-4,4'-DiCB	15	18.324	1.58	2.0	1.47	73
13C-2,2',6-TrCB	19	15.125	1.06	2.0	1.35	68
13C-3,4,4'-TrCB	37	25.938	1.10	2.0	1.48	74
13C-2,2',6,6'-TeCB	54	18.593	0.78	2.0	1.14	57
13C-3,4,4',5'-TeCB	81	33.003	0.79	2.0	1.55	78
13C-3,3',4,4'-TeCB	77	33.590	0.77	2.0	1.64	82
13C-2,2',4,6,6'-PeCB	104	24.563	1.62	2.0	1.51	75
13C-2,3,3',4,4'-PeCB	105	37.168	1.62	2.0	1.65	83
13C-2,3,4,4',5'-PeCB	114	36.514	1.62	2.0	1.72	86
13C-2,3',4,4',5'-PeCB	118	35.960	1.64	2.0	1.73	87
13C-2,3',4,4',5'-PeCB	123	35.608	1.57	2.0	1.73	86
13C-3,3',4,4',5'-PeCB	126	40.371	1.62	2.0	1.77	88
13C-2,2',4,4',6,6'-HxCB	155	30.538	1.34	2.0	1.69	84
13C-HxCB (156/157)	156/157	43.395	1.29	4.0	3.17	79
13C-2,3',4,4',5,5'-HxCB	167	42.221	1.30	2.0	1.60	80
13C-3,3',4,4',5,5'-HxCB	169	46.716	1.27	2.0	1.56	78
13C-2,2',3,4',5,6,6'-HpCB	188	36.447	1.06	2.0	1.89	94
13C-2,3,3',4,4',5,5'-HpCB	189	49.236	1.06	2.0	1.79	89
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.903	0.90	2.0	2.00	100
13C-2,3,3',4,4',5,5',6-OxCB	205	51.931	0.90	2.0	1.65	82
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.849	0.80	2.0	1.45	73
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.697	0.79	2.0	1.60	80
13C--DeCB	209	55.790	0.70	2.0	1.68	84
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.611	1.02	2.0	1.58	79
13C-2,3,3',5,5'-PeCB	111	33.590	1.60	2.0	1.74	87
13C-2,2',3,3',5,5',6-HpCB	178	39.566	1.08	2.0	1.82	91
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.855	1.60	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.557	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.790	1.63	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.130	1.29	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.392	0.90	2.0	NA	NA

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-008  
 Lab Sample ID 10341468008  
 Filename P160404A\_05

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.276
2		---	---	ND	---	0.276
3		---	---	ND	---	0.276
4		---	---	ND	---	0.276
5		---	---	ND	---	0.276
6		---	---	ND	---	0.276
7		---	---	ND	---	0.276
8		---	---	ND	---	0.276
9		---	---	ND	---	0.276
10		---	---	ND	---	0.276
11		---	---	ND	---	2.71
12	12/13	---	---	ND	---	0.553
13	12/13	---	---	ND	---	0.553
14		---	---	ND	---	0.276
15		---	---	ND	---	0.365
16		---	---	ND	---	0.276
17		---	---	ND	---	0.276
18	18/30	---	---	ND	---	0.553
19		---	---	ND	---	0.276
20	20/28	---	---	ND	---	1.43
21	21/33	---	---	ND	---	1.49
22		---	---	ND	---	1.05
23		---	---	ND	---	0.276
24		---	---	ND	---	0.276
25		---	---	ND	---	0.276
26	26/29	---	---	ND	---	0.553
27		---	---	ND	---	0.276
28	20/28	---	---	ND	---	1.43
29	26/29	---	---	ND	---	0.553
30	18/30	---	---	ND	---	0.553
31		---	---	ND	---	1.44
32		---	---	ND	---	0.276
33	21/33	---	---	ND	---	1.49
34		---	---	ND	---	0.276
35		---	---	ND	---	0.276
36		---	---	ND	---	0.276
37		---	---	ND	---	0.586
38		---	---	ND	---	0.276
39		---	---	ND	---	0.276
40	40/41/71	---	---	ND	---	1.66
41	40/41/71	---	---	ND	---	1.66
42		---	---	ND	---	0.553
43	43/73	---	---	ND	---	0.553
44	44/47/65	---	---	ND	---	1.66
45	45/51	---	---	ND	---	1.11
46		---	---	ND	---	0.553
47	44/47/65	---	---	ND	---	1.66
48		---	---	ND	---	0.553

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-008  
Lab Sample ID             10341468008  
Filename                    P160404A\_05

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.11
50	50/53	---	---	ND	---	1.11
51	45/51	---	---	ND	---	1.11
52		---	---	ND	---	1.70
53	50/53	---	---	ND	---	1.11
54		---	---	ND	---	0.553
55		---	---	ND	---	0.553
56		---	---	ND	---	0.553
57		---	---	ND	---	0.553
58		---	---	ND	---	0.553
59	59/62/75	---	---	ND	---	1.66
60		---	---	ND	---	0.553
61	61/70/74/76	---	---	ND	---	2.21
62	59/62/75	---	---	ND	---	1.66
63		---	---	ND	---	0.553
64		---	---	ND	---	0.553
65	44/47/65	---	---	ND	---	1.66
66		---	---	ND	---	0.929
67		---	---	ND	---	0.553
68		---	---	ND	---	0.553
69	49/69	---	---	ND	---	1.11
70	61/70/74/76	---	---	ND	---	2.21
71	40/41/71	---	---	ND	---	1.66
72		---	---	ND	---	0.553
73	43/73	---	---	ND	---	0.553
74	61/70/74/76	---	---	ND	---	2.21
75	59/62/75	---	---	ND	---	1.66
76	61/70/74/76	---	---	ND	---	2.21
77		---	---	ND	---	0.553
78		---	---	ND	---	0.553
79		---	---	ND	---	0.553
80		---	---	ND	---	0.553
81		---	---	ND	---	0.553
82		---	---	ND	---	0.553
83		---	---	ND	---	0.553
84		---	---	ND	---	0.553
85	85/116/117	---	---	ND	---	1.66
86	86/87/97/108/119/125	---	---	ND	---	3.32
87	86/87/97/108/119/125	---	---	ND	---	3.32
88	88/91	---	---	ND	---	1.11
89		---	---	ND	---	0.553
90	90/101/113	---	---	ND	---	1.66
91	88/91	---	---	ND	---	1.11
92		---	---	ND	---	0.553
93	93/98/100/102	---	---	ND	---	2.21
94		---	---	ND	---	0.553
95		---	---	ND	---	1.05
96		---	---	ND	---	0.553

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-008  
Lab Sample ID 10341468008  
Filename P160404A\_05

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.32
98	93/98/100/102	---	---	ND	---	2.21
99		---	---	ND	---	0.553
100	93/98/100/102	---	---	ND	---	2.21
101	90/101/113	---	---	ND	---	1.66
102	93/98/100/102	---	---	ND	---	2.21
103		---	---	ND	---	0.553
104		---	---	ND	---	0.553
105		37.185	1.47	0.750	---	0.553
106		---	---	ND	---	0.553
107	107/124	---	---	ND	---	1.11
108	86/87/97/108/119/125	---	---	ND	---	3.32
109		---	---	ND	---	0.553
110	110/115	32.869	1.58	1.86	---	1.11
111		---	---	ND	---	0.553
112		---	---	ND	---	0.553
113	90/101/113	---	---	ND	---	1.66
114		---	---	ND	---	0.553
115	110/115	32.869	1.58	(1.86)	---	1.11
116	85/116/117	---	---	ND	---	1.66
117	85/116/117	---	---	ND	---	1.66
118		35.977	1.50	1.78	---	0.707
119	86/87/97/108/119/125	---	---	ND	---	3.32
120		---	---	ND	---	0.553
121		---	---	ND	---	0.553
122		---	---	ND	---	0.553
123		---	---	ND	---	0.553
124	107/124	---	---	ND	---	1.11
125	86/87/97/108/119/125	---	---	ND	---	3.32
126		---	---	ND	---	0.553
127		---	---	ND	---	0.553
128	128/166	---	---	ND	---	1.11
129	129/138/163	39.164	1.26	2.09	---	1.66
130		---	---	ND	---	0.553
131		---	---	ND	---	0.553
132		36.061	1.20	0.697	---	0.553
133		---	---	ND	---	0.553
134	134/143	---	---	ND	---	1.11
135	135/151	---	---	ND	---	1.11
136		---	---	ND	---	0.553
137		---	---	ND	---	0.553
138	129/138/163	39.164	1.26	(2.09)	---	1.66
139	139/140	---	---	ND	---	1.11
140	139/140	---	---	ND	---	1.11
141		---	---	ND	---	0.553
142		---	---	ND	---	0.553
143	134/143	---	---	ND	---	1.11
144		---	---	ND	---	0.553

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-008  
Lab Sample ID 10341468008  
Filename P160404A\_05

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.553
146		---	---	ND	---	0.553
147	147/149	34.770	1.29	1.23	---	1.11
148		---	---	ND	---	0.553
149	147/149	34.770	1.29	(1.23)	---	1.11
150		---	---	ND	---	0.553
151	135/151	---	---	ND	---	1.11
152		---	---	ND	---	0.553
153	153/168	37.873	1.27	1.32	---	1.11
154		---	---	ND	---	0.553
155		---	---	ND	---	0.553
156	156/157	---	---	ND	---	1.11
157	156/157	---	---	ND	---	1.11
158		---	---	ND	---	0.553
159		---	---	ND	---	0.553
160		---	---	ND	---	0.553
161		---	---	ND	---	0.553
162		---	---	ND	---	0.553
163	129/138/163	39.164	1.26	(2.09)	---	1.66
164		---	---	ND	---	0.553
165		---	---	ND	---	0.553
166	128/166	---	---	ND	---	1.11
167		---	---	ND	---	0.553
168	153/168	37.873	1.27	(1.32)	---	1.11
169		---	---	ND	---	0.553
170		---	---	ND	---	0.553
171	171/173	---	---	ND	---	1.11
172		---	---	ND	---	0.553
173	171/173	---	---	ND	---	1.11
174		---	---	ND	---	0.553
175		---	---	ND	---	0.553
176		---	---	ND	---	0.553
177		---	---	ND	---	0.553
178		---	---	ND	---	0.553
179		---	---	ND	---	0.553
180	180/193	---	---	ND	---	1.11
181		---	---	ND	---	0.553
182		---	---	ND	---	0.553
183	183/185	---	---	ND	---	1.11
184		---	---	ND	---	0.553
185	183/185	---	---	ND	---	1.11
186		---	---	ND	---	0.553
187		---	---	ND	---	0.553
188		---	---	ND	---	0.553
189		---	---	ND	---	0.553
190		---	---	ND	---	0.553
191		---	---	ND	---	0.553
192		---	---	ND	---	0.553

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602473-008  
 Lab Sample ID        10341468008  
 Filename                P160404A\_05

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.11
194		---	---	ND	---	0.829
195		---	---	ND	---	0.829
196		---	---	ND	---	0.829
197	197/200	---	---	ND	---	1.66
198	198/199	---	---	ND	---	1.66
199	198/199	---	---	ND	---	1.66
200	197/200	---	---	ND	---	1.66
201		---	---	ND	---	0.829
202		---	---	ND	---	0.829
203		---	---	ND	---	0.829
204		---	---	ND	---	0.829
205		---	---	ND	---	0.829
206		---	---	ND	---	0.829
207		---	---	ND	---	0.829
208		---	---	ND	---	0.829
209		---	---	ND	---	0.829

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-008  
Lab Sample ID             10341468008  
Filename                    P160404A\_05

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	4.39
Total Hexachloro Biphenyls	5.34
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	9.72

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602473-009	Matrix	Water
Lab Sample ID	10341468009	Dilution	3
Filename	P160404A_06	Collected	03/09/2016 14:46
Injected By	BAL	Received	03/15/2016 10:00
Total Amount Extracted	1010 mL	Extracted	03/29/2016 10:25
% Moisture	NA	Analyzed	04/04/2016 05:13
Dry Weight Extracted	NA		
ICAL ID	P160404A02		
CCal Filename(s)	P160404A_01		
Method Blank ID	BLANK-49620		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.681	2.76	2.0	0.700	35
13C-4-MoCB	3	11.269	3.24	2.0	0.866	43
13C-2,2'-DiCB	4	11.533	1.62	2.0	0.935	47
13C-4,4'-DiCB	15	18.300	1.65	2.0	1.14	57
13C-2,2',6-TrCB	19	15.125	1.09	2.0	1.01	50
13C-3,4,4'-TrCB	37	25.921	1.07	2.0	1.22	61
13C-2,2',6,6'-TeCB	54	18.576	0.80	2.0	0.844	42
13C-3,4,4',5'-TeCB	81	32.987	0.79	2.0	1.42	71
13C-3,3',4,4'-TeCB	77	33.574	0.79	2.0	1.40	70
13C-2,2',4,6,6'-PeCB	104	24.546	1.59	2.0	1.25	63
13C-2,3,3',4,4'-PeCB	105	37.151	1.61	2.0	1.41	71
13C-2,3,4,4',5'-PeCB	114	36.497	1.62	2.0	1.44	72
13C-2,3',4,4',5'-PeCB	118	35.944	1.59	2.0	1.48	74
13C-2,3',4,4',5'-PeCB	123	35.591	1.61	2.0	1.47	74
13C-3,3',4,4',5'-PeCB	126	40.338	1.64	2.0	1.53	76
13C-2,2',4,4',6,6'-HxCB	155	30.538	1.26	2.0	1.53	77
13C-HxCB (156/157)	156/157	43.378	1.28	4.0	2.83	71
13C-2,3',4,4',5,5'-HxCB	167	42.204	1.25	2.0	1.40	70
13C-3,3',4,4',5,5'-HxCB	169	46.699	1.31	2.0	1.36	68
13C-2,2',3,4',5,6,6'-HpCB	188	36.413	1.05	2.0	1.80	90
13C-2,3,3',4,4',5,5'-HpCB	189	49.215	1.04	2.0	1.66	83
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.869	0.90	2.0	1.85	92
13C-2,3,3',4,4',5,5',6-OxCB	205	51.888	0.93	2.0	1.51	75
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.849	0.81	2.0	1.33	66
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.676	0.80	2.0	1.55	78
13C--DeCB	209	55.789	0.70	2.0	1.58	79
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.628	1.07	2.0	1.32	66
13C-2,3,3',5,5'-PeCB	111	33.574	1.62	2.0	1.50	75
13C-2,2',3,3',5,5',6-HpCB	178	39.549	1.06	2.0	1.69	84
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.843	1.57	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.557	0.78	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.773	1.58	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.113	1.27	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.370	0.92	2.0	NA	NA

Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
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R = Recovery outside of Method 1668A control limits  
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ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-009  
Lab Sample ID 10341468009  
Filename P160404A\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.247
2		---	---	ND	---	0.247
3		---	---	ND	---	0.247
4		---	---	ND	---	0.247
5		---	---	ND	---	0.247
6		---	---	ND	---	0.247
7		---	---	ND	---	0.247
8		---	---	ND	---	0.247
9		---	---	ND	---	0.247
10		---	---	ND	---	0.247
11		---	---	ND	---	2.42
12	12/13	---	---	ND	---	0.494
13	12/13	---	---	ND	---	0.494
14		---	---	ND	---	0.247
15		---	---	ND	---	0.326
16		---	---	ND	---	0.247
17		---	---	ND	---	0.247
18	18/30	---	---	ND	---	0.494
19		---	---	ND	---	0.247
20	20/28	---	---	ND	---	1.27
21	21/33	---	---	ND	---	1.33
22		---	---	ND	---	0.939
23		---	---	ND	---	0.247
24		---	---	ND	---	0.247
25		---	---	ND	---	0.247
26	26/29	---	---	ND	---	0.494
27		---	---	ND	---	0.247
28	20/28	---	---	ND	---	1.27
29	26/29	---	---	ND	---	0.494
30	18/30	---	---	ND	---	0.494
31		---	---	ND	---	1.28
32		---	---	ND	---	0.247
33	21/33	---	---	ND	---	1.33
34		---	---	ND	---	0.247
35		---	---	ND	---	0.247
36		---	---	ND	---	0.247
37		---	---	ND	---	0.524
38		---	---	ND	---	0.247
39		---	---	ND	---	0.247
40	40/41/71	---	---	ND	---	1.48
41	40/41/71	---	---	ND	---	1.48
42		---	---	ND	---	0.494
43	43/73	---	---	ND	---	0.494
44	44/47/65	---	---	ND	---	1.48
45	45/51	---	---	ND	---	0.988
46		---	---	ND	---	0.494
47	44/47/65	---	---	ND	---	1.48
48		---	---	ND	---	0.494

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-009  
 Lab Sample ID 10341468009  
 Filename P160404A\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.988
50	50/53	---	---	ND	---	0.988
51	45/51	---	---	ND	---	0.988
52		---	---	ND	---	1.52
53	50/53	---	---	ND	---	0.988
54		---	---	ND	---	0.494
55		---	---	ND	---	0.494
56		---	---	ND	---	0.494
57		---	---	ND	---	0.494
58		---	---	ND	---	0.494
59	59/62/75	---	---	ND	---	1.48
60		---	---	ND	---	0.494
61	61/70/74/76	---	---	ND	---	1.98
62	59/62/75	---	---	ND	---	1.48
63		---	---	ND	---	0.494
64		---	---	ND	---	0.494
65	44/47/65	---	---	ND	---	1.48
66		---	---	ND	---	0.830
67		---	---	ND	---	0.494
68		---	---	ND	---	0.494
69	49/69	---	---	ND	---	0.988
70	61/70/74/76	---	---	ND	---	1.98
71	40/41/71	---	---	ND	---	1.48
72		---	---	ND	---	0.494
73	43/73	---	---	ND	---	0.494
74	61/70/74/76	---	---	ND	---	1.98
75	59/62/75	---	---	ND	---	1.48
76	61/70/74/76	---	---	ND	---	1.98
77		---	---	ND	---	0.494
78		---	---	ND	---	0.494
79		---	---	ND	---	0.494
80		---	---	ND	---	0.494
81		---	---	ND	---	0.494
82		---	---	ND	---	0.494
83		---	---	ND	---	0.494
84		---	---	ND	---	0.494
85	85/116/117	---	---	ND	---	1.48
86	86/87/97/108/119/125	---	---	ND	---	2.96
87	86/87/97/108/119/125	---	---	ND	---	2.96
88	88/91	---	---	ND	---	0.988
89		---	---	ND	---	0.494
90	90/101/113	---	---	ND	---	1.48
91	88/91	---	---	ND	---	0.988
92		---	---	ND	---	0.494
93	93/98/100/102	---	---	ND	---	1.98
94		---	---	ND	---	0.494
95		---	---	ND	---	0.939
96		---	---	ND	---	0.494

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-009  
Lab Sample ID 10341468009  
Filename P160404A\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.96
98	93/98/100/102	---	---	ND	---	1.98
99		---	---	ND	---	0.494
100	93/98/100/102	---	---	ND	---	1.98
101	90/101/113	---	---	ND	---	1.48
102	93/98/100/102	---	---	ND	---	1.98
103		---	---	ND	---	0.494
104		---	---	ND	---	0.494
105		---	---	ND	---	0.494
106		---	---	ND	---	0.494
107	107/124	---	---	ND	---	0.988
108	86/87/97/108/119/125	---	---	ND	---	2.96
109		---	---	ND	---	0.494
110	110/115	---	---	ND	---	0.988
111		---	---	ND	---	0.494
112		---	---	ND	---	0.494
113	90/101/113	---	---	ND	---	1.48
114		---	---	ND	---	0.494
115	110/115	---	---	ND	---	0.988
116	85/116/117	---	---	ND	---	1.48
117	85/116/117	---	---	ND	---	1.48
118		---	---	ND	---	0.632
119	86/87/97/108/119/125	---	---	ND	---	2.96
120		---	---	ND	---	0.494
121		---	---	ND	---	0.494
122		---	---	ND	---	0.494
123		---	---	ND	---	0.494
124	107/124	---	---	ND	---	0.988
125	86/87/97/108/119/125	---	---	ND	---	2.96
126		---	---	ND	---	0.494
127		---	---	ND	---	0.494
128	128/166	---	---	ND	---	0.988
129	129/138/163	---	---	ND	---	1.48
130		---	---	ND	---	0.494
131		---	---	ND	---	0.494
132		---	---	ND	---	0.494
133		---	---	ND	---	0.494
134	134/143	---	---	ND	---	0.988
135	135/151	---	---	ND	---	0.988
136		---	---	ND	---	0.494
137		---	---	ND	---	0.494
138	129/138/163	---	---	ND	---	1.48
139	139/140	---	---	ND	---	0.988
140	139/140	---	---	ND	---	0.988
141		---	---	ND	---	0.494
142		---	---	ND	---	0.494
143	134/143	---	---	ND	---	0.988
144		---	---	ND	---	0.494

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
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R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID      K1602473-009  
Lab Sample ID        10341468009  
Filename                P160404A\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.494
146		---	---	ND	---	0.494
147	147/149	---	---	ND	---	0.988
148		---	---	ND	---	0.494
149	147/149	---	---	ND	---	0.988
150		---	---	ND	---	0.494
151	135/151	---	---	ND	---	0.988
152		---	---	ND	---	0.494
153	153/168	---	---	ND	---	0.988
154		---	---	ND	---	0.494
155		---	---	ND	---	0.494
156	156/157	---	---	ND	---	0.988
157	156/157	---	---	ND	---	0.988
158		---	---	ND	---	0.494
159		---	---	ND	---	0.494
160		---	---	ND	---	0.494
161		---	---	ND	---	0.494
162		---	---	ND	---	0.494
163	129/138/163	---	---	ND	---	1.48
164		---	---	ND	---	0.494
165		---	---	ND	---	0.494
166	128/166	---	---	ND	---	0.988
167		---	---	ND	---	0.494
168	153/168	---	---	ND	---	0.988
169		---	---	ND	---	0.494
170		---	---	ND	---	0.494
171	171/173	---	---	ND	---	0.988
172		---	---	ND	---	0.494
173	171/173	---	---	ND	---	0.988
174		---	---	ND	---	0.494
175		---	---	ND	---	0.494
176		---	---	ND	---	0.494
177		---	---	ND	---	0.494
178		---	---	ND	---	0.494
179		---	---	ND	---	0.494
180	180/193	---	---	ND	---	0.988
181		---	---	ND	---	0.494
182		---	---	ND	---	0.494
183	183/185	---	---	ND	---	0.988
184		---	---	ND	---	0.494
185	183/185	---	---	ND	---	0.988
186		---	---	ND	---	0.494
187		---	---	ND	---	0.494
188		---	---	ND	---	0.494
189		---	---	ND	---	0.494
190		---	---	ND	---	0.494
191		---	---	ND	---	0.494
192		---	---	ND	---	0.494

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
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R = Recovery outside of Method 1668A control limits  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602473-009  
 Lab Sample ID        10341468009  
 Filename                P160404A\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.988
194		---	---	ND	---	0.741
195		---	---	ND	---	0.741
196		---	---	ND	---	0.741
197	197/200	---	---	ND	---	1.48
198	198/199	---	---	ND	---	1.48
199	198/199	---	---	ND	---	1.48
200	197/200	---	---	ND	---	1.48
201		---	---	ND	---	0.741
202		---	---	ND	---	0.741
203		---	---	ND	---	0.741
204		---	---	ND	---	0.741
205		---	---	ND	---	0.741
206		---	---	ND	---	0.741
207		---	---	ND	---	0.741
208		---	---	ND	---	0.741
209		---	---	ND	---	0.741

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-009  
Lab Sample ID             10341468009  
Filename                    P160404A\_06

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602473-010		
Lab Sample ID	10341468010		
Filename	P160404A_07		
Injected By	BAL		
Total Amount Extracted	943 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/09/2016 15:40
ICAL ID	P160404A02	Received	03/15/2016 10:00
CCal Filename(s)	P160404A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/04/2016 06:12

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.693	3.04	2.0	0.960	48
13C-4-MoCB	3	11.281	3.00	2.0	1.20	60
13C-2,2'-DiCB	4	11.544	1.48	2.0	1.26	63
13C-4,4'-DiCB	15	18.323	1.58	2.0	1.52	76
13C-2,2',6-TrCB	19	15.125	1.08	2.0	1.36	68
13C-3,4,4'-TrCB	37	25.938	1.10	2.0	1.54	77
13C-2,2',6,6'-TeCB	54	18.592	0.78	2.0	1.20	60
13C-3,4,4',5'-TeCB	81	33.020	0.78	2.0	1.64	82
13C-3,3',4,4'-TeCB	77	33.590	0.78	2.0	1.62	81
13C-2,2',4,6,6'-PeCB	104	24.563	1.60	2.0	1.58	79
13C-2,3,3',4,4'-PeCB	105	37.167	1.66	2.0	1.62	81
13C-2,3,4,4',5'-PeCB	114	36.513	1.66	2.0	1.64	82
13C-2,3',4,4',5'-PeCB	118	35.960	1.62	2.0	1.73	86
13C-2,3',4,4',5'-PeCB	123	35.625	1.64	2.0	1.74	87
13C-3,3',4,4',5'-PeCB	126	40.371	1.59	2.0	1.73	87
13C-2,2',4,4',6,6'-HxCB	155	30.538	1.32	2.0	1.73	86
13C-HxCB (156/157)	156/157	43.411	1.28	4.0	3.21	80
13C-2,3',4,4',5,5'-HxCB	167	42.237	1.29	2.0	1.62	81
13C-3,3',4,4',5,5'-HxCB	169	46.749	1.25	2.0	1.56	78
13C-2,2',3,4',5,6,6'-HpCB	188	36.446	1.07	2.0	1.93	96
13C-2,3,3',4,4',5,5'-HpCB	189	49.257	1.05	2.0	1.80	90
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.919	0.88	2.0	2.01	101
13C-2,3,3',4,4',5,5',6-OxCB	205	51.951	0.89	2.0	1.61	81
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.891	0.77	2.0	1.45	73
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.697	0.81	2.0	1.66	83
13C--DeCB	209	55.832	0.70	2.0	1.67	83
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.628	1.06	2.0	1.68	84
13C-2,3,3',5,5'-PeCB	111	33.590	1.65	2.0	1.68	84
13C-2,2',3,3',5,5',6-HpCB	178	39.565	1.05	2.0	1.84	92
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.855	1.56	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.573	0.79	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.806	1.64	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.146	1.29	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.413	0.89	2.0	NA	NA

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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-010  
 Lab Sample ID 10341468010  
 Filename P160404A\_07

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.265
2		---	---	ND	---	0.265
3		---	---	ND	---	0.265
4		---	---	ND	---	0.265
5		---	---	ND	---	0.265
6		---	---	ND	---	0.265
7		---	---	ND	---	0.265
8		---	---	ND	---	0.265
9		---	---	ND	---	0.265
10		---	---	ND	---	0.265
11		---	---	ND	---	2.60
12	12/13	---	---	ND	---	0.530
13	12/13	---	---	ND	---	0.530
14		---	---	ND	---	0.265
15		---	---	ND	---	0.350
16		---	---	ND	---	0.265
17		---	---	ND	---	0.265
18	18/30	---	---	ND	---	0.530
19		---	---	ND	---	0.265
20	20/28	---	---	ND	---	1.37
21	21/33	---	---	ND	---	1.43
22		---	---	ND	---	1.01
23		---	---	ND	---	0.265
24		---	---	ND	---	0.265
25		---	---	ND	---	0.265
26	26/29	---	---	ND	---	0.530
27		---	---	ND	---	0.265
28	20/28	---	---	ND	---	1.37
29	26/29	---	---	ND	---	0.530
30	18/30	---	---	ND	---	0.530
31		---	---	ND	---	1.38
32		---	---	ND	---	0.265
33	21/33	---	---	ND	---	1.43
34		---	---	ND	---	0.265
35		---	---	ND	---	0.265
36		---	---	ND	---	0.265
37		25.955	1.02	0.726	---	0.562
38		---	---	ND	---	0.265
39		---	---	ND	---	0.265
40	40/41/71	---	---	ND	---	1.59
41	40/41/71	---	---	ND	---	1.59
42		25.216	0.80	0.539	---	0.530
43	43/73	---	---	ND	---	0.530
44	44/47/65	24.646	0.80	2.44	---	1.59
45	45/51	---	---	ND	---	1.06
46		---	---	ND	---	0.530
47	44/47/65	24.646	0.80	(2.44)	---	1.59
48		---	---	ND	---	0.530

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
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 RT = Retention Time  
 I = Interference  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-010  
Lab Sample ID 10341468010  
Filename P160404A\_07

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	24.126	0.79	1.29	---	1.06
50	50/53	---	---	ND	---	1.06
51	45/51	---	---	ND	---	1.06
52		23.590	0.79	3.98	---	1.63
53	50/53	---	---	ND	---	1.06
54		---	---	ND	---	0.530
55		---	---	ND	---	0.530
56		29.733	0.73	1.17	---	0.530
57		---	---	ND	---	0.530
58		---	---	ND	---	0.530
59	59/62/75	---	---	ND	---	1.59
60		29.968	0.77	0.629	---	0.530
61	61/70/74/76	28.676	0.76	6.50	---	2.12
62	59/62/75	---	---	ND	---	1.59
63		---	---	ND	---	0.530
64		25.971	0.81	1.06	---	0.530
65	44/47/65	24.646	0.80	(2.44)	---	1.59
66		29.028	0.75	2.26	---	0.891
67		---	---	ND	---	0.530
68		---	---	ND	---	0.530
69	49/69	24.126	0.79	(1.29)	---	1.06
70	61/70/74/76	28.676	0.76	(6.50)	---	2.12
71	40/41/71	---	---	ND	---	1.59
72		---	---	ND	---	0.530
73	43/73	---	---	ND	---	0.530
74	61/70/74/76	28.676	0.76	(6.50)	---	2.12
75	59/62/75	---	---	ND	---	1.59
76	61/70/74/76	28.676	0.76	(6.50)	---	2.12
77		---	---	ND	---	0.530
78		---	---	ND	---	0.530
79		---	---	ND	---	0.530
80		---	---	ND	---	0.530
81		---	---	ND	---	0.530
82		33.188	1.59	1.20	---	0.530
83		---	---	ND	---	0.530
84		28.861	1.58	2.44	---	0.530
85	85/116/117	---	---	ND	---	1.59
86	86/87/97/108/119/125	32.030	1.59	7.49	---	3.18
87	86/87/97/108/119/125	32.030	1.59	(7.49)	---	3.18
88	88/91	---	---	ND	---	1.06
89		---	---	ND	---	0.530
90	90/101/113	30.823	1.59	9.37	---	1.59
91	88/91	---	---	ND	---	1.06
92		30.219	1.61	1.56	---	0.530
93	93/98/100/102	---	---	ND	---	2.12
94		---	---	ND	---	0.530
95		27.737	1.58	6.21	---	1.01
96		---	---	ND	---	0.530

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-010  
Lab Sample ID             10341468010  
Filename                    P160404A\_07

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	32.030	1.59	(7.49)	---	3.18
98	93/98/100/102	---	---	ND	---	2.12
99		31.444	1.55	3.77	---	0.530
100	93/98/100/102	---	---	ND	---	2.12
101	90/101/113	30.823	1.59	(9.37)	---	1.59
102	93/98/100/102	---	---	ND	---	2.12
103		---	---	ND	---	0.530
104		---	---	ND	---	0.530
105		37.201	1.53	5.76	---	0.530
106		---	---	ND	---	0.530
107	107/124	---	---	ND	---	1.06
108	86/87/97/108/119/125	32.030	1.59	(7.49)	---	3.18
109		35.541	1.53	0.636	---	0.530
110	110/115	32.869	1.58	13.3	---	1.06
111		---	---	ND	---	0.530
112		---	---	ND	---	0.530
113	90/101/113	30.823	1.59	(9.37)	---	1.59
114		---	---	ND	---	0.530
115	110/115	32.869	1.58	(13.3)	---	1.06
116	85/116/117	---	---	ND	---	1.59
117	85/116/117	---	---	ND	---	1.59
118		35.977	1.53	12.7	---	0.679
119	86/87/97/108/119/125	32.030	1.59	(7.49)	---	3.18
120		---	---	ND	---	0.530
121		---	---	ND	---	0.530
122		---	---	ND	---	0.530
123		---	---	ND	---	0.530
124	107/124	---	---	ND	---	1.06
125	86/87/97/108/119/125	32.030	1.59	(7.49)	---	3.18
126		---	---	ND	---	0.530
127		---	---	ND	---	0.530
128	128/166	40.454	1.27	2.33	---	1.06
129	129/138/163	39.163	1.24	12.8	---	1.59
130		38.509	1.25	0.752	---	0.530
131		---	---	ND	---	0.530
132		36.061	1.27	4.12	---	0.530
133		---	---	ND	---	0.530
134	134/143	---	---	ND	---	1.06
135	135/151	33.825	1.30	2.13	---	1.06
136		31.292	1.25	0.881	---	0.530
137		38.727	1.24	0.854	---	0.530
138	129/138/163	39.163	1.24	(12.8)	---	1.59
139	139/140	---	---	ND	---	1.06
140	139/140	---	---	ND	---	1.06
141		38.073	1.25	1.66	---	0.530
142		---	---	ND	---	0.530
143	134/143	---	---	ND	---	1.06
144		---	---	ND	---	0.530

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-010  
Lab Sample ID 10341468010  
Filename P160404A\_07

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.530
146		37.251	1.28	1.19	---	0.530
147	147/149	34.769	1.26	6.92	---	1.06
148		---	---	ND	---	0.530
149	147/149	34.769	1.26	(6.92)	---	1.06
150		---	---	ND	---	0.530
151	135/151	33.825	1.30	(2.13)	---	1.06
152		---	---	ND	---	0.530
153	153/168	37.889	1.24	7.31	---	1.06
154		---	---	ND	---	0.530
155		---	---	ND	---	0.530
156	156/157	43.428	1.23	2.31	---	1.06
157	156/157	43.428	1.23	(2.31)	---	1.06
158		39.565	1.23	1.26	---	0.530
159		---	---	ND	---	0.530
160		---	---	ND	---	0.530
161		---	---	ND	---	0.530
162		---	---	ND	---	0.530
163	129/138/163	39.163	1.24	(12.8)	---	1.59
164		38.828	1.29	0.676	---	0.530
165		---	---	ND	---	0.530
166	128/166	40.454	1.27	(2.33)	---	1.06
167		42.254	1.24	0.650	---	0.530
168	153/168	37.889	1.24	(7.31)	---	1.06
169		---	---	ND	---	0.530
170		46.095	1.07	1.36	---	0.530
171	171/173	---	---	ND	---	1.06
172		---	---	ND	---	0.530
173	171/173	---	---	ND	---	1.06
174		41.382	1.04	1.10	---	0.530
175		---	---	ND	---	0.530
176		---	---	ND	---	0.530
177		41.852	1.01	0.612	---	0.530
178		---	---	ND	---	0.530
179		---	---	ND	---	0.530
180	180/193	44.820	1.06	2.48	---	1.06
181		---	---	ND	---	0.530
182		---	---	ND	---	0.530
183	183/185	---	---	ND	---	1.06
184		---	---	ND	---	0.530
185	183/185	---	---	ND	---	1.06
186		---	---	ND	---	0.530
187		40.522	1.03	1.14	---	0.530
188		---	---	ND	---	0.530
189		---	---	ND	---	0.530
190		---	---	ND	---	0.530
191		---	---	ND	---	0.530
192		---	---	ND	---	0.530

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602473-010  
 Lab Sample ID        10341468010  
 Filename                P160404A\_07

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	44.820	1.06	(2.48)	---	1.06
194		---	---	ND	---	0.795
195		---	---	ND	---	0.795
196		---	---	ND	---	0.795
197	197/200	---	---	ND	---	1.59
198	198/199	---	---	ND	---	1.59
199	198/199	---	---	ND	---	1.59
200	197/200	---	---	ND	---	1.59
201		---	---	ND	---	0.795
202		---	---	ND	---	0.795
203		---	---	ND	---	0.795
204		---	---	ND	---	0.795
205		---	---	ND	---	0.795
206		---	---	ND	---	0.795
207		---	---	ND	---	0.795
208		---	---	ND	---	0.795
209		---	---	ND	---	0.795

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-010  
Lab Sample ID             10341468010  
Filename                    P160404A\_07

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	0.726
Total Tetrachloro Biphenyls	19.9
Total Pentachloro Biphenyls	64.4
Total Hexachloro Biphenyls	45.9
Total Heptachloro Biphenyls	6.69
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	138

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602473-011		
Lab Sample ID	10341468011		
Filename	P160404A_08		
Injected By	BAL		
Total Amount Extracted	1050 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/09/2016 14:08
ICAL ID	P160404A02	Received	03/15/2016 10:00
CCal Filename(s)	P160404A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/04/2016 07:11

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.693	3.16	2.0	0.996	50
13C-4-MoCB	3	11.281	3.10	2.0	1.09	55
13C-2,2'-DiCB	4	11.544	1.54	2.0	1.15	57
13C-4,4'-DiCB	15	18.300	1.62	2.0	1.25	63
13C-2,2',6-TrCB	19	15.113	1.09	2.0	1.13	57
13C-3,4,4'-TrCB	37	25.921	1.09	2.0	1.24	62
13C-2,2',6,6'-TeCB	54	18.576	0.82	2.0	0.905	45
13C-3,4,4',5'-TeCB	81	32.987	0.77	2.0	1.34	67
13C-3,3',4,4'-TeCB	77	33.574	0.80	2.0	1.41	70
13C-2,2',4,6,6'-PeCB	104	24.546	1.63	2.0	1.32	66
13C-2,3,3',4,4'-PeCB	105	37.152	1.63	2.0	1.44	72
13C-2,3,4,4',5'-PeCB	114	36.498	1.63	2.0	1.49	74
13C-2,3',4,4',5'-PeCB	118	35.944	1.64	2.0	1.52	76
13C-2,3',4,4',5'-PeCB	123	35.592	1.59	2.0	1.51	75
13C-3,3',4,4',5'-PeCB	126	40.321	1.59	2.0	1.57	78
13C-2,2',4,4',6,6'-HxCB	155	30.522	1.22	2.0	1.50	75
13C-HxCB (156/157)	156/157	43.379	1.28	4.0	2.84	71
13C-2,3',4,4',5,5'-HxCB	167	42.188	1.25	2.0	1.39	69
13C-3,3',4,4',5,5'-HxCB	169	46.682	1.25	2.0	1.33	66
13C-2,2',3,4',5,6,6'-HpCB	188	36.414	1.08	2.0	1.78	89
13C-2,3,3',4,4',5,5'-HpCB	189	49.215	1.03	2.0	1.69	84
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.886	0.88	2.0	1.90	95
13C-2,3,3',4,4',5,5',6-OxCB	205	51.888	0.90	2.0	1.49	75
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.806	0.81	2.0	1.37	68
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.654	0.81	2.0	1.56	78
13C--DeCB	209	55.768	0.73	2.0	1.56	78
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.628	1.08	2.0	1.48	74
13C-2,3,3',5,5'-PeCB	111	33.574	1.64	2.0	1.70	85
13C-2,2',3,3',5,5',6-HpCB	178	39.533	1.03	2.0	1.83	91
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.843	1.56	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.557	0.78	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.757	1.63	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.097	1.29	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.349	0.88	2.0	NA	NA

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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-011  
 Lab Sample ID 10341468011  
 Filename P160404A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.239
2		---	---	ND	---	0.239
3		---	---	ND	---	0.239
4		---	---	ND	---	0.239
5		---	---	ND	---	0.239
6		---	---	ND	---	0.239
7		---	---	ND	---	0.239
8		---	---	ND	---	0.239
9		---	---	ND	---	0.239
10		---	---	ND	---	0.239
11		---	---	ND	---	2.34
12	12/13	---	---	ND	---	0.477
13	12/13	---	---	ND	---	0.477
14		---	---	ND	---	0.239
15		---	---	ND	---	0.315
16		---	---	ND	---	0.239
17		---	---	ND	---	0.239
18	18/30	---	---	ND	---	0.477
19		---	---	ND	---	0.239
20	20/28	---	---	ND	---	1.23
21	21/33	---	---	ND	---	1.29
22		---	---	ND	---	0.907
23		---	---	ND	---	0.239
24		---	---	ND	---	0.239
25		---	---	ND	---	0.239
26	26/29	---	---	ND	---	0.477
27		---	---	ND	---	0.239
28	20/28	---	---	ND	---	1.23
29	26/29	---	---	ND	---	0.477
30	18/30	---	---	ND	---	0.477
31		---	---	ND	---	1.24
32		---	---	ND	---	0.239
33	21/33	---	---	ND	---	1.29
34		---	---	ND	---	0.239
35		---	---	ND	---	0.239
36		---	---	ND	---	0.239
37		---	---	ND	---	0.506
38		---	---	ND	---	0.239
39		---	---	ND	---	0.239
40	40/41/71	---	---	ND	---	1.43
41	40/41/71	---	---	ND	---	1.43
42		---	---	ND	---	0.477
43	43/73	---	---	ND	---	0.477
44	44/47/65	---	---	ND	---	1.43
45	45/51	---	---	ND	---	0.955
46		---	---	ND	---	0.477
47	44/47/65	---	---	ND	---	1.43
48		---	---	ND	---	0.477

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID           K1602473-011  
 Lab Sample ID             10341468011  
 Filename                    P160404A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.955
50	50/53	---	---	ND	---	0.955
51	45/51	---	---	ND	---	0.955
52		---	---	ND	---	1.47
53	50/53	---	---	ND	---	0.955
54		---	---	ND	---	0.477
55		---	---	ND	---	0.477
56		---	---	ND	---	0.477
57		---	---	ND	---	0.477
58		---	---	ND	---	0.477
59	59/62/75	---	---	ND	---	1.43
60		---	---	ND	---	0.477
61	61/70/74/76	---	---	ND	---	1.91
62	59/62/75	---	---	ND	---	1.43
63		---	---	ND	---	0.477
64		---	---	ND	---	0.477
65	44/47/65	---	---	ND	---	1.43
66		---	---	ND	---	0.802
67		---	---	ND	---	0.477
68		---	---	ND	---	0.477
69	49/69	---	---	ND	---	0.955
70	61/70/74/76	---	---	ND	---	1.91
71	40/41/71	---	---	ND	---	1.43
72		---	---	ND	---	0.477
73	43/73	---	---	ND	---	0.477
74	61/70/74/76	---	---	ND	---	1.91
75	59/62/75	---	---	ND	---	1.43
76	61/70/74/76	---	---	ND	---	1.91
77		---	---	ND	---	0.477
78		---	---	ND	---	0.477
79		---	---	ND	---	0.477
80		---	---	ND	---	0.477
81		---	---	ND	---	0.477
82		---	---	ND	---	0.477
83		---	---	ND	---	0.477
84		---	---	ND	---	0.477
85	85/116/117	---	---	ND	---	1.43
86	86/87/97/108/119/125	---	---	ND	---	2.86
87	86/87/97/108/119/125	---	---	ND	---	2.86
88	88/91	---	---	ND	---	0.955
89		---	---	ND	---	0.477
90	90/101/113	---	---	ND	---	1.43
91	88/91	---	---	ND	---	0.955
92		---	---	ND	---	0.477
93	93/98/100/102	---	---	ND	---	1.91
94		---	---	ND	---	0.477
95		---	---	ND	---	0.907
96		---	---	ND	---	0.477

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID           K1602473-011  
 Lab Sample ID             10341468011  
 Filename                    P160404A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.86
98	93/98/100/102	---	---	ND	---	1.91
99		---	---	ND	---	0.477
100	93/98/100/102	---	---	ND	---	1.91
101	90/101/113	---	---	ND	---	1.43
102	93/98/100/102	---	---	ND	---	1.91
103		---	---	ND	---	0.477
104		---	---	ND	---	0.477
105		---	---	ND	---	0.477
106		---	---	ND	---	0.477
107	107/124	---	---	ND	---	0.955
108	86/87/97/108/119/125	---	---	ND	---	2.86
109		---	---	ND	---	0.477
110	110/115	---	---	ND	---	0.955
111		---	---	ND	---	0.477
112		---	---	ND	---	0.477
113	90/101/113	---	---	ND	---	1.43
114		---	---	ND	---	0.477
115	110/115	---	---	ND	---	0.955
116	85/116/117	---	---	ND	---	1.43
117	85/116/117	---	---	ND	---	1.43
118		---	---	ND	---	0.611
119	86/87/97/108/119/125	---	---	ND	---	2.86
120		---	---	ND	---	0.477
121		---	---	ND	---	0.477
122		---	---	ND	---	0.477
123		---	---	ND	---	0.477
124	107/124	---	---	ND	---	0.955
125	86/87/97/108/119/125	---	---	ND	---	2.86
126		---	---	ND	---	0.477
127		---	---	ND	---	0.477
128	128/166	---	---	ND	---	0.955
129	129/138/163	---	---	ND	---	1.43
130		---	---	ND	---	0.477
131		---	---	ND	---	0.477
132		---	---	ND	---	0.477
133		---	---	ND	---	0.477
134	134/143	---	---	ND	---	0.955
135	135/151	---	---	ND	---	0.955
136		---	---	ND	---	0.477
137		---	---	ND	---	0.477
138	129/138/163	---	---	ND	---	1.43
139	139/140	---	---	ND	---	0.955
140	139/140	---	---	ND	---	0.955
141		---	---	ND	---	0.477
142		---	---	ND	---	0.477
143	134/143	---	---	ND	---	0.955
144		---	---	ND	---	0.477

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID      K1602473-011  
Lab Sample ID         10341468011  
Filename                P160404A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.477
146		---	---	ND	---	0.477
147	147/149	---	---	ND	---	0.955
148		---	---	ND	---	0.477
149	147/149	---	---	ND	---	0.955
150		---	---	ND	---	0.477
151	135/151	---	---	ND	---	0.955
152		---	---	ND	---	0.477
153	153/168	---	---	ND	---	0.955
154		---	---	ND	---	0.477
155		---	---	ND	---	0.477
156	156/157	---	---	ND	---	0.955
157	156/157	---	---	ND	---	0.955
158		---	---	ND	---	0.477
159		---	---	ND	---	0.477
160		---	---	ND	---	0.477
161		---	---	ND	---	0.477
162		---	---	ND	---	0.477
163	129/138/163	---	---	ND	---	1.43
164		---	---	ND	---	0.477
165		---	---	ND	---	0.477
166	128/166	---	---	ND	---	0.955
167		---	---	ND	---	0.477
168	153/168	---	---	ND	---	0.955
169		---	---	ND	---	0.477
170		---	---	ND	---	0.477
171	171/173	---	---	ND	---	0.955
172		---	---	ND	---	0.477
173	171/173	---	---	ND	---	0.955
174		---	---	ND	---	0.477
175		---	---	ND	---	0.477
176		---	---	ND	---	0.477
177		---	---	ND	---	0.477
178		---	---	ND	---	0.477
179		---	---	ND	---	0.477
180	180/193	---	---	ND	---	0.955
181		---	---	ND	---	0.477
182		---	---	ND	---	0.477
183	183/185	---	---	ND	---	0.955
184		---	---	ND	---	0.477
185	183/185	---	---	ND	---	0.955
186		---	---	ND	---	0.477
187		---	---	ND	---	0.477
188		---	---	ND	---	0.477
189		---	---	ND	---	0.477
190		---	---	ND	---	0.477
191		---	---	ND	---	0.477
192		---	---	ND	---	0.477

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602473-011  
 Lab Sample ID        10341468011  
 Filename                P160404A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.955
194		---	---	ND	---	0.716
195		---	---	ND	---	0.716
196		---	---	ND	---	0.716
197	197/200	---	---	ND	---	1.43
198	198/199	---	---	ND	---	1.43
199	198/199	---	---	ND	---	1.43
200	197/200	---	---	ND	---	1.43
201		---	---	ND	---	0.716
202		---	---	ND	---	0.716
203		---	---	ND	---	0.716
204		---	---	ND	---	0.716
205		---	---	ND	---	0.716
206		---	---	ND	---	0.716
207		---	---	ND	---	0.716
208		---	---	ND	---	0.716
209		---	---	ND	---	0.716

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602473-011  
Lab Sample ID             10341468011  
Filename                    P160404A\_08

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602473-012		
Lab Sample ID	10341468012		
Filename	P160404A_09		
Injected By	BAL		
Total Amount Extracted	1010 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/09/2016
ICAL ID	P160404A02	Received	03/15/2016 10:00
CCal Filename(s)	P160404A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/04/2016 08:10

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.693	3.26	2.0	1.15	58
13C-4-MoCB	3	11.281	3.03	2.0	1.32	66
13C-2,2'-DiCB	4	11.544	1.60	2.0	1.40	70
13C-4,4'-DiCB	15	18.300	1.61	2.0	1.47	73
13C-2,2',6-TrCB	19	15.125	1.08	2.0	1.32	66
13C-3,4,4'-TrCB	37	25.921	1.09	2.0	1.44	72
13C-2,2',6,6'-TeCB	54	18.576	0.79	2.0	1.14	57
13C-3,4,4',5'-TeCB	81	32.987	0.79	2.0	1.54	77
13C-3,3',4,4'-TeCB	77	33.574	0.79	2.0	1.52	76
13C-2,2',4,6,6'-PeCB	104	24.546	1.65	2.0	1.51	76
13C-2,3,3',4,4'-PeCB	105	37.152	1.65	2.0	1.50	75
13C-2,3,4,4',5'-PeCB	114	36.481	1.63	2.0	1.53	77
13C-2,3',4,4',5'-PeCB	118	35.944	1.64	2.0	1.57	79
13C-2,3',4,4',5'-PeCB	123	35.592	1.60	2.0	1.58	79
13C-3,3',4,4',5'-PeCB	126	40.321	1.62	2.0	1.61	81
13C-2,2',4,4',6,6'-HxCB	155	30.539	1.28	2.0	1.69	84
13C-HxCB (156/157)	156/157	43.395	1.28	4.0	3.04	76
13C-2,3',4,4',5,5'-HxCB	167	42.188	1.24	2.0	1.46	73
13C-3,3',4,4',5,5'-HxCB	169	46.699	1.27	2.0	1.47	73
13C-2,2',3,4',5,6,6'-HpCB	188	36.414	1.03	2.0	1.89	95
13C-2,3,3',4,4',5,5'-HpCB	189	49.215	1.07	2.0	1.71	85
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.886	0.90	2.0	1.96	98
13C-2,3,3',4,4',5,5',6-OxCB	205	51.909	0.88	2.0	1.58	79
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.827	0.80	2.0	1.47	73
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.654	0.78	2.0	1.61	81
13C--DeCB	209	55.767	0.71	2.0	1.65	82
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.611	1.06	2.0	1.65	83
13C-2,3,3',5,5'-PeCB	111	33.574	1.60	2.0	1.68	84
13C-2,2',3,3',5,5',6-HpCB	178	39.550	1.05	2.0	1.88	94
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.855	1.60	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.557	0.77	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.774	1.57	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.114	1.30	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.370	0.91	2.0	NA	NA

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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-012  
 Lab Sample ID 10341468012  
 Filename P160404A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.248
2		---	---	ND	---	0.248
3		---	---	ND	---	0.248
4		---	---	ND	---	0.248
5		---	---	ND	---	0.248
6		---	---	ND	---	0.248
7		---	---	ND	---	0.248
8		---	---	ND	---	0.248
9		---	---	ND	---	0.248
10		---	---	ND	---	0.248
11		---	---	ND	---	2.43
12	12/13	---	---	ND	---	0.496
13	12/13	---	---	ND	---	0.496
14		---	---	ND	---	0.248
15		---	---	ND	---	0.328
16		---	---	ND	---	0.248
17		---	---	ND	---	0.248
18	18/30	---	---	ND	---	0.496
19		---	---	ND	---	0.248
20	20/28	---	---	ND	---	1.28
21	21/33	---	---	ND	---	1.34
22		---	---	ND	---	0.943
23		---	---	ND	---	0.248
24		---	---	ND	---	0.248
25		---	---	ND	---	0.248
26	26/29	---	---	ND	---	0.496
27		---	---	ND	---	0.248
28	20/28	---	---	ND	---	1.28
29	26/29	---	---	ND	---	0.496
30	18/30	---	---	ND	---	0.496
31		---	---	ND	---	1.29
32		---	---	ND	---	0.248
33	21/33	---	---	ND	---	1.34
34		---	---	ND	---	0.248
35		---	---	ND	---	0.248
36		---	---	ND	---	0.248
37		---	---	ND	---	0.526
38		---	---	ND	---	0.248
39		---	---	ND	---	0.248
40	40/41/71	---	---	ND	---	1.49
41	40/41/71	---	---	ND	---	1.49
42		---	---	ND	---	0.496
43	43/73	---	---	ND	---	0.496
44	44/47/65	---	---	ND	---	1.49
45	45/51	---	---	ND	---	0.992
46		---	---	ND	---	0.496
47	44/47/65	---	---	ND	---	1.49
48		---	---	ND	---	0.496

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-012  
 Lab Sample ID 10341468012  
 Filename P160404A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.992
50	50/53	---	---	ND	---	0.992
51	45/51	---	---	ND	---	0.992
52		---	---	ND	---	1.53
53	50/53	---	---	ND	---	0.992
54		---	---	ND	---	0.496
55		---	---	ND	---	0.496
56		---	---	ND	---	0.496
57		---	---	ND	---	0.496
58		---	---	ND	---	0.496
59	59/62/75	---	---	ND	---	1.49
60		---	---	ND	---	0.496
61	61/70/74/76	---	---	ND	---	1.98
62	59/62/75	---	---	ND	---	1.49
63		---	---	ND	---	0.496
64		---	---	ND	---	0.496
65	44/47/65	---	---	ND	---	1.49
66		---	---	ND	---	0.834
67		---	---	ND	---	0.496
68		---	---	ND	---	0.496
69	49/69	---	---	ND	---	0.992
70	61/70/74/76	---	---	ND	---	1.98
71	40/41/71	---	---	ND	---	1.49
72		---	---	ND	---	0.496
73	43/73	---	---	ND	---	0.496
74	61/70/74/76	---	---	ND	---	1.98
75	59/62/75	---	---	ND	---	1.49
76	61/70/74/76	---	---	ND	---	1.98
77		---	---	ND	---	0.496
78		---	---	ND	---	0.496
79		---	---	ND	---	0.496
80		---	---	ND	---	0.496
81		---	---	ND	---	0.496
82		---	---	ND	---	0.496
83		---	---	ND	---	0.496
84		---	---	ND	---	0.496
85	85/116/117	---	---	ND	---	1.49
86	86/87/97/108/119/125	---	---	ND	---	2.98
87	86/87/97/108/119/125	---	---	ND	---	2.98
88	88/91	---	---	ND	---	0.992
89		---	---	ND	---	0.496
90	90/101/113	---	---	ND	---	1.49
91	88/91	---	---	ND	---	0.992
92		---	---	ND	---	0.496
93	93/98/100/102	---	---	ND	---	1.98
94		---	---	ND	---	0.496
95		---	---	ND	---	0.943
96		---	---	ND	---	0.496

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602473-012  
Lab Sample ID 10341468012  
Filename P160404A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.98
98	93/98/100/102	---	---	ND	---	1.98
99		---	---	ND	---	0.496
100	93/98/100/102	---	---	ND	---	1.98
101	90/101/113	---	---	ND	---	1.49
102	93/98/100/102	---	---	ND	---	1.98
103		---	---	ND	---	0.496
104		---	---	ND	---	0.496
105		---	---	ND	---	0.496
106		---	---	ND	---	0.496
107	107/124	---	---	ND	---	0.992
108	86/87/97/108/119/125	---	---	ND	---	2.98
109		---	---	ND	---	0.496
110	110/115	32.853	1.60	1.01	---	0.992
111		---	---	ND	---	0.496
112		---	---	ND	---	0.496
113	90/101/113	---	---	ND	---	1.49
114		---	---	ND	---	0.496
115	110/115	32.853	1.60	(1.01)	---	0.992
116	85/116/117	---	---	ND	---	1.49
117	85/116/117	---	---	ND	---	1.49
118		---	---	ND	---	0.635
119	86/87/97/108/119/125	---	---	ND	---	2.98
120		---	---	ND	---	0.496
121		---	---	ND	---	0.496
122		---	---	ND	---	0.496
123		---	---	ND	---	0.496
124	107/124	---	---	ND	---	0.992
125	86/87/97/108/119/125	---	---	ND	---	2.98
126		---	---	ND	---	0.496
127		---	---	ND	---	0.496
128	128/166	---	---	ND	---	0.992
129	129/138/163	---	---	ND	---	1.49
130		---	---	ND	---	0.496
131		---	---	ND	---	0.496
132		---	---	ND	---	0.496
133		---	---	ND	---	0.496
134	134/143	---	---	ND	---	0.992
135	135/151	---	---	ND	---	0.992
136		---	---	ND	---	0.496
137		---	---	ND	---	0.496
138	129/138/163	---	---	ND	---	1.49
139	139/140	---	---	ND	---	0.992
140	139/140	---	---	ND	---	0.992
141		---	---	ND	---	0.496
142		---	---	ND	---	0.496
143	134/143	---	---	ND	---	0.992
144		---	---	ND	---	0.496

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602473-012  
 Lab Sample ID 10341468012  
 Filename P160404A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.496
146		---	---	ND	---	0.496
147	147/149	---	---	ND	---	0.992
148		---	---	ND	---	0.496
149	147/149	---	---	ND	---	0.992
150		---	---	ND	---	0.496
151	135/151	---	---	ND	---	0.992
152		---	---	ND	---	0.496
153	153/168	---	---	ND	---	0.992
154		---	---	ND	---	0.496
155		---	---	ND	---	0.496
156	156/157	---	---	ND	---	0.992
157	156/157	---	---	ND	---	0.992
158		---	---	ND	---	0.496
159		---	---	ND	---	0.496
160		---	---	ND	---	0.496
161		---	---	ND	---	0.496
162		---	---	ND	---	0.496
163	129/138/163	---	---	ND	---	1.49
164		---	---	ND	---	0.496
165		---	---	ND	---	0.496
166	128/166	---	---	ND	---	0.992
167		---	---	ND	---	0.496
168	153/168	---	---	ND	---	0.992
169		---	---	ND	---	0.496
170		---	---	ND	---	0.496
171	171/173	---	---	ND	---	0.992
172		---	---	ND	---	0.496
173	171/173	---	---	ND	---	0.992
174		---	---	ND	---	0.496
175		---	---	ND	---	0.496
176		---	---	ND	---	0.496
177		---	---	ND	---	0.496
178		---	---	ND	---	0.496
179		---	---	ND	---	0.496
180	180/193	---	---	ND	---	0.992
181		---	---	ND	---	0.496
182		---	---	ND	---	0.496
183	183/185	---	---	ND	---	0.992
184		---	---	ND	---	0.496
185	183/185	---	---	ND	---	0.992
186		---	---	ND	---	0.496
187		---	---	ND	---	0.496
188		---	---	ND	---	0.496
189		---	---	ND	---	0.496
190		---	---	ND	---	0.496
191		---	---	ND	---	0.496
192		---	---	ND	---	0.496

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602473-012  
 Lab Sample ID        10341468012  
 Filename                P160404A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.992
194		---	---	ND	---	0.744
195		---	---	ND	---	0.744
196		---	---	ND	---	0.744
197	197/200	---	---	ND	---	1.49
198	198/199	---	---	ND	---	1.49
199	198/199	---	---	ND	---	1.49
200	197/200	---	---	ND	---	1.49
201		---	---	ND	---	0.744
202		---	---	ND	---	0.744
203		---	---	ND	---	0.744
204		---	---	ND	---	0.744
205		---	---	ND	---	0.744
206		---	---	ND	---	0.744
207		---	---	ND	---	0.744
208		---	---	ND	---	0.744
209		---	---	ND	---	0.744

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

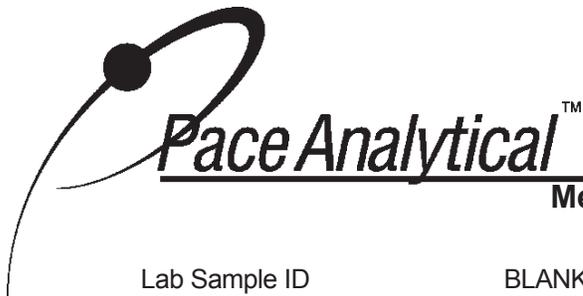
Client Sample ID           K1602473-012  
Lab Sample ID             10341468012  
Filename                    P160404A\_09

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	1.01
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	1.01

ND = Not Detected

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-49620	Matrix	Water
Filename	P160401A_08	Extracted	03/29/2016 10:25
Injected By	CVS	Analyzed	04/01/2016 10:50
Total Amount Extracted	1040 mL	Dilution	3
ICAL ID	P160401A02		
CCal Filename(s)	P160401A_01		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
------------	-------	----	-------	------------	------------	------------

Labeled Analytes

13C-2-MoCB	1	8.705	2.90	2.0	1.72	86
13C-4-MoCB	3	11.293	3.08	2.0	1.77	88
13C-2,2'-DiCB	4	11.557	1.53	2.0	1.81	90
13C-4,4'-DiCB	15	18.324	1.61	2.0	1.30	65
13C-2,2',6-TrCB	19	15.149	1.11	2.0	1.56	78
13C-3,4,4'-TrCB	37	25.938	1.07	2.0	1.46	73
13C-2,2',6,6'-TeCB	54	18.610	0.82	2.0	1.30	65
13C-3,4,4',5-TeCB	81	33.019	0.82	2.0	1.50	75
13C-3,3',4,4'-TeCB	77	33.606	0.80	2.0	1.53	76
13C-2,2',4,6,6'-PeCB	104	24.562	1.67	2.0	1.44	72
13C-2,3,3',4,4'-PeCB	105	37.167	1.62	2.0	1.38	69
13C-2,3,4,4',5-PeCB	114	36.512	1.61	2.0	1.46	73
13C-2,3',4,4',5-PeCB	118	35.942	1.60	2.0	1.45	72
13C-2,3',4,4',5'-PeCB	123	35.624	1.59	2.0	1.43	72
13C-3,3',4,4',5-PeCB	126	40.352	1.61	2.0	1.48	74
13C-2,2',4,4',6,6'-HxCB	155	30.537	1.28	2.0	2.21	111
13C-HxCB (156/157)	156/157	43.410	1.26	4.0	2.97	74
13C-2,3',4,4',5,5'-HxCB	167	42.219	1.27	2.0	1.43	72
13C-3,3',4,4',5,5'-HxCB	169	46.713	1.26	2.0	1.51	76
13C-2,2',3,4',5,6,6'-HpCB	188	36.445	1.06	2.0	1.94	97
13C-2,3,3',4,4',5,5'-HpCB	189	49.233	1.04	2.0	1.65	82
13C-2,2',3,3',5,5',6,6'-OoCB	202	41.900	0.89	2.0	1.88	94
13C-2,3,3',4,4',5,5',6-OoCB	205	51.905	0.88	2.0	1.73	86
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.867	0.81	2.0	1.64	82
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	48.694	0.78	2.0	1.81	90
13C-DeCB	209	55.807	0.67	2.0	1.98	99

Cleanup Standards

13C-2,4,4'-TrCB	28	21.645	1.06	2.0	1.67	83
13C-2,3,3',5,5'-PeCB	111	33.589	1.60	2.0	1.59	80
13C-2,2',3,3',5,5',6-HpCB	178	39.564	1.04	2.0	1.84	92

Recovery Standards

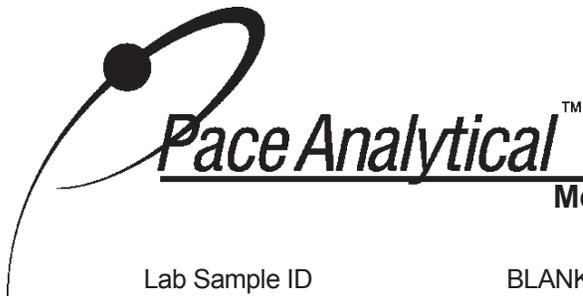
13C-2,5-DiCB	9	13.867	1.63	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.573	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.806	1.62	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.128	1.28	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	51.367	0.90	2.0	NA	NA

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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Nn = Value obtained from additional analyses

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\* = See Discussion  
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RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-49620  
 Filename P160401A\_08

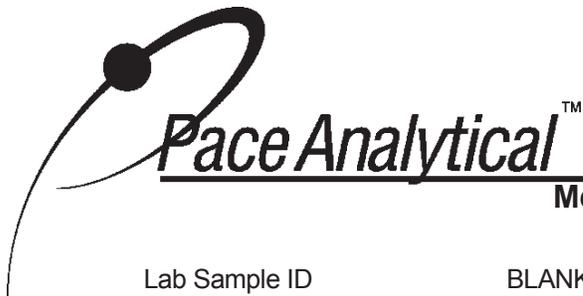
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		--	--	ND	--	0.241
2		--	--	ND	--	0.241
3		--	--	ND	--	0.241
4		--	--	ND	--	0.241
5		--	--	ND	--	0.241
6		--	--	ND	--	0.241
7		--	--	ND	--	0.241
8		--	--	ND	--	0.241
9		--	--	ND	--	0.241
10		--	--	ND	--	0.241
11		--	--	ND	--	2.36
12	12/13	--	--	ND	--	0.482
13	12/13	--	--	ND	--	0.482
14		--	--	ND	--	0.241
15		--	--	ND	--	0.241
16		--	--	ND	--	0.241
17		--	--	ND	--	0.241
18	18/30	--	--	ND	--	0.482
19		--	--	ND	--	0.241
20	20/28	--	--	ND	--	1.24
21	21/33	--	--	ND	--	1.30
22		--	--	ND	--	0.916
23		--	--	ND	--	0.241
24		--	--	ND	--	0.241
25		--	--	ND	--	0.241
26	26/29	--	--	ND	--	0.482
27		--	--	ND	--	0.241
28	20/28	--	--	ND	--	1.24
29	26/29	--	--	ND	--	0.482
30	18/30	--	--	ND	--	0.482
31		--	--	ND	--	1.25
32		--	--	ND	--	0.241
33	21/33	--	--	ND	--	1.30
34		--	--	ND	--	0.241
35		--	--	ND	--	0.241
36		--	--	ND	--	0.241
37		--	--	ND	--	0.511
38		--	--	ND	--	0.241
39		--	--	ND	--	0.241
40	40/41/71	--	--	ND	--	1.45
41	40/41/71	--	--	ND	--	1.45
42		--	--	ND	--	0.482
43	43/73	--	--	ND	--	0.482
44	44/47/65	--	--	ND	--	1.45
45	45/51	--	--	ND	--	0.965

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
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 NC = Not Calculated  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-49620  
 Filename P160401A\_08

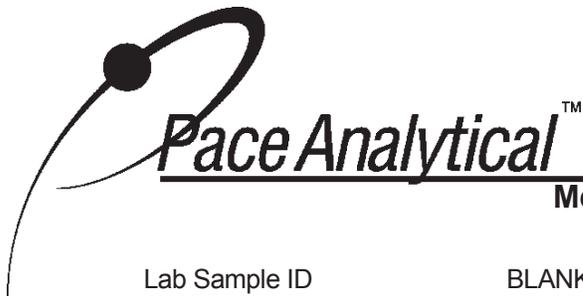
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		--	--	ND	--	0.482
47	44/47/65	--	--	ND	--	1.45
48		--	--	ND	--	0.482
49	49/69	--	--	ND	--	0.965
50	50/53	--	--	ND	--	0.965
51	45/51	--	--	ND	--	0.965
52		--	--	ND	--	1.49
53	50/53	--	--	ND	--	0.965
54		--	--	ND	--	0.482
55		--	--	ND	--	0.482
56		--	--	ND	--	0.482
57		--	--	ND	--	0.482
58		--	--	ND	--	0.482
59	59/62/75	--	--	ND	--	1.45
60		--	--	ND	--	0.482
61	61/70/74/76	--	--	ND	--	1.93
62	59/62/75	--	--	ND	--	1.45
63		--	--	ND	--	0.482
64		--	--	ND	--	0.482
65	44/47/65	--	--	ND	--	1.45
66		--	--	ND	--	0.810
67		--	--	ND	--	0.482
68		--	--	ND	--	0.482
69	49/69	--	--	ND	--	0.965
70	61/70/74/76	--	--	ND	--	1.93
71	40/41/71	--	--	ND	--	1.45
72		--	--	ND	--	0.482
73	43/73	--	--	ND	--	0.482
74	61/70/74/76	--	--	ND	--	1.93
75	59/62/75	--	--	ND	--	1.45
76	61/70/74/76	--	--	ND	--	1.93
77		--	--	ND	--	0.482
78		--	--	ND	--	0.482
79		--	--	ND	--	0.482
80		--	--	ND	--	0.482
81		--	--	ND	--	0.482
82		--	--	ND	--	0.482
83		--	--	ND	--	0.482
84		--	--	ND	--	0.482
85	85/116/117	--	--	ND	--	1.45
86	86/87/97/108/119/125	--	--	ND	--	2.89
87	86/87/97/108/119/125	--	--	ND	--	2.89
88	88/91	--	--	ND	--	0.965
89		--	--	ND	--	0.482
90	90/101/113	--	--	ND	--	1.45

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-49620  
Filename P160401A\_08

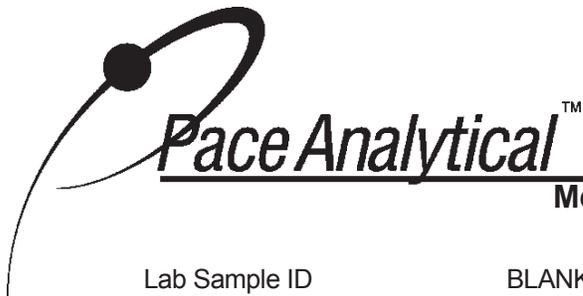
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	--	--	ND	--	0.965
92		--	--	ND	--	0.482
93	93/98/100/102	--	--	ND	--	1.93
94		--	--	ND	--	0.482
95		--	--	ND	--	0.916
96		--	--	ND	--	0.482
97	86/87/97/108/119/125	--	--	ND	--	2.89
98	93/98/100/102	--	--	ND	--	1.93
99		--	--	ND	--	0.482
100	93/98/100/102	--	--	ND	--	1.93
101	90/101/113	--	--	ND	--	1.45
102	93/98/100/102	--	--	ND	--	1.93
103		--	--	ND	--	0.482
104		--	--	ND	--	0.482
105		--	--	ND	--	0.482
106		--	--	ND	--	0.482
107	107/124	--	--	ND	--	0.965
108	86/87/97/108/119/125	--	--	ND	--	2.89
109		--	--	ND	--	0.482
110	110/115	--	--	ND	--	0.965
111		--	--	ND	--	0.482
112		--	--	ND	--	0.482
113	90/101/113	--	--	ND	--	1.45
114		--	--	ND	--	0.482
115	110/115	--	--	ND	--	0.965
116	85/116/117	--	--	ND	--	1.45
117	85/116/117	--	--	ND	--	1.45
118		--	--	ND	--	0.617
119	86/87/97/108/119/125	--	--	ND	--	2.89
120		--	--	ND	--	0.482
121		--	--	ND	--	0.482
122		--	--	ND	--	0.482
123		--	--	ND	--	0.482
124	107/124	--	--	ND	--	0.965
125	86/87/97/108/119/125	--	--	ND	--	2.89
126		--	--	ND	--	0.482
127		--	--	ND	--	0.482
128	128/166	--	--	ND	--	0.965
129	129/138/163	--	--	ND	--	1.45
130		--	--	ND	--	0.482
131		--	--	ND	--	0.482
132		--	--	ND	--	0.482
133		--	--	ND	--	0.482
134	134/143	--	--	ND	--	0.965
135	135/151	--	--	ND	--	0.965

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-49620  
 Filename P160401A\_08

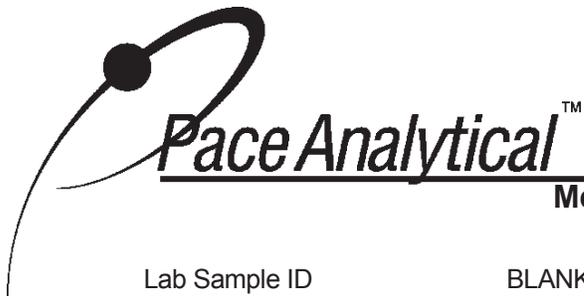
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		--	--	ND	--	0.482
137		--	--	ND	--	0.482
138	129/138/163	--	--	ND	--	1.45
139	139/140	--	--	ND	--	0.965
140	139/140	--	--	ND	--	0.965
141		--	--	ND	--	0.482
142		--	--	ND	--	0.482
143	134/143	--	--	ND	--	0.965
144		--	--	ND	--	0.482
145		--	--	ND	--	0.482
146		--	--	ND	--	0.482
147	147/149	--	--	ND	--	0.965
148		--	--	ND	--	0.482
149	147/149	--	--	ND	--	0.965
150		--	--	ND	--	0.482
151	135/151	--	--	ND	--	0.965
152		--	--	ND	--	0.482
153	153/168	--	--	ND	--	0.965
154		--	--	ND	--	0.482
155		--	--	ND	--	0.482
156	156/157	--	--	ND	--	0.965
157	156/157	--	--	ND	--	0.965
158		--	--	ND	--	0.482
159		--	--	ND	--	0.482
160		--	--	ND	--	0.482
161		--	--	ND	--	0.482
162		--	--	ND	--	0.482
163	129/138/163	--	--	ND	--	1.45
164		--	--	ND	--	0.482
165		--	--	ND	--	0.482
166	128/166	--	--	ND	--	0.965
167		--	--	ND	--	0.482
168	153/168	--	--	ND	--	0.965
169		--	--	ND	--	0.482
170		--	--	ND	--	0.482
171	171/173	--	--	ND	--	0.965
172		--	--	ND	--	0.482
173	171/173	--	--	ND	--	0.965
174		--	--	ND	--	0.482
175		--	--	ND	--	0.482
176		--	--	ND	--	0.482
177		--	--	ND	--	0.482
178		--	--	ND	--	0.482
179		--	--	ND	--	0.482
180	180/193	--	--	ND	--	0.965

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-49620  
 Filename P160401A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		--	--	ND	--	0.482
182		--	--	ND	--	0.482
183	183/185	--	--	ND	--	0.965
184		--	--	ND	--	0.482
185	183/185	--	--	ND	--	0.965
186		--	--	ND	--	0.482
187		--	--	ND	--	0.482
188		--	--	ND	--	0.482
189		--	--	ND	--	0.482
190		--	--	ND	--	0.482
191		--	--	ND	--	0.482
192		--	--	ND	--	0.482
193	180/193	--	--	ND	--	0.965
194		--	--	ND	--	0.723
195		--	--	ND	--	0.723
196		--	--	ND	--	0.723
197	197/200	--	--	ND	--	1.45
198	198/199	--	--	ND	--	1.45
199	198/199	--	--	ND	--	1.45
200	197/200	--	--	ND	--	1.45
201		--	--	ND	--	0.723
202		--	--	ND	--	0.723
203		--	--	ND	--	0.723
204		--	--	ND	--	0.723
205		--	--	ND	--	0.723
206		--	--	ND	--	0.723
207		--	--	ND	--	0.723
208		--	--	ND	--	0.723
209		--	--	ND	--	0.723

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID           CBLKHS  
Lab Sample ID             BLANK-49620  
Filename                    P160401A\_08

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCS-49621	Matrix	Water
Filename	P160401A_03	Dilution	3
Total Amount Extracted	1030 mL	Extracted	03/29/2016 10:25
ICAL ID	P160401A02	Analyzed	04/01/2016 05:55
CCal Filename(s)	P160401A_01	Injected By	CVS
Method Blank ID	BLANK-49620		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	0.980	98	2.0	1.28	64
3	1.0	0.982	98	2.0	1.31	66
4	1.0	1.11	111	2.0	1.32	66
15	1.0	1.04	104	2.0	1.02	51
19	1.0	1.01	101	2.0	1.16	58
37	1.0	0.971	97	2.0	1.16	58
54	1.0	1.08	108	2.0	1.07	53
81	1.0	1.03	103	2.0	1.27	63
77	1.0	1.05	105	2.0	1.27	63
104	1.0	1.11	111	2.0	1.11	56
105	1.0	1.09	109	2.0	1.13	57
114	1.0	1.04	104	2.0	1.19	59
118	1.0	1.11	111	2.0	1.17	59
123	1.0	1.12	112	2.0	1.15	57
126	1.0	1.07	107	2.0	1.20	60
155	1.0	1.05	105	2.0	1.75	88
156/157	2.0	2.14	107	4.0	2.46	62
167	1.0	1.08	108	2.0	1.18	59
169	1.0	1.08	108	2.0	1.25	63
188	1.0	1.15	115	2.0	1.67	84
189	1.0	1.08	108	2.0	1.40	70
202	1.0	1.05	105	2.0	1.58	79
205	1.0	1.11	111	2.0	1.48	74
206	1.0	1.17	117	2.0	1.40	70
208	1.0	1.10	110	2.0	1.56	78
209	1.0	1.03	103	2.0	1.79	90

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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### Method 1668A Polychlorobiphenyls Laboratory Control Spike Analysis Results

Lab Sample ID	LCSD-49622	Matrix	Water
Filename	P160401A_04	Dilution	3
Total Amount Extracted	1040 mL	Extracted	03/29/2016 10:25
ICAL ID	P160401A02	Analyzed	04/01/2016 06:54
CCal Filename(s)	P160401A_01	Injected By	CVS
Method Blank ID	BLANK-49620		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	0.968	97	2.0	1.55	78
3	1.0	1.00	100	2.0	1.60	80
4	1.0	1.10	110	2.0	1.63	82
15	1.0	1.05	105	2.0	1.22	61
19	1.0	0.990	99	2.0	1.43	72
37	1.0	0.960	96	2.0	1.38	69
54	1.0	1.05	105	2.0	1.32	66
81	1.0	1.05	105	2.0	1.33	66
77	1.0	1.07	107	2.0	1.34	67
104	1.0	1.08	108	2.0	1.38	69
105	1.0	1.06	106	2.0	1.25	63
114	1.0	1.03	103	2.0	1.31	65
118	1.0	1.09	109	2.0	1.28	64
123	1.0	1.07	107	2.0	1.27	63
126	1.0	1.05	105	2.0	1.30	65
155	1.0	1.01	101	2.0	1.99	99
156/157	2.0	2.05	102	4.0	2.65	66
167	1.0	1.07	107	2.0	1.27	64
169	1.0	1.07	107	2.0	1.31	66
188	1.0	1.15	115	2.0	1.81	91
189	1.0	1.04	104	2.0	1.47	74
202	1.0	1.03	103	2.0	1.73	86
205	1.0	1.08	108	2.0	1.51	76
206	1.0	1.18	118	2.0	1.44	72
208	1.0	1.10	110	2.0	1.64	82
209	1.0	0.984	98	2.0	1.87	93

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client ALS Environmental

Spike 1 ID LCS-49621  
Spike 1 Filename P160401A\_03

Spike 2 ID LCSD-49622  
Spike 2 Filename P160401A\_04

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	98	97	1.0
4-MoCB	3	98	100	2.0
2,2'-DiCB	4	111	110	0.9
4,4'-DiCB	15	104	105	1.0
2,2',6-TrCB	19	101	99	2.0
3,4,4'-TrCB	37	97	96	1.0
2,2',6,6'-TeCB	54	108	105	2.8
3,3',4,4'-TeCB	77	105	107	1.9
3,4,4',5-TeCB	81	103	105	1.9
2,2',4,6,6'-PeCB	104	111	108	2.7
2,3,3',4,4'-PeCB	105	109	106	2.8
2,3,4,4',5-PeCB	114	104	103	1.0
2,3',4,4',5-PeCB	118	111	109	1.8
2,3',4,4',5'-PeCB	123	112	107	4.6
3,3',4,4',5-PeCB	126	107	105	1.9
2,2',4,4',6,6'-HxCB	155	105	101	3.9
(156/157)	156/157	107	102	4.8
2,3',4,4',5,5'-HxCB	167	108	107	0.9
3,3',4,4',5,5'-HxCB	169	108	107	0.9
2,2',3,4',5,6,6'-HpCB	188	115	115	0.0
2,3,3',4,4',5,5'-HpCB	189	108	104	3.8
2,2',3,3',5,5',6,6'-OxCB	202	105	103	1.9
2,3,3',4,4',5,5',6-OxCB	205	111	108	2.7
2,2',3,3',4,4',5,5',6-NoCB	206	117	118	0.9
2,2',3,3',4,5,5',6,6'-NoCB	208	110	110	0.0
Decachlorobiphenyl	209	103	98	5.0

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

**REPORT OF LABORATORY ANALYSIS**

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City of Portland  
**Water Pollution Control Laboratory**

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April 07, 2016

Linda Scheffler  
Director's Office

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Work Order  
**W16C070**

Project  
**Portland Harbor**

Received  
03/08/16 14:14

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland  
Water Pollution Control Laboratory**

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**LABORATORY ANALYSIS REPORT**

Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W16C070</b>	Project Mgr: Linda Scheffler
Received: 3/8/16 14:14	
Submitted By: Field Operations	

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
FDBLANK	W16C070-01	Water	Grab	03/08/16 12:22	03/08/16 12:22	

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**FDBLANK : W16C070-01**

**General Chemistry**

Total suspended solids	ND mg/L	2	2		B16C153	03/09/16	03/09/16	SM 2540D	
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**Total Metals**

Total Metals by ICPMS									
Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Arsenic	ND ug/L	0.100	0.100	1	B16C171	03/10/16	03/11/16	EPA 200.8	
Cadmium	ND ug/L	0.100	0.100	1	B16C171	03/10/16	03/11/16	EPA 200.8	
Chromium	ND ug/L	0.200	0.200	1	B16C171	03/10/16	03/11/16	EPA 200.8	
Copper	ND ug/L	0.200	0.200	1	B16C171	03/10/16	03/11/16	EPA 200.8	
Lead	ND ug/L	0.100	0.100	1	B16C171	03/10/16	03/11/16	EPA 200.8	
Mercury	ND ug/L	0.00100	0.00100	1	B16C169	03/10/16	03/10/16	WPCLSOP M-10	
Nickel	ND ug/L	0.200	0.200	1	B16C171	03/10/16	03/11/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16C171	03/10/16	03/11/16	EPA 200.8	
Zinc	ND ug/L	0.500	0.500	1	B16C171	03/10/16	03/11/16	EPA 200.8	

Reported: 04/07/16 08:20

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16C070**

**Client: Director's Office**  
**Received: 03/08/16 14:14**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

Acenaphthene	ND ug/L	0.020	0.020	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Acenaphthylene	ND ug/L	0.020	0.020	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Anthracene	ND ug/L	0.020	0.020	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Benzo(a)anthracene	ND ug/L	0.010	0.010	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Benzo(a)pyrene	ND ug/L	0.010	0.010	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Benzo(b)fluoranthene	ND ug/L	0.010	0.010	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND ug/L	0.010	0.010	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND ug/L	0.010	0.010	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Chrysene	ND ug/L	0.010	0.010	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND ug/L	0.010	0.010	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	V3
Fluoranthene	ND ug/L	0.010	0.010	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Fluorene	ND ug/L	0.020	0.020	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND ug/L	0.010	0.010	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
1-Methylnaphthalene	ND ug/L	0.040	0.040	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
2-Methylnaphthalene	ND ug/L	0.040	0.040	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Naphthalene	ND ug/L	0.040	0.040	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Phenanthrene	ND ug/L	0.020	0.020	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Pyrene	ND ug/L	0.010	0.010	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND ug/L	1.0	0.50	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	V3
Di-n-butyl phthalate	ND ug/L	1.0	0.50	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	V3
Diethyl phthalate	ND ug/L	1.0	0.50	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Dimethyl phthalate	ND ug/L	1.0	0.50	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND ug/L	1.0	0.50	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	V3
Bis(2-ethylhexyl) phthalate	ND ug/L	1.0	0.50	1	B16C251	03/15/16	03/16/16	EPA 8270-SIM	V3
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.22 ug/L	0.229	95%	60.4-153	B16C251	03/15/16	03/16/16	EPA 8270-SIM	
Fluoranthene-d10	0.28 ug/L	0.229	122%	69-149	B16C251	03/15/16	03/16/16	EPA 8270-SIM	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16C070**

**Client: Director's Office**  
**Received: 03/08/16 14:14**

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B16C153</b>										
<b>Blank (B16C153-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					03/09/16 :03/09/16	
<b>LCS (B16C153-BS1)</b>										
Total suspended solids	98	mg/L			100		98% (90-110)		03/09/16 :03/09/16	
<b>Duplicate (B16C153-DUP1) Source: W16C070-01</b>										
Total suspended solids	ND	mg/L	2	2		ND	(20)		03/09/16 :03/09/16	
<b>Duplicate (B16C153-DUP2) Source: W16C072-01</b>										
Total suspended solids	9400	mg/L	2	2		9600	2 (20)		03/09/16 :03/09/16	
<b>Duplicate (B16C153-DUP3) Source: W16C079-01</b>										
Total suspended solids	140	mg/L	2	2		160	13 (20)		03/09/16 :03/09/16	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B16C169</b>										
<b>Blank (B16C169-BLK1)</b>										
Mercury	ND	ug/L	0.000900	0.000900					03/10/16 :03/10/16	
<b>LCS (B16C169-BS1)</b>										
Mercury	0.0108	ug/L	0.000900	0.000900	0.0100		108% (85-125)		03/10/16 :03/10/16	
<b>Duplicate (B16C169-DUP1) Source: W16C082-01</b>										
Mercury	0.00570	ug/L	0.00100	0.00100		0.00500	13 (20)		03/10/16 :03/10/16	
<b>Matrix Spike (B16C169-MS1) Source: W16C082-01</b>										
Mercury	0.0157	ug/L	0.00100	0.00100	0.0111	0.00500	96% (70-130)		03/10/16 :03/10/16	
<b>Total Metals by ICPMS - Batch B16C171</b>										
<b>Blank (B16C171-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					03/10/16 :03/11/16	
Cadmium	ND	ug/L	0.100	0.100					03/10/16 :03/11/16	
Chromium	ND	ug/L	0.200	0.200					03/10/16 :03/11/16	
Copper	ND	ug/L	0.200	0.200					03/10/16 :03/11/16	
Lead	ND	ug/L	0.100	0.100					03/10/16 :03/11/16	
Nickel	ND	ug/L	0.200	0.200					03/10/16 :03/11/16	

Reported: 04/07/16 08:20

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*Jennifer Shackelford*

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**Project: Portland Harbor**  
**Work Order: W16C070**

**Client: Director's Office**  
**Received: 03/08/16 14:14**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16C171**

**Blank (B16C171-BLK1)**

Silver	ND	ug/L	0.100	0.100					03/10/16 :03/11/16	
Zinc	ND	ug/L	0.500	0.500					03/10/16 :03/11/16	

**LCS (B16C171-BS1)**

Arsenic	9.72	ug/L	0.100	0.100	10.0		97% (85-115)		03/10/16 :03/11/16	
Cadmium	9.84	ug/L	0.100	0.100	10.0		98% (85-115)		03/10/16 :03/11/16	
Chromium	9.38	ug/L	0.200	0.200	10.0		94% (85-115)		03/10/16 :03/11/16	
Copper	9.48	ug/L	0.200	0.200	10.0		95% (85-115)		03/10/16 :03/11/16	
Lead	10.1	ug/L	0.100	0.100	10.0		101% (85-115)		03/10/16 :03/11/16	
Nickel	9.47	ug/L	0.200	0.200	10.0		95% (85-115)		03/10/16 :03/11/16	
Silver	9.94	ug/L	0.100	0.100	10.0		99% (85-115)		03/10/16 :03/11/16	
Zinc	49.1	ug/L	0.500	0.500	50.0		98% (85-115)		03/10/16 :03/11/16	

**Duplicate (B16C171-DUP1)**

**Source: W16C049-01**

Arsenic	0.332	ug/L	0.100	0.100		0.335		0.7 (20)	03/10/16 :03/11/16	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	03/10/16 :03/11/16	
Chromium	0.646	ug/L	0.200	0.200		0.653		1 (20)	03/10/16 :03/11/16	
Copper	4.35	ug/L	0.200	0.200		4.34		0.3 (20)	03/10/16 :03/11/16	
Lead	0.627	ug/L	0.100	0.100		0.625		0.3 (20)	03/10/16 :03/11/16	
Nickel	2.11	ug/L	0.200	0.200		2.17		3 (20)	03/10/16 :03/11/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	03/10/16 :03/11/16	
Zinc	47.1	ug/L	0.500	0.500		47.4		0.6 (20)	03/10/16 :03/11/16	

**Duplicate (B16C171-DUP3)**

**Source: W16C091-03**

Arsenic	0.713	ug/L	0.100	0.100		0.695		2 (20)	03/10/16 :03/11/16	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	03/10/16 :03/11/16	
Chromium	1.86	ug/L	0.200	0.200		1.78		4 (20)	03/10/16 :03/11/16	
Copper	2.79	ug/L	0.200	0.200		2.70		3 (20)	03/10/16 :03/11/16	
Lead	1.32	ug/L	0.100	0.100		1.27		4 (20)	03/10/16 :03/11/16	
Nickel	1.25	ug/L	0.200	0.200		1.19		5 (20)	03/10/16 :03/11/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	03/10/16 :03/11/16	
Zinc	8.83	ug/L	0.500	0.500		8.53		4 (20)	03/10/16 :03/11/16	

**Matrix Spike (B16C171-MS1)**

**Source: W16C049-01**

Arsenic	20.2	ug/L	0.100	0.100	20.0	0.335	99% (70-130)		03/10/16 :03/11/16	
Cadmium	19.2	ug/L	0.100	0.100	20.0	ND	96% (70-130)		03/10/16 :03/11/16	
Chromium	19.7	ug/L	0.200	0.200	20.0	0.653	95% (70-130)		03/10/16 :03/11/16	
Copper	22.8	ug/L	0.200	0.200	20.0	4.34	92% (70-130)		03/10/16 :03/11/16	
Lead	21.0	ug/L	0.100	0.100	20.0	0.625	102% (70-130)		03/10/16 :03/11/16	
Nickel	20.9	ug/L	0.200	0.200	20.0	2.17	94% (70-130)		03/10/16 :03/11/16	
Silver	18.9	ug/L	0.100	0.100	20.0	ND	94% (70-130)		03/10/16 :03/11/16	
Zinc	141	ug/L	0.500	0.500	100	47.4	94% (70-130)		03/10/16 :03/11/16	

Reported: 04/07/16 08:20

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16C070**

**Client: Director's Office**  
**Received: 03/08/16 14:14**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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Total Metals by ICPMS - Batch B16C171

**Matrix Spike (B16C171-MS2)**

**Source: W16C091-03**

Arsenic	19.7	ug/L	0.100	0.100	20.0	0.695	95% (70-130)		03/10/16 :03/11/16	
Cadmium	19.1	ug/L	0.100	0.100	20.0	ND	96% (70-130)		03/10/16 :03/11/16	
Chromium	20.9	ug/L	0.200	0.200	20.0	1.78	96% (70-130)		03/10/16 :03/11/16	
Copper	21.3	ug/L	0.200	0.200	20.0	2.70	93% (70-130)		03/10/16 :03/11/16	
Lead	21.4	ug/L	0.100	0.100	20.0	1.27	101% (70-130)		03/10/16 :03/11/16	
Nickel	20.3	ug/L	0.200	0.200	20.0	1.19	96% (70-130)		03/10/16 :03/11/16	
Silver	19.4	ug/L	0.100	0.100	20.0	ND	97% (70-130)		03/10/16 :03/11/16	
Zinc	101	ug/L	0.500	0.500	100	8.53	93% (70-130)		03/10/16 :03/11/16	

Reported: 04/07/16 08:20

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16C070**

**Client: Director's Office**  
**Received: 03/08/16 14:14**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16C251**

**Blank (B16C251-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					03/15/16 :03/16/16	
Acenaphthylene	ND	ug/L	0.020	0.020					03/15/16 :03/16/16	
Anthracene	ND	ug/L	0.020	0.020					03/15/16 :03/16/16	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					03/15/16 :03/16/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					03/15/16 :03/16/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					03/15/16 :03/16/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					03/15/16 :03/16/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					03/15/16 :03/16/16	
Chrysene	ND	ug/L	0.010	0.010					03/15/16 :03/16/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					03/15/16 :03/16/16	V3
Fluoranthene	ND	ug/L	0.010	0.010					03/15/16 :03/16/16	
Fluorene	ND	ug/L	0.020	0.020					03/15/16 :03/16/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					03/15/16 :03/16/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					03/15/16 :03/16/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					03/15/16 :03/16/16	
Naphthalene	ND	ug/L	0.040	0.040					03/15/16 :03/16/16	
Phenanthrene	ND	ug/L	0.020	0.020					03/15/16 :03/16/16	
Pyrene	ND	ug/L	0.010	0.010					03/15/16 :03/16/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					03/15/16 :03/16/16	V3
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					03/15/16 :03/16/16	V3
Diethyl phthalate	ND	ug/L	1.0	0.50					03/15/16 :03/16/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					03/15/16 :03/16/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					03/15/16 :03/16/16	V3
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					03/15/16 :03/16/16	V3

**Surrogate**

2-Methylnaphthalene-d10	0.19	ug/L			0.229		83% (60.4-153)		03/15/16 :03/16/16	
Fluoranthene-d10	0.27	ug/L			0.229		118% (69-149)		03/15/16 :03/16/16	

**LCS (B16C251-BS1)**

Acenaphthene	0.547	ug/L	0.020	0.020	0.457		120% (58.8-155)		03/15/16 :03/16/16	
Acenaphthylene	0.540	ug/L	0.020	0.020	0.457		118% (64-155)		03/15/16 :03/16/16	
Anthracene	0.522	ug/L	0.020	0.020	0.457		114% (76.2-129)		03/15/16 :03/16/16	
Benzo(a)anthracene	0.522	ug/L	0.010	0.010	0.457		114% (72.9-138)		03/15/16 :03/16/16	
Benzo(a)pyrene	0.508	ug/L	0.010	0.010	0.457		111% (75.5-137)		03/15/16 :03/16/16	
Benzo(b)fluoranthene	0.539	ug/L	0.010	0.010	0.457		118% (59.9-160)		03/15/16 :03/16/16	
Benzo(g,h,i)perylene	0.457	ug/L	0.010	0.010	0.457		100% (70.1-134)		03/15/16 :03/16/16	
Benzo(k)fluoranthene	0.547	ug/L	0.010	0.010	0.457		120% (61.1-157)		03/15/16 :03/16/16	
Chrysene	0.541	ug/L	0.010	0.010	0.457		118% (76.7-146)		03/15/16 :03/16/16	
Dibenzo(a,h)anthracene	0.446	ug/L	0.010	0.010	0.457		98% (63.9-140)		03/15/16 :03/16/16	V3
Fluoranthene	0.587	ug/L	0.010	0.010	0.457		128% (77.5-134)		03/15/16 :03/16/16	
Fluorene	0.552	ug/L	0.020	0.020	0.457		121% (61.2-157)		03/15/16 :03/16/16	

Reported: 04/07/16 08:20

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16C070**

**Client: Director's Office**  
**Received: 03/08/16 14:14**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16C251**

**LCS (B16C251-BS1)**

Indeno(1,2,3-cd)pyrene	0.462	ug/L	0.010	0.010	0.457		101% (68.4-135)		03/15/16 :03/16/16	
1-Methylnaphthalene	0.519	ug/L	0.040	0.040	0.457		114% (79.6-158)		03/15/16 :03/16/16	
2-Methylnaphthalene	0.509	ug/L	0.040	0.040	0.457		111% (76-161)		03/15/16 :03/16/16	
Naphthalene	0.523	ug/L	0.040	0.040	0.457		114% (60.6-164)		03/15/16 :03/16/16	
Phenanthrene	0.538	ug/L	0.020	0.020	0.457		118% (77.4-140)		03/15/16 :03/16/16	
Pyrene	0.571	ug/L	0.010	0.010	0.457		125% (81.1-141)		03/15/16 :03/16/16	
Butyl benzyl phthalate	2.19	ug/L	1.0	0.50	4.57		48% (54.7-176)		03/15/16 :03/16/16	V3
Di-n-butyl phthalate	5.12	ug/L	1.0	0.50	4.57		112% (74.3-149)		03/15/16 :03/16/16	V3
Diethyl phthalate	5.93	ug/L	1.0	0.50	4.57		130% (75.5-173)		03/15/16 :03/16/16	
Dimethyl phthalate	5.91	ug/L	1.0	0.50	4.57		129% (81.6-148)		03/15/16 :03/16/16	
Di-n-octyl phthalate	3.26	ug/L	1.0	0.50	4.57		71% (60.2-155)		03/15/16 :03/16/16	V3
Bis(2-ethylhexyl) phthalate	3.52	ug/L	1.0	0.50	4.57		77% (64.4-162)		03/15/16 :03/16/16	V3
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.25	ug/L			0.229		110% (60.4-153)		03/15/16 :03/16/16	
Fluoranthene-d10	0.30	ug/L			0.229		130% (69-149)		03/15/16 :03/16/16	

**Duplicate (B16C251-DUP1)**

**Source: W16C082-05**

Acenaphthene	ND	ug/L	0.020	0.020		ND	(50)		03/15/16 :03/16/16	
Acenaphthylene	ND	ug/L	0.020	0.020		ND	(50)		03/15/16 :03/16/16	
Anthracene	ND	ug/L	0.020	0.020		ND	(50)		03/15/16 :03/16/16	
Benzo(a)anthracene	0.0171	ug/L	0.010	0.010		0.0183	6 (50)		03/15/16 :03/16/16	
Benzo(a)pyrene	0.0234	ug/L	0.010	0.010		0.0274	16 (50)		03/15/16 :03/16/16	
Benzo(b)fluoranthene	0.0411	ug/L	0.010	0.010		0.0474	14 (50)		03/15/16 :03/16/16	
Benzo(g,h,i)perylene	0.0737	ug/L	0.010	0.010		0.0823	11 (50)		03/15/16 :03/16/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010		0.0109	(50)		03/15/16 :03/16/16	
Chrysene	0.0354	ug/L	0.010	0.010		0.0394	11 (50)		03/15/16 :03/16/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010		ND	(50)		03/15/16 :03/16/16	V3
Fluoranthene	0.0834	ug/L	0.010	0.010		0.0966	15 (50)		03/15/16 :03/16/16	
Fluorene	ND	ug/L	0.020	0.020		ND	(50)		03/15/16 :03/16/16	
Indeno(1,2,3-cd)pyrene	0.0183	ug/L	0.010	0.010		0.0211	14 (50)		03/15/16 :03/16/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040		ND	(50)		03/15/16 :03/16/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040		ND	(50)		03/15/16 :03/16/16	
Naphthalene	ND	ug/L	0.040	0.040		ND	(50)		03/15/16 :03/16/16	
Phenanthrene	0.0537	ug/L	0.020	0.020		0.0577	7 (50)		03/15/16 :03/16/16	
Pyrene	0.139	ug/L	0.010	0.010		0.161	15 (50)		03/15/16 :03/16/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50		ND	(50)		03/15/16 :03/16/16	V3
Di-n-butyl phthalate	ND	ug/L	1.0	0.50		ND	(50)		03/15/16 :03/16/16	V3
Diethyl phthalate	ND	ug/L	1.0	0.50		ND	(50)		03/15/16 :03/16/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50		ND	(50)		03/15/16 :03/16/16	
Di-n-octyl phthalate	0.658	ug/L	1.0	0.50		0.937	35 (50)		03/15/16 :03/16/16	J, V3
Bis(2-ethylhexyl) phthalate	3.10	ug/L	1.0	0.50		3.18	3 (50)		03/15/16 :03/16/16	V3

Reported: 04/07/16 08:20

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**Project: Portland Harbor**  
**Work Order: W16C070**

**Client: Director's Office**  
**Received: 03/08/16 14:14**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16C251**

**Duplicate (B16C251-DUP1)**

**Source: W16C082-05**

**Surrogate**

2-Methylnaphthalene-d10	0.24	ug/L			0.229		106% (60.4-153)		03/15/16 :03/16/16	
Fluoranthene-d10	0.28	ug/L			0.229		124% (69-149)		03/15/16 :03/16/16	

**Matrix Spike (B16C251-MS1)**

**Source: W16C082-05**

Acenaphthene	0.527	ug/L	0.020	0.020	0.457	ND	115% (58.8-155)		03/15/16 :03/16/16	
Acenaphthylene	0.557	ug/L	0.020	0.020	0.457	ND	122% (64-155)		03/15/16 :03/16/16	
Anthracene	0.563	ug/L	0.020	0.020	0.457	ND	123% (76.2-129)		03/15/16 :03/16/16	
Benzo(a)anthracene	0.592	ug/L	0.010	0.010	0.457	0.0183	126% (72.9-138)		03/15/16 :03/16/16	
Benzo(a)pyrene	0.524	ug/L	0.010	0.010	0.457	0.0274	109% (75.5-137)		03/15/16 :03/16/16	
Benzo(b)fluoranthene	0.524	ug/L	0.010	0.010	0.457	0.0474	104% (59.9-160)		03/15/16 :03/16/16	
Benzo(g,h,i)perylene	0.546	ug/L	0.010	0.010	0.457	0.0823	102% (70.1-134)		03/15/16 :03/16/16	
Benzo(k)fluoranthene	0.461	ug/L	0.010	0.010	0.457	0.0109	98% (61.1-157)		03/15/16 :03/16/16	
Chrysene	0.588	ug/L	0.010	0.010	0.457	0.0394	120% (76.7-146)		03/15/16 :03/16/16	
Dibenzo(a,h)anthracene	0.453	ug/L	0.010	0.010	0.457	ND	99% (63.9-140)		03/15/16 :03/16/16	V3
Fluoranthene	0.672	ug/L	0.010	0.010	0.457	0.0966	126% (77.5-134)		03/15/16 :03/16/16	
Fluorene	0.551	ug/L	0.020	0.020	0.457	ND	121% (61.2-157)		03/15/16 :03/16/16	
Indeno(1,2,3-cd)pyrene	0.486	ug/L	0.010	0.010	0.457	0.0211	102% (68.4-135)		03/15/16 :03/16/16	
1-Methylnaphthalene	0.539	ug/L	0.040	0.040	0.457	ND	118% (79.6-159)		03/15/16 :03/16/16	
2-Methylnaphthalene	0.540	ug/L	0.040	0.040	0.457	ND	118% (76-161)		03/15/16 :03/16/16	
Naphthalene	0.546	ug/L	0.040	0.040	0.457	ND	120% (60.6-164)		03/15/16 :03/16/16	
Phenanthrene	0.597	ug/L	0.020	0.020	0.457	0.0577	118% (77.4-140)		03/15/16 :03/16/16	
Pyrene	0.727	ug/L	0.010	0.010	0.457	0.161	124% (81.1-141)		03/15/16 :03/16/16	J
Butyl benzyl phthalate	6.20	ug/L	1.0	0.50	4.57	ND	136% (54.7-176)		03/15/16 :03/16/16	V3
Di-n-butyl phthalate	6.79	ug/L	1.0	0.50	4.57	ND	149% (74.3-149)		03/15/16 :03/16/16	V3
Diethyl phthalate	6.13	ug/L	1.0	0.50	4.57	ND	134% (75.5-173)		03/15/16 :03/16/16	
Dimethyl phthalate	5.86	ug/L	1.0	0.50	4.57	ND	128% (81.6-148)		03/15/16 :03/16/16	
Di-n-octyl phthalate	6.64	ug/L	1.0	0.50	4.57	0.937	125% (60.2-155)		03/15/16 :03/16/16	V3
Bis(2-ethylhexyl) phthalate	8.09	ug/L	1.0	0.50	4.57	3.18	108% (64.4-162)		03/15/16 :03/16/16	V3
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.26	ug/L			0.229		115% (60.4-153)		03/15/16 :03/16/16	
Fluoranthene-d10	0.30	ug/L			0.229		130% (69-149)		03/15/16 :03/16/16	

Reported: 04/07/16 08:20

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC

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Water Pollution Control Laboratory

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ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W16C070**

Client: Director's Office  
Received: 03/08/16 14:14

**Qualifiers**

- J Analyte was detected but at a concentration below the reporting limit; the result is an estimate.
- V3 Continuing calibration verification was low; sample results for this analyte may be low estimates.

**Definitions**

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 04/07/16 08:20

Jennifer Shackelford, Laboratory Coordinator QA/QC

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Date: 3/8/16

Work Order #: 1014070

Collected By: MJS, JSM, ADA



City of Portland  
Chain-of-Custody

Bureau of Environmental Services

Water Pollution Control Laboratory  
6543 N. Burlington Ave.  
Portland, Oregon 97203-4552  
Sample Custodian: (503) 823-5696  
General Lab: (503) 823-5681

Client Name: Director's Office Matrix: Stormwater

Project Name: Portland Harbor

### Requested Analyses

Lab Number	2016 Stormwater Outfall Monitoring COC		Sample Date	Sample Time	Sample Type	TSS	Total Metals (As, Cd, Cr, Cu, Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs + phthalates (low-level)	Pesticides (Low-level)	Conductivity (umhos/cm)	pH (pH units)	Temperature (Deg C)	Meter:	Meter:	Meter:	# of Containers	Remarks
	Location ID	Pesticides only required for samples from Outfalls 17 and 44																	
01	19-SW3		3/8/16	1222	G										✓	✓	✓	4	OF19 Composite Set-up
	FDBlank																		

<b>Relinquished By:</b> Signature: <i>Matt Sullivan</i> Date: 3/8/16 Printed Name: Matt Sullivan Time: 1414	<b>Received By:</b> Signature: <i>MacKenzie York</i> Date: 3/8/16 Printed Name: MacKenzie York Time: 1414
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### WPCL Cooler Receipt Form

Work Order Number: W16C070

Cooler Receipt Form Filled Out By: MZ

Project: Portland Harbor

Sample transport: Samples received on ice

Courier \_\_\_\_\_

Directly from field \_\_\_\_\_

Temperature (°C) 9

	Yes	No	NA
Is the COC present and signed?	X		
Are sample bottles intact?	X		
Do the COC and sample labels match?	X		
Are the appropriate containers used?	X		
Are samples appropriately preserved?	X		
Do VOA vials have Headspace?			X
Are samples received within holding times?	X		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	<u>1501753</u>	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
<u>3/2/16</u>	<u>1430</u>	<u>MZ</u>	<u>W16C070-01</u>	<u>D</u>	<u>1</u>	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

April 04, 2016

**Analytical Report for Service Request No: K1602468**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W16C070**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory March 10, 2016  
For your reference, these analyses have been assigned our service request number **K1602468**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

## Table of Contents

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
Idaho DHW	<a href="http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx">http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx</a>	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L14-50
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Michigan DEQ	<a href="http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html">http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html</a>	9949
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wisconsin DNR	<a href="http://dnr.wi.gov/">http://dnr.wi.gov/</a>	998386840
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

**SUBCONTRACT ORDER**  
**City of Portland Water Pollution Control Lab**  
**W16C070**

K1602468

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

ALS Environmental  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

**WPCL Project Name**

**Portland Harbor**

<b>TURNAROUND REQUEST</b>
<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush _ day(s)

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W16C070-01</b>	<b>Water</b>	<b>Sampled:03/08/16 12:22</b>		
Out-PCB Congeners 209	03/22/16 17:00	09/04/16 12:22		
<i>Containers Supplied:</i>				
G amber 1L (A)				

Released By <i>Kristen Thomas</i>	Date <i>3/10/16</i>	Received By <i>Swift</i>	Date <i>ALS 6-10-16 11:45</i>
Released By _____	Date _____	Received By <i>[Signature]</i>	Date <i>3/10/16 1340</i>



PC H2

### Cooler Receipt and Preservation Form

Client City of PDX Service Request K16 02468  
 Received: 3/10/16 Opened: 3/10/16 By: [Signature] Unloaded: 3/10/16 By: [Signature]

- Samples were received via?  Mail  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- Samples were received in: (circle)  Cooler  Box  Envelope  Other \_\_\_\_\_ NA
- Were custody seals on coolers? NA Y  N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
5.0	5.1	-	-	-0.2	323	NA	NA	
2.7	2.4	-	-	-0.3	307			

- Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves \_\_\_\_\_
- Were custody papers properly filled out (ink, signed, etc.)? NA  Y N
- Did all bottles arrive in good condition (unbroken)? Indicate in the table below. NA  Y N
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y N
- Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA  Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y N
- Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below.  NA Y N
- Were VOA vials received without headspace? Indicate in the table below.  NA Y N
- Was C12/Res negative? NA  Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Report Prepared for:**

Accounts Payable  
ALS Environmental  
1317 South 13th Avenue  
Kelso WA 98626

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Prepared Date:**

April 1, 2016

**Report Information:**

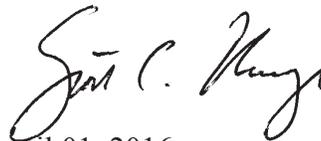
**Pace Project #: 10341467**  
**Sample Receipt Date: 03/15/2016**  
**Client Project #: K1602468**  
**Client Sub PO #: 51K1602468**  
**State Cert #: C755**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



April 01, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.



## **DISCUSSION**

This report presents the results from the analyses performed on one sample submitted by a representative of ALS Environmental. The sample was analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the amount of sample extracted.

The isotopically-labeled PCB internal standards in the sample extract were recovered at 59-103%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the sample material.

Laboratory spike samples were also prepared with the sample batch using reference material that had been fortified with native standards. The results show that the spiked native compounds were recovered at 96-118%, with relative percent differences of 0.0-5.0%. These results were within the target ranges for this method. Matrix spikes were not prepared with the sample batch.

## **REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc.

## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia	9952C
Maryland	322	Wisconsin	999407970
Michigan	9909	Wyoming	8TMS-Q
Minnesota	027-053-137		

## REPORT OF LABORATORY ANALYSIS

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Report No.....10341467

# Appendix A

## Sample Management

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

10341467

Project Number: K1602468  
 Project Manager: Howard Holmes  
 QAP: LAB Q-AP

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Lab ID	C1 Biphem Cong 1668A
				Date	Time	Pace MN		
K1602468-001	W16C070-01	1	Water	3/8/16	1222	Pace MN	X	

001

**Folder Comments:**

Report - Fisser on Wet Weight basis -  
 16084-MRL-only

Tier II



<b>Special Instructions/Comments</b> Please provide the electronic (PDF and EDD) report to the following e-mail address: ALS.Data@alsglobal.com.  <i>City of Portland EDD</i> <i>Full list 209 Cargenors</i>	<b>Turnaround Requirements</b> RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD Requested FAX Date: _____ Requested Report Date: 03/25/16	<b>Report Requirements</b> I. Results Only _____ II. Results + QC Summaries <input checked="" type="checkbox"/> III. Results + QC and Calibration Summaries _____ IV. Data Validation Report with Raw Data _____ PQL/MDL/J <u>Y</u> EDD <u>Y</u>	<b>Invoice Information</b> PO# 51K1602468 Bill to _____
	H - Test is On Hold P - Test is Authorized for Prep Only Received By: <i>[Signature]</i> 3/15/16 Airbill Number: _____ Inquired By: <i>[Signature]</i> 3/14/16 1151 T = 3.1		



**PURCHASE ORDER**  
FOR SUBCONTRACTED ANALYSES

Service Request: K1602468

**Date:** 3/10/2016  
**Contact:** Howard Holmes  
**Email:** howard.holmes@alsglobal.com

**Company:** Pace Analytical Services  
**Address:** 1700 Elm Street, Suite 200  
Minneapolis MN, 55414  
**Phone:** 612.607.1700

**Bill To:** ALS Environmental  
1317 South 13th Avenue  
Kelso WA, 98626

**Ship To:** ALS Environmental  
ALKLS.Data@alsglobal.com

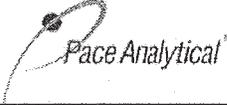
**Phone:** 1-360-577-7222

**Phone:** 360-501-3364

Item/Description	Quantity	Unit Price
1668A/Cl Biphphen Cong	1	

Comments:

ALS Group USA, Corp.  
www.alsglobal.com  
An ALS Limited Company

	Document Name: <b>Sample Condition Upon Receipt Form</b>	Document Revised: 05Jan2016 Page 1 of 1
	Document No.: F-MN-L-213-rev.15	Issuing Authority: Pace Minnesota Quality Office

**Sample Condition Upon Receipt**

Client Name: ALS Environmental

Project #: **WO#: 10341467**



Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  Speedee  Other: \_\_\_\_\_  
 Tracking Number: 6447 9271 3325

Custody Seal on Cooler/Box Present?  Yes  No      Seals Intact?  Yes  No      Optional: Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_

Packing Material:  Bubble Wrap  Bubble Bags  None  Other: bottle holders      Temp Blank?  Yes  No

Thermometer Used:  151401163  B88A912167504  B88A0143310098      Type of Ice:  Wet  Blue  None  Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.0      Cooler Temp Corrected (°C): 3.1      Biological Tissue Frozen?  Yes  No  N/A  
 Temp should be above freezing to 6°C      Correction Factor: +0.1      Date and Initials of Person Examining Contents: KAC 3-15-16

USDA Regulated Soil (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)?  Yes  No  
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
 If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**

Field Data Required?  Yes  No

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/Resolution: \_\_\_\_\_

Project Manager Review: [Signature]

Date: 3/15/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

### REPORT OF LABORATORY ANALYSIS

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# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1602468-001		
Lab Sample ID	10341467001		
Filename	P160401A_10		
Injected By	CVS		
Total Amount Extracted	950 mL	Matrix	Water
% Moisture	NA	Dilution	3
Dry Weight Extracted	NA	Collected	03/08/2016 12:22
ICAL ID	P160401A02	Received	03/15/2016 10:00
CCal Filename(s)	P160401A_01	Extracted	03/29/2016 10:25
Method Blank ID	BLANK-49620	Analyzed	04/01/2016 12:48

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.705	3.15	2.0	1.45	73
13C-4-MoCB	3	11.293	3.05	2.0	1.60	80
13C-2,2'-DiCB	4	11.557	1.45	2.0	1.68	84
13C-4,4'-DiCB	15	18.324	1.62	2.0	1.29	65
13C-2,2',6-TrCB	19	15.137	1.04	2.0	1.40	70
13C-3,4,4'-TrCB	37	25.937	1.06	2.0	1.53	77
13C-2,2',6,6'-TeCB	54	18.593	0.82	2.0	1.17	59
13C-3,4,4',5'-TeCB	81	33.002	0.77	2.0	1.42	71
13C-3,3',4,4'-TeCB	77	33.589	0.79	2.0	1.48	74
13C-2,2',4,6,6'-PeCB	104	24.562	1.62	2.0	1.48	74
13C-2,3,3',4,4'-PeCB	105	37.166	1.57	2.0	1.33	66
13C-2,3,4,4',5'-PeCB	114	36.495	1.60	2.0	1.38	69
13C-2,3',4,4',5'-PeCB	118	35.942	1.61	2.0	1.36	68
13C-2,3',4,4',5'-PeCB	123	35.606	1.55	2.0	1.35	68
13C-3,3',4,4',5'-PeCB	126	40.352	1.57	2.0	1.40	70
13C-2,2',4,4',6,6'-HxCB	155	30.553	1.33	2.0	2.07	103
13C-HxCB (156/157)	156/157	43.409	1.28	4.0	2.69	67
13C-2,3',4,4',5,5'-HxCB	167	42.218	1.28	2.0	1.33	67
13C-3,3',4,4',5,5'-HxCB	169	46.712	1.26	2.0	1.36	68
13C-2,2',3,4',5,6,6'-HpCB	188	36.428	1.03	2.0	1.89	94
13C-2,3,3',4,4',5,5'-HpCB	189	49.232	1.02	2.0	1.56	78
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.916	0.85	2.0	1.79	89
13C-2,3,3',4,4',5,5',6-OxCB	205	51.905	0.92	2.0	1.56	78
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.844	0.85	2.0	1.49	75
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.693	0.79	2.0	1.79	90
13C--DeCB	209	55.784	0.69	2.0	1.86	93
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.628	1.06	2.0	1.64	82
13C-2,3,3',5,5'-PeCB	111	33.589	1.59	2.0	1.67	84
13C-2,2',3,3',5,5',6-HpCB	178	39.580	1.04	2.0	1.92	96
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.867	1.57	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.573	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.788	1.58	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.127	1.30	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.388	0.89	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602468-001  
 Lab Sample ID 10341467001  
 Filename P160401A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.263
2		---	---	ND	---	0.263
3		---	---	ND	---	0.263
4		---	---	ND	---	0.263
5		---	---	ND	---	0.263
6		---	---	ND	---	0.263
7		---	---	ND	---	0.263
8		---	---	ND	---	0.263
9		---	---	ND	---	0.263
10		---	---	ND	---	0.263
11		---	---	ND	---	2.58
12	12/13	---	---	ND	---	0.526
13	12/13	---	---	ND	---	0.526
14		---	---	ND	---	0.263
15		---	---	ND	---	0.347
16		---	---	ND	---	0.263
17		---	---	ND	---	0.263
18	18/30	---	---	ND	---	0.526
19		---	---	ND	---	0.263
20	20/28	---	---	ND	---	1.36
21	21/33	---	---	ND	---	1.42
22		---	---	ND	---	1.00
23		---	---	ND	---	0.263
24		---	---	ND	---	0.263
25		---	---	ND	---	0.263
26	26/29	---	---	ND	---	0.526
27		---	---	ND	---	0.263
28	20/28	---	---	ND	---	1.36
29	26/29	---	---	ND	---	0.526
30	18/30	---	---	ND	---	0.526
31		---	---	ND	---	1.37
32		---	---	ND	---	0.263
33	21/33	---	---	ND	---	1.42
34		---	---	ND	---	0.263
35		---	---	ND	---	0.263
36		---	---	ND	---	0.263
37		---	---	ND	---	0.558
38		---	---	ND	---	0.263
39		---	---	ND	---	0.263
40	40/41/71	---	---	ND	---	1.58
41	40/41/71	---	---	ND	---	1.58
42		---	---	ND	---	0.526
43	43/73	---	---	ND	---	0.526
44	44/47/65	---	---	ND	---	1.58
45	45/51	---	---	ND	---	1.05
46		---	---	ND	---	0.526
47	44/47/65	---	---	ND	---	1.58
48		---	---	ND	---	0.526

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1602468-001  
Lab Sample ID 10341467001  
Filename P160401A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.05
50	50/53	---	---	ND	---	1.05
51	45/51	---	---	ND	---	1.05
52		---	---	ND	---	1.62
53	50/53	---	---	ND	---	1.05
54		---	---	ND	---	0.526
55		---	---	ND	---	0.526
56		---	---	ND	---	0.526
57		---	---	ND	---	0.526
58		---	---	ND	---	0.526
59	59/62/75	---	---	ND	---	1.58
60		---	---	ND	---	0.526
61	61/70/74/76	---	---	ND	---	2.11
62	59/62/75	---	---	ND	---	1.58
63		---	---	ND	---	0.526
64		---	---	ND	---	0.526
65	44/47/65	---	---	ND	---	1.58
66		---	---	ND	---	0.884
67		---	---	ND	---	0.526
68		---	---	ND	---	0.526
69	49/69	---	---	ND	---	1.05
70	61/70/74/76	---	---	ND	---	2.11
71	40/41/71	---	---	ND	---	1.58
72		---	---	ND	---	0.526
73	43/73	---	---	ND	---	0.526
74	61/70/74/76	---	---	ND	---	2.11
75	59/62/75	---	---	ND	---	1.58
76	61/70/74/76	---	---	ND	---	2.11
77		---	---	ND	---	0.526
78		---	---	ND	---	0.526
79		---	---	ND	---	0.526
80		---	---	ND	---	0.526
81		---	---	ND	---	0.526
82		---	---	ND	---	0.526
83		---	---	ND	---	0.526
84		---	---	ND	---	0.526
85	85/116/117	---	---	ND	---	1.58
86	86/87/97/108/119/125	---	---	ND	---	3.16
87	86/87/97/108/119/125	---	---	ND	---	3.16
88	88/91	---	---	ND	---	1.05
89		---	---	ND	---	0.526
90	90/101/113	---	---	ND	---	1.58
91	88/91	---	---	ND	---	1.05
92		---	---	ND	---	0.526
93	93/98/100/102	---	---	ND	---	2.11
94		---	---	ND	---	0.526
95		---	---	ND	---	1.00
96		---	---	ND	---	0.526

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1602468-001  
Lab Sample ID             10341467001  
Filename                    P160401A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.16
98	93/98/100/102	---	---	ND	---	2.11
99		---	---	ND	---	0.526
100	93/98/100/102	---	---	ND	---	2.11
101	90/101/113	---	---	ND	---	1.58
102	93/98/100/102	---	---	ND	---	2.11
103		---	---	ND	---	0.526
104		---	---	ND	---	0.526
105		---	---	ND	---	0.526
106		---	---	ND	---	0.526
107	107/124	---	---	ND	---	1.05
108	86/87/97/108/119/125	---	---	ND	---	3.16
109		---	---	ND	---	0.526
110	110/115	---	---	ND	---	1.05
111		---	---	ND	---	0.526
112		---	---	ND	---	0.526
113	90/101/113	---	---	ND	---	1.58
114		---	---	ND	---	0.526
115	110/115	---	---	ND	---	1.05
116	85/116/117	---	---	ND	---	1.58
117	85/116/117	---	---	ND	---	1.58
118		---	---	ND	---	0.674
119	86/87/97/108/119/125	---	---	ND	---	3.16
120		---	---	ND	---	0.526
121		---	---	ND	---	0.526
122		---	---	ND	---	0.526
123		---	---	ND	---	0.526
124	107/124	---	---	ND	---	1.05
125	86/87/97/108/119/125	---	---	ND	---	3.16
126		---	---	ND	---	0.526
127		---	---	ND	---	0.526
128	128/166	---	---	ND	---	1.05
129	129/138/163	---	---	ND	---	1.58
130		---	---	ND	---	0.526
131		---	---	ND	---	0.526
132		---	---	ND	---	0.526
133		---	---	ND	---	0.526
134	134/143	---	---	ND	---	1.05
135	135/151	---	---	ND	---	1.05
136		---	---	ND	---	0.526
137		---	---	ND	---	0.526
138	129/138/163	---	---	ND	---	1.58
139	139/140	---	---	ND	---	1.05
140	139/140	---	---	ND	---	1.05
141		---	---	ND	---	0.526
142		---	---	ND	---	0.526
143	134/143	---	---	ND	---	1.05
144		---	---	ND	---	0.526

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1602468-001  
 Lab Sample ID 10341467001  
 Filename P160401A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.526
146		---	---	ND	---	0.526
147	147/149	---	---	ND	---	1.05
148		---	---	ND	---	0.526
149	147/149	---	---	ND	---	1.05
150		---	---	ND	---	0.526
151	135/151	---	---	ND	---	1.05
152		---	---	ND	---	0.526
153	153/168	---	---	ND	---	1.05
154		---	---	ND	---	0.526
155		---	---	ND	---	0.526
156	156/157	---	---	ND	---	1.05
157	156/157	---	---	ND	---	1.05
158		---	---	ND	---	0.526
159		---	---	ND	---	0.526
160		---	---	ND	---	0.526
161		---	---	ND	---	0.526
162		---	---	ND	---	0.526
163	129/138/163	---	---	ND	---	1.58
164		---	---	ND	---	0.526
165		---	---	ND	---	0.526
166	128/166	---	---	ND	---	1.05
167		---	---	ND	---	0.526
168	153/168	---	---	ND	---	1.05
169		---	---	ND	---	0.526
170		---	---	ND	---	0.526
171	171/173	---	---	ND	---	1.05
172		---	---	ND	---	0.526
173	171/173	---	---	ND	---	1.05
174		---	---	ND	---	0.526
175		---	---	ND	---	0.526
176		---	---	ND	---	0.526
177		---	---	ND	---	0.526
178		---	---	ND	---	0.526
179		---	---	ND	---	0.526
180	180/193	---	---	ND	---	1.05
181		---	---	ND	---	0.526
182		---	---	ND	---	0.526
183	183/185	---	---	ND	---	1.05
184		---	---	ND	---	0.526
185	183/185	---	---	ND	---	1.05
186		---	---	ND	---	0.526
187		---	---	ND	---	0.526
188		---	---	ND	---	0.526
189		---	---	ND	---	0.526
190		---	---	ND	---	0.526
191		---	---	ND	---	0.526
192		---	---	ND	---	0.526

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1602468-001  
 Lab Sample ID        10341467001  
 Filename                P160401A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.05
194		---	---	ND	---	0.790
195		---	---	ND	---	0.790
196		---	---	ND	---	0.790
197	197/200	---	---	ND	---	1.58
198	198/199	---	---	ND	---	1.58
199	198/199	---	---	ND	---	1.58
200	197/200	---	---	ND	---	1.58
201		---	---	ND	---	0.790
202		---	---	ND	---	0.790
203		---	---	ND	---	0.790
204		---	---	ND	---	0.790
205		---	---	ND	---	0.790
206		---	---	ND	---	0.790
207		---	---	ND	---	0.790
208		---	---	ND	---	0.790
209		---	---	ND	---	0.790

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

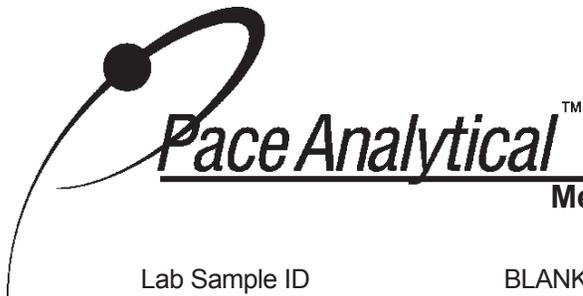
Client Sample ID           K1602468-001  
Lab Sample ID             10341467001  
Filename                    P160401A\_10

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-49620	Matrix	Water
Filename	P160401A_08	Extracted	03/29/2016 10:25
Injected By	CVS	Analyzed	04/01/2016 10:50
Total Amount Extracted	1040 mL	Dilution	3
ICAL ID	P160401A02		
CCal Filename(s)	P160401A_01		

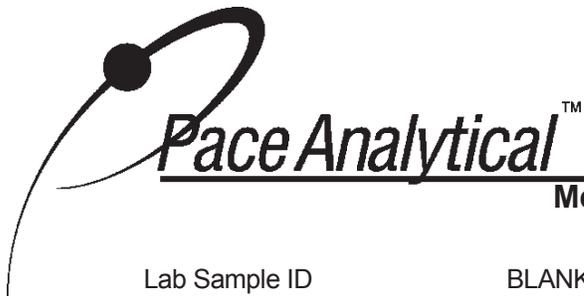
PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.705	2.90	2.0	1.72	86
13C-4-MoCB	3	11.293	3.08	2.0	1.77	88
13C-2,2'-DiCB	4	11.557	1.53	2.0	1.81	90
13C-4,4'-DiCB	15	18.324	1.61	2.0	1.30	65
13C-2,2',6-TrCB	19	15.149	1.11	2.0	1.56	78
13C-3,4,4'-TrCB	37	25.938	1.07	2.0	1.46	73
13C-2,2',6,6'-TeCB	54	18.610	0.82	2.0	1.30	65
13C-3,4,4',5-TeCB	81	33.019	0.82	2.0	1.50	75
13C-3,3',4,4'-TeCB	77	33.606	0.80	2.0	1.53	76
13C-2,2',4,6,6'-PeCB	104	24.562	1.67	2.0	1.44	72
13C-2,3,3',4,4'-PeCB	105	37.167	1.62	2.0	1.38	69
13C-2,3,4,4',5-PeCB	114	36.512	1.61	2.0	1.46	73
13C-2,3',4,4',5-PeCB	118	35.942	1.60	2.0	1.45	72
13C-2,3',4,4',5'-PeCB	123	35.624	1.59	2.0	1.43	72
13C-3,3',4,4',5-PeCB	126	40.352	1.61	2.0	1.48	74
13C-2,2',4,4',6,6'-HxCB	155	30.537	1.28	2.0	2.21	111
13C-HxCB (156/157)	156/157	43.410	1.26	4.0	2.97	74
13C-2,3',4,4',5,5'-HxCB	167	42.219	1.27	2.0	1.43	72
13C-3,3',4,4',5,5'-HxCB	169	46.713	1.26	2.0	1.51	76
13C-2,2',3,4',5,6,6'-HpCB	188	36.445	1.06	2.0	1.94	97
13C-2,3,3',4,4',5,5'-HpCB	189	49.233	1.04	2.0	1.65	82
13C-2,2',3,3',5,5',6,6'-OoCB	202	41.900	0.89	2.0	1.88	94
13C-2,3,3',4,4',5,5',6-OoCB	205	51.905	0.88	2.0	1.73	86
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.867	0.81	2.0	1.64	82
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	48.694	0.78	2.0	1.81	90
13C-DeCB	209	55.807	0.67	2.0	1.98	99
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.645	1.06	2.0	1.67	83
13C-2,3,3',5,5'-PeCB	111	33.589	1.60	2.0	1.59	80
13C-2,2',3,3',5,5',6-HpCB	178	39.564	1.04	2.0	1.84	92
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.867	1.63	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.573	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.806	1.62	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.128	1.28	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	51.367	0.90	2.0	NA	NA

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-49620  
 Filename P160401A\_08

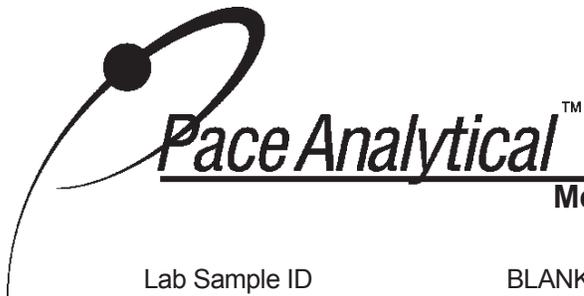
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		--	--	ND	--	0.241
2		--	--	ND	--	0.241
3		--	--	ND	--	0.241
4		--	--	ND	--	0.241
5		--	--	ND	--	0.241
6		--	--	ND	--	0.241
7		--	--	ND	--	0.241
8		--	--	ND	--	0.241
9		--	--	ND	--	0.241
10		--	--	ND	--	0.241
11		--	--	ND	--	2.36
12	12/13	--	--	ND	--	0.482
13	12/13	--	--	ND	--	0.482
14		--	--	ND	--	0.241
15		--	--	ND	--	0.241
16		--	--	ND	--	0.241
17		--	--	ND	--	0.241
18	18/30	--	--	ND	--	0.482
19		--	--	ND	--	0.241
20	20/28	--	--	ND	--	1.24
21	21/33	--	--	ND	--	1.30
22		--	--	ND	--	0.916
23		--	--	ND	--	0.241
24		--	--	ND	--	0.241
25		--	--	ND	--	0.241
26	26/29	--	--	ND	--	0.482
27		--	--	ND	--	0.241
28	20/28	--	--	ND	--	1.24
29	26/29	--	--	ND	--	0.482
30	18/30	--	--	ND	--	0.482
31		--	--	ND	--	1.25
32		--	--	ND	--	0.241
33	21/33	--	--	ND	--	1.30
34		--	--	ND	--	0.241
35		--	--	ND	--	0.241
36		--	--	ND	--	0.241
37		--	--	ND	--	0.511
38		--	--	ND	--	0.241
39		--	--	ND	--	0.241
40	40/41/71	--	--	ND	--	1.45
41	40/41/71	--	--	ND	--	1.45
42		--	--	ND	--	0.482
43	43/73	--	--	ND	--	0.482
44	44/47/65	--	--	ND	--	1.45
45	45/51	--	--	ND	--	0.965

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-49620  
 Filename P160401A\_08

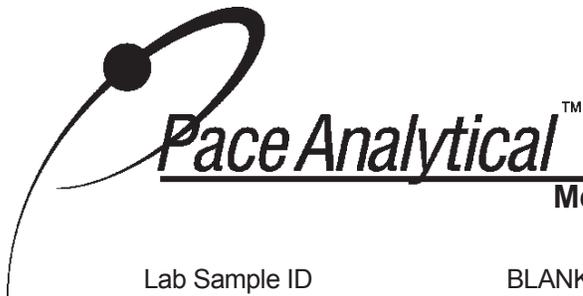
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		--	--	ND	--	0.482
47	44/47/65	--	--	ND	--	1.45
48		--	--	ND	--	0.482
49	49/69	--	--	ND	--	0.965
50	50/53	--	--	ND	--	0.965
51	45/51	--	--	ND	--	0.965
52		--	--	ND	--	1.49
53	50/53	--	--	ND	--	0.965
54		--	--	ND	--	0.482
55		--	--	ND	--	0.482
56		--	--	ND	--	0.482
57		--	--	ND	--	0.482
58		--	--	ND	--	0.482
59	59/62/75	--	--	ND	--	1.45
60		--	--	ND	--	0.482
61	61/70/74/76	--	--	ND	--	1.93
62	59/62/75	--	--	ND	--	1.45
63		--	--	ND	--	0.482
64		--	--	ND	--	0.482
65	44/47/65	--	--	ND	--	1.45
66		--	--	ND	--	0.810
67		--	--	ND	--	0.482
68		--	--	ND	--	0.482
69	49/69	--	--	ND	--	0.965
70	61/70/74/76	--	--	ND	--	1.93
71	40/41/71	--	--	ND	--	1.45
72		--	--	ND	--	0.482
73	43/73	--	--	ND	--	0.482
74	61/70/74/76	--	--	ND	--	1.93
75	59/62/75	--	--	ND	--	1.45
76	61/70/74/76	--	--	ND	--	1.93
77		--	--	ND	--	0.482
78		--	--	ND	--	0.482
79		--	--	ND	--	0.482
80		--	--	ND	--	0.482
81		--	--	ND	--	0.482
82		--	--	ND	--	0.482
83		--	--	ND	--	0.482
84		--	--	ND	--	0.482
85	85/116/117	--	--	ND	--	1.45
86	86/87/97/108/119/125	--	--	ND	--	2.89
87	86/87/97/108/119/125	--	--	ND	--	2.89
88	88/91	--	--	ND	--	0.965
89		--	--	ND	--	0.482
90	90/101/113	--	--	ND	--	1.45

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-49620  
 Filename P160401A\_08

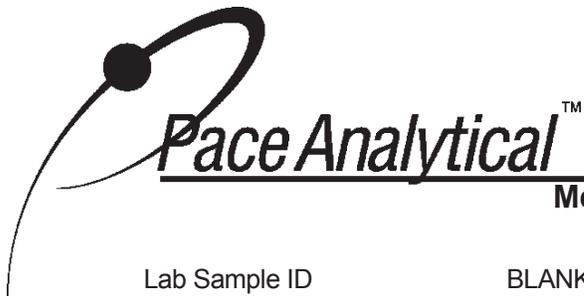
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	--	--	ND	--	0.965
92		--	--	ND	--	0.482
93	93/98/100/102	--	--	ND	--	1.93
94		--	--	ND	--	0.482
95		--	--	ND	--	0.916
96		--	--	ND	--	0.482
97	86/87/97/108/119/125	--	--	ND	--	2.89
98	93/98/100/102	--	--	ND	--	1.93
99		--	--	ND	--	0.482
100	93/98/100/102	--	--	ND	--	1.93
101	90/101/113	--	--	ND	--	1.45
102	93/98/100/102	--	--	ND	--	1.93
103		--	--	ND	--	0.482
104		--	--	ND	--	0.482
105		--	--	ND	--	0.482
106		--	--	ND	--	0.482
107	107/124	--	--	ND	--	0.965
108	86/87/97/108/119/125	--	--	ND	--	2.89
109		--	--	ND	--	0.482
110	110/115	--	--	ND	--	0.965
111		--	--	ND	--	0.482
112		--	--	ND	--	0.482
113	90/101/113	--	--	ND	--	1.45
114		--	--	ND	--	0.482
115	110/115	--	--	ND	--	0.965
116	85/116/117	--	--	ND	--	1.45
117	85/116/117	--	--	ND	--	1.45
118		--	--	ND	--	0.617
119	86/87/97/108/119/125	--	--	ND	--	2.89
120		--	--	ND	--	0.482
121		--	--	ND	--	0.482
122		--	--	ND	--	0.482
123		--	--	ND	--	0.482
124	107/124	--	--	ND	--	0.965
125	86/87/97/108/119/125	--	--	ND	--	2.89
126		--	--	ND	--	0.482
127		--	--	ND	--	0.482
128	128/166	--	--	ND	--	0.965
129	129/138/163	--	--	ND	--	1.45
130		--	--	ND	--	0.482
131		--	--	ND	--	0.482
132		--	--	ND	--	0.482
133		--	--	ND	--	0.482
134	134/143	--	--	ND	--	0.965
135	135/151	--	--	ND	--	0.965

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-49620  
Filename P160401A\_08

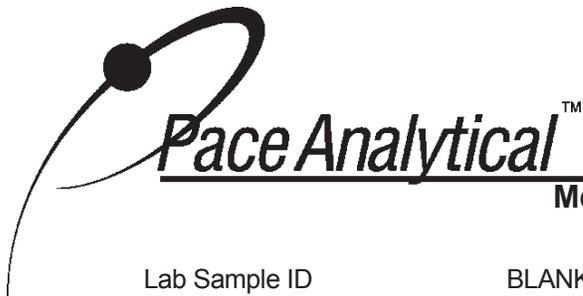
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		--	--	ND	--	0.482
137		--	--	ND	--	0.482
138	129/138/163	--	--	ND	--	1.45
139	139/140	--	--	ND	--	0.965
140	139/140	--	--	ND	--	0.965
141		--	--	ND	--	0.482
142		--	--	ND	--	0.482
143	134/143	--	--	ND	--	0.965
144		--	--	ND	--	0.482
145		--	--	ND	--	0.482
146		--	--	ND	--	0.482
147	147/149	--	--	ND	--	0.965
148		--	--	ND	--	0.482
149	147/149	--	--	ND	--	0.965
150		--	--	ND	--	0.482
151	135/151	--	--	ND	--	0.965
152		--	--	ND	--	0.482
153	153/168	--	--	ND	--	0.965
154		--	--	ND	--	0.482
155		--	--	ND	--	0.482
156	156/157	--	--	ND	--	0.965
157	156/157	--	--	ND	--	0.965
158		--	--	ND	--	0.482
159		--	--	ND	--	0.482
160		--	--	ND	--	0.482
161		--	--	ND	--	0.482
162		--	--	ND	--	0.482
163	129/138/163	--	--	ND	--	1.45
164		--	--	ND	--	0.482
165		--	--	ND	--	0.482
166	128/166	--	--	ND	--	0.965
167		--	--	ND	--	0.482
168	153/168	--	--	ND	--	0.965
169		--	--	ND	--	0.482
170		--	--	ND	--	0.482
171	171/173	--	--	ND	--	0.965
172		--	--	ND	--	0.482
173	171/173	--	--	ND	--	0.965
174		--	--	ND	--	0.482
175		--	--	ND	--	0.482
176		--	--	ND	--	0.482
177		--	--	ND	--	0.482
178		--	--	ND	--	0.482
179		--	--	ND	--	0.482
180	180/193	--	--	ND	--	0.965

Conc = Concentration  
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R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-49620  
 Filename P160401A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		--	--	ND	--	0.482
182		--	--	ND	--	0.482
183	183/185	--	--	ND	--	0.965
184		--	--	ND	--	0.482
185	183/185	--	--	ND	--	0.965
186		--	--	ND	--	0.482
187		--	--	ND	--	0.482
188		--	--	ND	--	0.482
189		--	--	ND	--	0.482
190		--	--	ND	--	0.482
191		--	--	ND	--	0.482
192		--	--	ND	--	0.482
193	180/193	--	--	ND	--	0.965
194		--	--	ND	--	0.723
195		--	--	ND	--	0.723
196		--	--	ND	--	0.723
197	197/200	--	--	ND	--	1.45
198	198/199	--	--	ND	--	1.45
199	198/199	--	--	ND	--	1.45
200	197/200	--	--	ND	--	1.45
201		--	--	ND	--	0.723
202		--	--	ND	--	0.723
203		--	--	ND	--	0.723
204		--	--	ND	--	0.723
205		--	--	ND	--	0.723
206		--	--	ND	--	0.723
207		--	--	ND	--	0.723
208		--	--	ND	--	0.723
209		--	--	ND	--	0.723

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
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 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID            CBLKHS  
Lab Sample ID              BLANK-49620  
Filename                     P160401A\_08

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCS-49621	Matrix	Water
Filename	P160401A_03	Dilution	3
Total Amount Extracted	1030 mL	Extracted	03/29/2016 10:25
ICAL ID	P160401A02	Analyzed	04/01/2016 05:55
CCal Filename(s)	P160401A_01	Injected By	CVS
Method Blank ID	BLANK-49620		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	0.980	98	2.0	1.28	64
3	1.0	0.982	98	2.0	1.31	66
4	1.0	1.11	111	2.0	1.32	66
15	1.0	1.04	104	2.0	1.02	51
19	1.0	1.01	101	2.0	1.16	58
37	1.0	0.971	97	2.0	1.16	58
54	1.0	1.08	108	2.0	1.07	53
81	1.0	1.03	103	2.0	1.27	63
77	1.0	1.05	105	2.0	1.27	63
104	1.0	1.11	111	2.0	1.11	56
105	1.0	1.09	109	2.0	1.13	57
114	1.0	1.04	104	2.0	1.19	59
118	1.0	1.11	111	2.0	1.17	59
123	1.0	1.12	112	2.0	1.15	57
126	1.0	1.07	107	2.0	1.20	60
155	1.0	1.05	105	2.0	1.75	88
156/157	2.0	2.14	107	4.0	2.46	62
167	1.0	1.08	108	2.0	1.18	59
169	1.0	1.08	108	2.0	1.25	63
188	1.0	1.15	115	2.0	1.67	84
189	1.0	1.08	108	2.0	1.40	70
202	1.0	1.05	105	2.0	1.58	79
205	1.0	1.11	111	2.0	1.48	74
206	1.0	1.17	117	2.0	1.40	70
208	1.0	1.10	110	2.0	1.56	78
209	1.0	1.03	103	2.0	1.79	90

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

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### Method 1668A Polychlorobiphenyls Laboratory Control Spike Analysis Results

Lab Sample ID	LCSD-49622	Matrix	Water
Filename	P160401A_04	Dilution	3
Total Amount Extracted	1040 mL	Extracted	03/29/2016 10:25
ICAL ID	P160401A02	Analyzed	04/01/2016 06:54
CCal Filename(s)	P160401A_01	Injected By	CVS
Method Blank ID	BLANK-49620		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	0.968	97	2.0	1.55	78
3	1.0	1.00	100	2.0	1.60	80
4	1.0	1.10	110	2.0	1.63	82
15	1.0	1.05	105	2.0	1.22	61
19	1.0	0.990	99	2.0	1.43	72
37	1.0	0.960	96	2.0	1.38	69
54	1.0	1.05	105	2.0	1.32	66
81	1.0	1.05	105	2.0	1.33	66
77	1.0	1.07	107	2.0	1.34	67
104	1.0	1.08	108	2.0	1.38	69
105	1.0	1.06	106	2.0	1.25	63
114	1.0	1.03	103	2.0	1.31	65
118	1.0	1.09	109	2.0	1.28	64
123	1.0	1.07	107	2.0	1.27	63
126	1.0	1.05	105	2.0	1.30	65
155	1.0	1.01	101	2.0	1.99	99
156/157	2.0	2.05	102	4.0	2.65	66
167	1.0	1.07	107	2.0	1.27	64
169	1.0	1.07	107	2.0	1.31	66
188	1.0	1.15	115	2.0	1.81	91
189	1.0	1.04	104	2.0	1.47	74
202	1.0	1.03	103	2.0	1.73	86
205	1.0	1.08	108	2.0	1.51	76
206	1.0	1.18	118	2.0	1.44	72
208	1.0	1.10	110	2.0	1.64	82
209	1.0	0.984	98	2.0	1.87	93

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client ALS Environmental

Spike 1 ID LCS-49621  
Spike 1 Filename P160401A\_03

Spike 2 ID LCSD-49622  
Spike 2 Filename P160401A\_04

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	98	97	1.0
4-MoCB	3	98	100	2.0
2,2'-DiCB	4	111	110	0.9
4,4'-DiCB	15	104	105	1.0
2,2',6-TrCB	19	101	99	2.0
3,4,4'-TrCB	37	97	96	1.0
2,2',6,6'-TeCB	54	108	105	2.8
3,3',4,4'-TeCB	77	105	107	1.9
3,4,4',5-TeCB	81	103	105	1.9
2,2',4,6,6'-PeCB	104	111	108	2.7
2,3,3',4,4'-PeCB	105	109	106	2.8
2,3,4,4',5-PeCB	114	104	103	1.0
2,3',4,4',5-PeCB	118	111	109	1.8
2,3',4,4',5'-PeCB	123	112	107	4.6
3,3',4,4',5-PeCB	126	107	105	1.9
2,2',4,4',6,6'-HxCB	155	105	101	3.9
(156/157)	156/157	107	102	4.8
2,3',4,4',5,5'-HxCB	167	108	107	0.9
3,3',4,4',5,5'-HxCB	169	108	107	0.9
2,2',3,4',5,6,6'-HpCB	188	115	115	0.0
2,3,3',4,4',5,5'-HpCB	189	108	104	3.8
2,2',3,3',5,5',6,6'-OxCB	202	105	103	1.9
2,3,3',4,4',5,5',6-OxCB	205	111	108	2.7
2,2',3,3',4,4',5,5',6-NoCB	206	117	118	0.9
2,2',3,3',4,5,5',6,6'-NoCB	208	110	110	0.0
Decachlorobiphenyl	209	103	98	5.0

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

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55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Sampling in City Outfall Basins 44 and 45

**To:** File  
**From:** Cindy Ryals, GSI Water Solutions, Inc.  
**Date:** October 31, 2016

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in May 2016. Two stormwater grab samples (W16E158-01, W16E158-03), one field duplicate grab sample (W16E158-04), and one field decontamination blank (W16E158-02) were collected in Outfall Basins 44 and 45 on May 19, 2016, and submitted for analyses. Sample collection dates and laboratory identification numbers are presented in Table 1.

The laboratory analyses for these samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- ALS Environmental
  - Organochlorine Pesticides – EPA 8081 (sample W16E158-03 only)
- Pace Analytical Lab
  - Chlorinated Biphenyl Congeners – EPA 1668A

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with these source control program samples.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method and field decontamination blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control and duplicate laboratory control (LC/DLC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for field duplicate and laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## **Analysis Holding Times**

The samples were extracted and analyzed within the acceptable holding times for all analyses.

## **Method Blanks**

Method blanks were analyzed during the subcontracted laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. Method blank results met acceptance criteria, with the following exceptions:

- The MDL is elevated for a few analytes in the method blank for organochlorine pesticides due to matrix interference. The level of background was low relative to the MDL, and the field sample analyzed in this sequence did not contain detected analytes, so data quality are not affected.
- The method blank for organochlorine pesticides contained low levels of 4,4'-DDE above the MRL. 4,4'-DDE was not detected in the field sample analyzed in this sequence, and therefore data quality are not affected.

## **Field Decontamination Blanks**

A field decontamination blank (W16E158-02) was processed with the field samples and field duplicate sample. The field decontamination blank was analyzed for TSS, total metals, total

mercury, PAHs and phthalates, and PCB congeners. Copper was detected at a low level in the field decontamination blank. However, sample results were all greater than ten times the blank concentration, and therefore no qualification was necessary. No other analytes were detected in the field decontamination blank.

## **Surrogate Recoveries**

Surrogate recoveries were completed during the analyses of PAHs, phthalates, and pesticides. All surrogate recoveries for the field sample, field duplicate, field decontamination blank and all associated QC samples were within control criteria.

## **Internal Standard Recoveries**

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. Labeled internal standard recoveries were within method-specified target ranges for the samples and the associated QC samples.

## **Matrix Spike/Matrix Spike Duplicates**

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates. All MS recoveries were within acceptance limits.

## **Laboratory Control Sample / Duplicate Laboratory Control Samples**

LC samples were processed during the analyses of TSS, total metals, total mercury, PAHs and phthalates, organochlorine pesticides, and PCB congeners. DLC samples were processed during the analysis of organochlorine pesticides and PCB congeners. LC/DLC sample recoveries and RPDs were within laboratory control limits, with the following exceptions:

- The Relative Percent Difference (RPD) for 4,4'-DDT in the replicate Laboratory Control Sample (LCS) analyses (KWG1604091-1 and KWG1604091-2) was outside control criteria. The individual recoveries of this analyte met control criteria suggesting that the analysis was within control. Because the sample result was non-detect, no further qualification was necessary.

## **Laboratory Duplicate**

WPCL processed duplicate samples during the TSS analysis, the total metals analysis, the analysis of mercury, and the analysis of PAHs and phthalates. RPDs were within laboratory acceptance limits for all lab duplicate samples.

## **Field Duplicate**

A field duplicate sample W16E158-04 was collected along with W16E158-01 (45\_SW1). Both samples were analyzed for TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. Field duplicate detections and RPDs are presented in Table 2. All RPDs were within acceptance criteria, with two exceptions:

- The RPD between the two samples exceeded the acceptance criteria for benzo(a)anthracene and benzo(a)pyrene. These results are flagged as estimates.

## Other

### Elevated Detection Limits

The reporting limit is elevated for all analytes tested by method 8081B (organochlorine pesticides) in sample W16E158-03. The sample extract was diluted prior to instrumental analysis due to relatively high levels of non-target background components. A semi-quantitative screen was performed prior to final analysis. The results of the screening indicated the need to perform a dilution.

The reporting limit is further elevated for several analytes in this sample due to matrix interference, which prevented adequate resolution of the target compounds at the reporting limit. The results are flagged as estimates to indicate the matrix interference.

A list of additional data qualifications added during validation is provided in Table 3.

**Table 1. Field Samples Submitted with Corresponding Laboratory Identifications**

City of Portland  
Outfalls 44 & 45

Field Sample ID	Sample Date	BES Sample ID	Analytes	Notes
45_SW1	5/19/2016	W16E158-01	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	
44_SW20	5/19/2016	W16E158-03	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Pest, Cond, pH, Temp	
Field Decon Blank	5/19/2016	W16E158-02	TSS, Tot Met, Tot Hg, PCB Cong, PAHs	
Field Duplicate	5/19/2016	W16E158-04	TSS, Tot Met, Tot Hg, PCB Cong, PAHs	Duplicate of 45_SW1

**Notes**

BES = City of Portland Bureau of Environmental Services

TSS = Total Suspended Solids

Tot Met = Total Metals

Tot Hg = Total Mercury

PCB Cong = PCB Congeners

PAHs = PAHs + phthalates

Pest = Low level organochlorine pesticides

Cond = Conductivity

Temp = temperature

**Table 2. Field Duplicate Detections**

City of Portland  
Outfalls 44 & 45

Sample IDs	Analyte	Unit	Reporting Limit	Primary Sample	Field Duplicate	Relative Percent Difference	Notes
<b>Total Suspended Solids</b>							
W16E158-01 & W16E158-04	Total Suspended Solids	mg/L	2	46	45	2	
<b>Total Metals</b>							
W16E158-01 & W16E158-04	Arsenic	µg/L	0.1	0.957	0.925	3	
	Cadmium	µg/L	0.1	0.375	0.358	5	
	Chromium	µg/L	0.2	9.4	9.03	4	
	Copper	µg/L	0.2	20.4	21	3	
	Lead	µg/L	0.1	6.21	6.09	2	
	Mercury	µg/L	0.001	0.0155	0.015	3	
	Nickel	µg/L	0.2	7.13	6.93	3	
	Silver	µg/L	0.1	0.1 U	0.1 U	0	
Zinc	µg/L	2.50	609	605	1		
<b>PAHs and phthalates</b>							
W16E158-01 & W16E158-04	Anthracene	µg/L	0.020	0.046	0.063	31	
	Benzo(a)anthracene	µg/L	0.010	0.034	0.061	57	1
	Benzo(a)pyrene	µg/L	0.010	0.062	0.13	71	1
	Benzo(b)fluoranthene	µg/L	0.010	0.12	0.2	50	
	Benzo(g,h,i)perylene	µg/L	0.010	0.12	0.18	40	
	Chrysene	µg/L	0.010	0.072	0.12	50	
	Fluoranthene	µg/L	0.010	0.14	0.18	25	
	Indeno(1,2,3-cd)pyrene	µg/L	0.010	0.075	0.12	46	
	Phenanthrene	µg/L	0.020	0.13	0.12	8	
	Pyrene	µg/L	0.010	0.13	0.18	32	
	Dimethyl phthalate	µg/L	1.0	1.0 U	1.0 U	0	
	Bis(2-ethylhexyl) phthalate	µg/L	1.0	2.4	2.8	15	
<b>PCB Congeners</b>							
W16E158-01 & W16E158-04	PCB Congener 110/115	ng/L	1.0	1.0 U	1.0 U	0	

**Notes**

ug/L = micrograms per liter

mg/L = milligrams per liter

ng/L = nanograms per liter

U = Analyte was not detected above the reported sample quantification limit.

1 RPD exceeds acceptance criteria. Results are flagged as estimates.

**Table 3. Qualifiers Added or Modified During Validation**

City of Portland  
Outfalls 44 & 45

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
W16E158-01	Benzo(a)anthracene	ug/L	0.034	J	RPD
W16E158-04	Benzo(a)anthracene	ug/L	0.061	J	RPD
W16E158-01	Benzo(a)pyrene	ug/L	0.062	J	RPD
W16E158-04	Benzo(a)pyrene	ug/L	0.130	J	RPD
W16E158-03	Aldrin	ug/L	0.007	UJ	MI
W16E158-03	beta-BHC	ug/L	0.006	UJ	MI
W16E158-03	delta-BHC	ug/L	0.043	UJ	MI
W16E158-03	Dieldrin	ug/L	0.008	UJ	MI
W16E158-03	Endrin Aldehyde	ug/L	0.012	UJ	MI
W16E158-03	gamma-BHC (Lindane)	ug/L	0.010	UJ	MI

**Notes**

µg/L = micrograms per liter

**Qualifier Definitions**

J = Detection of analyte is considered an estimate with unknown bias

UJ = reported quantitation limit is approximate and may be inaccurate or imprecise

**Reason Code Definitions**

RPD = The RPD between the results in the sample and sample duplicate exceeded control criteria

MI = The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compounds at the reporting limit. Samples are flagged to indicate matrix interference.



City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



June 17, 2016

Linda Scheffler  
Director's Office

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Work Order  
**W16E158**

Project  
**Portland Harbor**

Received  
05/19/16 15:15

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland  
Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W16E158</b>	Project Mgr: Linda Scheffler
Received: 5/19/16 15:15	
Submitted By: Field Operations	

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
45_SW1	W16E158-01	Stormwater	Grab	05/19/16 14:02	05/19/16 14:02	
Field Decon Blank	W16E158-02	DI Water	Field Decon Blank	05/19/16 13:55	05/19/16 13:55	
44_SW20	W16E158-03	Stormwater	Grab	05/19/16 14:16	05/19/16 14:16	
Field Duplicate	W16E158-04	Stormwater	Grab	05/19/16 00:00	05/19/16 00:00	

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field conductivity

45_SW1 : W16E158-01										
Conductivity*	29	umhos/cm			1	B16E304	05/19/16	05/19/16	FO SOP 1.03a	
44_SW20 : W16E158-03										
Conductivity*	47	umhos/cm			1	B16E304	05/19/16	05/19/16	FO SOP 1.03a	

Field pH

45_SW1 : W16E158-01										
pH*	6.2	pH Units			1	B16E304	05/19/16 14:02	05/19/16	FO SOP 1.01a	
44_SW20 : W16E158-03										
pH*	6.3	pH Units			1	B16E304	05/19/16 14:16	05/19/16	FO SOP 1.01a	

Field temperature

45_SW1 : W16E158-01										
Temperature*	16.3	°C			1	B16E304	05/19/16 14:02	05/19/16	FO SOP 1.05a	
44_SW20 : W16E158-03										
Temperature*	17.5	°C			1	B16E304	05/19/16 14:16	05/19/16	FO SOP 1.05a	

Reported: 06/17/16 14:19

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16E158**

**Client: Director's Office**  
**Received: 05/19/16 15:15**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**General Chemistry**

**Total Suspended Solids**

45\_SW1 : W16E158-01

Total suspended solids      **46** mg/L      2      2      B16E310    05/20/16      05/20/16    SM 2540D

Field Decon Blank : W16E158-02

Total suspended solids      ND mg/L      2      2      B16E310    05/20/16      05/20/16    SM 2540D

44\_SW20 : W16E158-03

Total suspended solids      **34** mg/L      2      2      B16E310    05/20/16      05/20/16    SM 2540D

Field Duplicate : W16E158-04

Total suspended solids      **45** mg/L      2      2      B16E310    05/20/16      05/20/16    SM 2540D

Reported: 06/17/16 14:19

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16E158**

**Client: Director's Office**  
**Received: 05/19/16 15:15**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Total Metals**

Total Metals by ICPMS

45\_SW1 : W16E158-01

Arsenic	0.957	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Cadmium	0.375	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Chromium	9.40	ug/L	0.200	0.200	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Copper	20.4	ug/L	0.200	0.200	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Lead	6.21	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Mercury	0.0155	ug/L	0.00100	0.00100	1	B16E346	05/23/16	05/24/16	WPCLSOP M-10	
Nickel	7.13	ug/L	0.200	0.200	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Zinc	609	ug/L	2.50	2.50	5	B16E308	05/20/16	05/23/16	EPA 200.8	

Field Decon Blank : W16E158-02

Arsenic	ND	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Cadmium	ND	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Chromium	ND	ug/L	0.200	0.200	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Copper	0.345	ug/L	0.200	0.200	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Lead	ND	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Mercury	ND	ug/L	0.00100	0.00100	1	B16E346	05/23/16	05/24/16	WPCLSOP M-10	
Nickel	ND	ug/L	0.200	0.200	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Zinc	ND	ug/L	0.500	0.500	1	B16E308	05/20/16	05/23/16	EPA 200.8	

44\_SW20 : W16E158-03

Arsenic	0.768	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Cadmium	0.424	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Chromium	3.41	ug/L	0.200	0.200	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Copper	21.2	ug/L	0.200	0.200	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Lead	5.90	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Mercury	0.0179	ug/L	0.00100	0.00100	1	B16E346	05/23/16	05/24/16	WPCLSOP M-10	
Nickel	2.81	ug/L	0.200	0.200	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Zinc	120	ug/L	0.500	0.500	1	B16E308	05/20/16	05/23/16	EPA 200.8	

Field Duplicate : W16E158-04

Arsenic	0.925	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Cadmium	0.358	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Chromium	9.03	ug/L	0.200	0.200	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Copper	21.0	ug/L	0.200	0.200	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Lead	6.09	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Mercury	0.0150	ug/L	0.00100	0.00100	1	B16E346	05/23/16	05/24/16	WPCLSOP M-10	
Nickel	6.93	ug/L	0.200	0.200	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16E308	05/20/16	05/23/16	EPA 200.8	
Zinc	605	ug/L	2.50	2.50	5	B16E308	05/20/16	05/23/16	EPA 200.8	

Reported: 06/17/16 14:19

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16E158**

**Client: Director's Office**  
**Received: 05/19/16 15:15**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

45\_SW1 : W16E158-01

Acenaphthene	ND	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Acenaphthylene	0.039	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Anthracene	0.046	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(a)anthracene	0.034	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(a)pyrene	0.062	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.12	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.12	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.031	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Chrysene	0.072	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.019	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Fluoranthene	0.14	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Fluorene	0.020	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.075	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Phenanthrene	0.13	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Pyrene	0.13	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Di-n-butyl phthalate	0.60	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	J
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.4	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.20	ug/L	0.229	89%	60.4-153	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Fluoranthene-d10	0.25	ug/L	0.229	109%	69-149	B16E344	05/23/16	06/02/16	EPA 8270-SIM	

Field Decon Blank : W16E158-02

Acenaphthene	ND	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16E158**

**Client: Director's Office**  
**Received: 05/19/16 15:15**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

Field Decon Blank : W16E158-02

2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Phenanthrene	ND	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Pyrene	ND	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.19	ug/L	0.229	83%	60.4-153	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Fluoranthene-d10	0.25	ug/L	0.229	110%	69-149	B16E344	05/23/16	06/02/16	EPA 8270-SIM	

44\_SW20 : W16E158-03

Acenaphthene	ND	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Anthracene	0.020	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(a)anthracene	0.011	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(a)pyrene	0.017	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.032	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.065	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.011	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Chrysene	0.034	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Fluoranthene	0.062	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.022	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Phenanthrene	0.076	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Pyrene	0.069	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Di-n-octyl phthalate	2.2	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	4.2	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.20	ug/L	0.229	86%	60.4-153	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Fluoranthene-d10	0.22	ug/L	0.229	94%	69-149	B16E344	05/23/16	06/02/16	EPA 8270-SIM	

Field Duplicate : W16E158-04

Reported: 06/17/16 14:19

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**Project: Portland Harbor**  
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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

Field Duplicate : W16E158-04

Acenaphthene	ND	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Acenaphthylene	0.081	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Anthracene	0.063	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(a)anthracene	0.061	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(a)pyrene	0.13	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.20	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.18	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.060	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Chrysene	0.12	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.028	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Fluoranthene	0.18	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Fluorene	0.026	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.12	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Phenanthrene	0.12	ug/L	0.020	0.020	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Pyrene	0.18	ug/L	0.010	0.010	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Di-n-butyl phthalate	0.58	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	J
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.8	ug/L	1.0	0.50	1	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.18	ug/L	0.229	79%	60.4-153	B16E344	05/23/16	06/02/16	EPA 8270-SIM	
Fluoranthene-d10	0.23	ug/L	0.229	100%	69-149	B16E344	05/23/16	06/02/16	EPA 8270-SIM	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Project: **Portland Harbor**  
Work Order: **W16E158**

Client: Director's Office  
Received: 05/19/16 15:15

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B16E310</b>										
<b>Blank (B16E310-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					05/20/16 :05/20/16	
<b>LCS (B16E310-BS1)</b>										
Total suspended solids	96	mg/L			100		96% (90-110)		05/20/16 :05/20/16	
<b>Duplicate (B16E310-DUP1) Source: W16E154-01</b>										
Total suspended solids	150	mg/L	2	2		149	0.7 (20)		05/20/16 :05/20/16	
<b>Duplicate (B16E310-DUP2) Source: W16E158-01</b>										
Total suspended solids	47	mg/L	2	2		46	2 (20)		05/20/16 :05/20/16	
<b>Duplicate (B16E310-DUP3) Source: W16E160-02</b>										
Total suspended solids	99	mg/L	2	2		100	1 (20)		05/20/16 :05/20/16	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B16E308</b>										
<b>Blank (B16E308-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					05/20/16 :05/23/16	
Cadmium	ND	ug/L	0.100	0.100					05/20/16 :05/23/16	
Chromium	ND	ug/L	0.200	0.200					05/20/16 :05/23/16	
Copper	ND	ug/L	0.200	0.200					05/20/16 :05/23/16	
Lead	ND	ug/L	0.100	0.100					05/20/16 :05/23/16	
Nickel	ND	ug/L	0.200	0.200					05/20/16 :05/23/16	
Silver	ND	ug/L	0.100	0.100					05/20/16 :05/23/16	
Zinc	ND	ug/L	0.500	0.500					05/20/16 :05/23/16	
<b>LCS (B16E308-BS1)</b>										
Arsenic	10.0	ug/L	0.100	0.100	10.0		100% (85-115)		05/20/16 :05/23/16	
Cadmium	10.1	ug/L	0.100	0.100	10.0		101% (85-115)		05/20/16 :05/23/16	
Chromium	9.80	ug/L	0.200	0.200	10.0		98% (85-115)		05/20/16 :05/23/16	
Copper	9.99	ug/L	0.200	0.200	10.0		100% (85-115)		05/20/16 :05/23/16	
Lead	9.58	ug/L	0.100	0.100	10.0		96% (85-115)		05/20/16 :05/23/16	
Nickel	10.0	ug/L	0.200	0.200	10.0		100% (85-115)		05/20/16 :05/23/16	
Silver	9.88	ug/L	0.100	0.100	10.0		99% (85-115)		05/20/16 :05/23/16	
Zinc	51.5	ug/L	0.500	0.500	50.0		103% (85-115)		05/20/16 :05/23/16	

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**Work Order: W16E158**

**Client: Director's Office**  
**Received: 05/19/16 15:15**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16E308**

**Duplicate (B16E308-DUP2)**

**Source: W16E157-02**

Arsenic	1.29	ug/L	0.100	0.100		1.36			05/20/16 :05/23/16	
Cadmium	28.6	ug/L	0.100	0.100		28.0			05/20/16 :05/23/16	
Chromium	10.5	ug/L	0.200	0.200		9.31			05/20/16 :05/23/16	
Copper	55.5	ug/L	0.200	0.200		57.0			05/20/16 :05/23/16	
Lead	61.4	ug/L	0.500	0.500		58.7			05/20/16 :05/23/16	
Nickel	13.5	ug/L	0.200	0.200		11.1			05/20/16 :05/23/16	
Silver	0.199	ug/L	0.100	0.100		0.165			05/20/16 :05/23/16	
Zinc	348	ug/L	2.50	2.50		349			05/20/16 :05/23/16	

**Matrix Spike (B16E308-MS1)**

**Source: W16E157-02**

Arsenic	20.2	ug/L	0.100	0.100	20.0	1.36	94% (70-130)		05/20/16 :05/23/16	
Cadmium	48.3	ug/L	0.100	0.100	20.0	28.0	101% (70-130)		05/20/16 :05/23/16	
Chromium	29.9	ug/L	0.200	0.200	20.0	9.31	103% (70-130)		05/20/16 :05/23/16	
Copper	73.5	ug/L	0.200	0.200	20.0	57.0	83% (70-130)		05/20/16 :05/23/16	
Lead	79.9	ug/L	0.500	0.500	20.0	58.7	106% (70-130)		05/20/16 :05/23/16	
Nickel	32.0	ug/L	0.200	0.200	20.0	11.1	104% (70-130)		05/20/16 :05/23/16	
Silver	19.4	ug/L	0.100	0.100	20.0	0.165	96% (70-130)		05/20/16 :05/23/16	
Zinc	457	ug/L	2.50	2.50	100	349	108% (70-130)		05/20/16 :05/23/16	

**Total Metals by ICPMS - Batch B16E346**

**Blank (B16E346-BLK1)**

Mercury	ND	ug/L	0.000900	0.000900					05/23/16 :05/24/16	
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**LCS (B16E346-BS1)**

Mercury	0.00996	ug/L	0.000900	0.000900	0.0100		100% (85-125)		05/23/16 :05/24/16	
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**Duplicate (B16E346-DUP1)**

**Source: W16E158-03**

Mercury	0.0183	ug/L	0.00100	0.00100		0.0179		2 (20)	05/23/16 :05/24/16	
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**Matrix Spike (B16E346-MS1)**

**Source: W16E158-03**

Mercury	0.0266	ug/L	0.00100	0.00100	0.0111	0.0179	79% (70-130)		05/23/16 :05/24/16	
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Reported: 06/17/16 14:19

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16E158**

**Client: Director's Office**  
**Received: 05/19/16 15:15**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16E344**

**Blank (B16E344-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					05/23/16 :06/02/16	
Acenaphthylene	ND	ug/L	0.020	0.020					05/23/16 :06/02/16	
Anthracene	ND	ug/L	0.020	0.020					05/23/16 :06/02/16	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					05/23/16 :06/02/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					05/23/16 :06/02/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					05/23/16 :06/02/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					05/23/16 :06/02/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					05/23/16 :06/02/16	
Chrysene	ND	ug/L	0.010	0.010					05/23/16 :06/02/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					05/23/16 :06/02/16	
Fluoranthene	ND	ug/L	0.010	0.010					05/23/16 :06/02/16	
Fluorene	ND	ug/L	0.020	0.020					05/23/16 :06/02/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					05/23/16 :06/02/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					05/23/16 :06/02/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					05/23/16 :06/02/16	
Naphthalene	ND	ug/L	0.040	0.040					05/23/16 :06/02/16	
Phenanthrene	ND	ug/L	0.020	0.020					05/23/16 :06/02/16	
Pyrene	ND	ug/L	0.010	0.010					05/23/16 :06/02/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					05/23/16 :06/02/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					05/23/16 :06/02/16	
Diethyl phthalate	ND	ug/L	1.0	0.50					05/23/16 :06/02/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					05/23/16 :06/02/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					05/23/16 :06/02/16	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					05/23/16 :06/02/16	

**Surrogate**

2-Methylnaphthalene-d10	0.20	ug/L			0.229		87% (60.4-153)		05/23/16 :06/02/16	
Fluoranthene-d10	0.24	ug/L			0.229		106% (69-149)		05/23/16 :06/02/16	

**LCS (B16E344-BS1)**

Acenaphthene	0.226	ug/L	0.020	0.020	0.229		99% (58.8-155)		05/23/16 :06/02/16	
Acenaphthylene	0.230	ug/L	0.020	0.020	0.229		100% (64-155)		05/23/16 :06/02/16	
Anthracene	0.243	ug/L	0.020	0.020	0.229		106% (76.2-129)		05/23/16 :06/02/16	
Benzo(a)anthracene	0.241	ug/L	0.010	0.010	0.229		106% (72.9-138)		05/23/16 :06/02/16	
Benzo(a)pyrene	0.249	ug/L	0.010	0.010	0.229		109% (75.5-137)		05/23/16 :06/02/16	
Benzo(b)fluoranthene	0.259	ug/L	0.010	0.010	0.229		113% (59.9-160)		05/23/16 :06/02/16	
Benzo(g,h,i)perylene	0.250	ug/L	0.010	0.010	0.229		110% (70.1-134)		05/23/16 :06/02/16	
Benzo(k)fluoranthene	0.247	ug/L	0.010	0.010	0.229		108% (61.1-157)		05/23/16 :06/02/16	
Chrysene	0.255	ug/L	0.010	0.010	0.229		112% (76.7-146)		05/23/16 :06/02/16	
Dibenzo(a,h)anthracene	0.270	ug/L	0.010	0.010	0.229		118% (63.9-140)		05/23/16 :06/02/16	
Fluoranthene	0.258	ug/L	0.010	0.010	0.229		113% (77.5-134)		05/23/16 :06/02/16	
Fluorene	0.253	ug/L	0.020	0.020	0.229		110% (61.2-157)		05/23/16 :06/02/16	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16E158**

**Client: Director's Office**  
**Received: 05/19/16 15:15**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16E344**

**LCS (B16E344-BS1)**

Indeno(1,2,3-cd)pyrene	0.271	ug/L	0.010	0.010	0.229		118% (68.4-135)		05/23/16 :06/02/16	
1-Methylnaphthalene	0.199	ug/L	0.040	0.040	0.229		87% (79.6-158)		05/23/16 :06/02/16	
2-Methylnaphthalene	0.202	ug/L	0.040	0.040	0.229		88% (76-161)		05/23/16 :06/02/16	
Naphthalene	0.221	ug/L	0.040	0.040	0.229		96% (60.6-164)		05/23/16 :06/02/16	
Phenanthrene	0.239	ug/L	0.020	0.020	0.229		105% (77.4-140)		05/23/16 :06/02/16	
Pyrene	0.253	ug/L	0.010	0.010	0.229		110% (81.1-141)		05/23/16 :06/02/16	
Butyl benzyl phthalate	2.56	ug/L	1.0	0.50	2.29		112% (54.7-176)		05/23/16 :06/02/16	
Di-n-butyl phthalate	2.59	ug/L	1.0	0.50	2.29		113% (74.3-149)		05/23/16 :06/02/16	
Diethyl phthalate	2.89	ug/L	1.0	0.50	2.29		126% (75.5-173)		05/23/16 :06/02/16	
Dimethyl phthalate	2.80	ug/L	1.0	0.50	2.29		122% (81.6-148)		05/23/16 :06/02/16	
Di-n-octyl phthalate	2.69	ug/L	1.0	0.50	2.29		118% (60.2-155)		05/23/16 :06/02/16	
Bis(2-ethylhexyl) phthalate	2.49	ug/L	1.0	0.50	2.29		109% (64.4-162)		05/23/16 :06/02/16	

**Surrogate**

2-Methylnaphthalene-d10	0.22	ug/L			0.229		95% (60.4-153)		05/23/16 :06/02/16	
Fluoranthene-d10	0.26	ug/L			0.229		114% (69-149)		05/23/16 :06/02/16	

**Matrix Spike (B16E344-MS1)**

**Source: W16E158-01**

Acenaphthene	0.243	ug/L	0.020	0.020	0.229	ND	106% (58.8-155)		05/23/16 :06/02/16	
Acenaphthylene	0.301	ug/L	0.020	0.020	0.229	0.0394	114% (64-155)		05/23/16 :06/02/16	
Anthracene	0.290	ug/L	0.020	0.020	0.229	0.0457	107% (76.2-129)		05/23/16 :06/02/16	
Benzo(a)anthracene	0.252	ug/L	0.010	0.010	0.229	0.0337	96% (72.9-138)		05/23/16 :06/02/16	
Benzo(a)pyrene	0.243	ug/L	0.010	0.010	0.229	0.0617	79% (75.5-137)		05/23/16 :06/02/16	
Benzo(b)fluoranthene	0.283	ug/L	0.010	0.010	0.229	0.119	72% (59.9-160)		05/23/16 :06/02/16	
Benzo(g,h,i)perylene	0.311	ug/L	0.010	0.010	0.229	0.122	83% (70.1-134)		05/23/16 :06/02/16	
Benzo(k)fluoranthene	0.234	ug/L	0.010	0.010	0.229	0.0314	89% (61.1-157)		05/23/16 :06/02/16	
Chrysene	0.293	ug/L	0.010	0.010	0.229	0.0720	97% (76.7-146)		05/23/16 :06/02/16	
Dibenzo(a,h)anthracene	0.193	ug/L	0.010	0.010	0.229	0.0189	76% (63.9-140)		05/23/16 :06/02/16	
Fluoranthene	0.369	ug/L	0.010	0.010	0.229	0.141	100% (77.5-134)		05/23/16 :06/02/16	
Fluorene	0.273	ug/L	0.020	0.020	0.229	0.0200	110% (61.2-157)		05/23/16 :06/02/16	
Indeno(1,2,3-cd)pyrene	0.255	ug/L	0.010	0.010	0.229	0.0754	78% (68.4-135)		05/23/16 :06/02/16	
1-Methylnaphthalene	0.197	ug/L	0.040	0.040	0.229	ND	86% (79.6-159)		05/23/16 :06/02/16	
2-Methylnaphthalene	0.203	ug/L	0.040	0.040	0.229	ND	89% (76-161)		05/23/16 :06/02/16	
Naphthalene	0.247	ug/L	0.040	0.040	0.229	ND	108% (60.6-164)		05/23/16 :06/02/16	
Phenanthrene	0.345	ug/L	0.020	0.020	0.229	0.125	96% (77.4-140)		05/23/16 :06/02/16	
Pyrene	0.349	ug/L	0.010	0.010	0.229	0.126	98% (81.1-141)		05/23/16 :06/02/16	
Butyl benzyl phthalate	3.03	ug/L	1.0	0.50	2.29	ND	133% (54.7-176)		05/23/16 :06/02/16	
Di-n-butyl phthalate	3.19	ug/L	1.0	0.50	2.29	0.598	114% (74.3-149)		05/23/16 :06/02/16	
Diethyl phthalate	2.86	ug/L	1.0	0.50	2.29	ND	125% (75.5-173)		05/23/16 :06/02/16	
Dimethyl phthalate	2.75	ug/L	1.0	0.50	2.29	ND	120% (81.6-148)		05/23/16 :06/02/16	
Di-n-octyl phthalate	2.56	ug/L	1.0	0.50	2.29	ND	112% (60.2-155)		05/23/16 :06/02/16	
Bis(2-ethylhexyl) phthalate	4.49	ug/L	1.0	0.50	2.29	2.41	91% (64.4-162)		05/23/16 :06/02/16	

Reported: 06/17/16 14:19

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16E158**

**Client: Director's Office**  
**Received: 05/19/16 15:15**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16E344**

**Matrix Spike (B16E344-MS1)**

**Source: W16E158-01**

**Surrogate**

2-Methylnaphthalene-d10	0.20	ug/L			0.229		87% (60.4-153)		05/23/16 :06/02/16	
Fluoranthene-d10	0.25	ug/L			0.229		110% (69-149)		05/23/16 :06/02/16	

**Matrix Spike Dup (B16E344-MSD1)**

**Source: W16E158-01**

Acenaphthene	0.251	ug/L	0.020	0.020	0.229	ND	110% (58.8-155 3 (50)		05/23/16 :06/02/16	
Acenaphthylene	0.309	ug/L	0.020	0.020	0.229	0.0394	118% (64-155) 2 (50)		05/23/16 :06/02/16	
Anthracene	0.308	ug/L	0.020	0.020	0.229	0.0457	115% (76.2-129 6 (50)		05/23/16 :06/02/16	
Benzo(a)anthracene	0.273	ug/L	0.010	0.010	0.229	0.0337	104% (72.9-138 8 (50)		05/23/16 :06/02/16	
Benzo(a)pyrene	0.259	ug/L	0.010	0.010	0.229	0.0617	87% (75.5-137) 7 (50)		05/23/16 :06/02/16	
Benzo(b)fluoranthene	0.288	ug/L	0.010	0.010	0.229	0.119	74% (59.9-160) 2 (50)		05/23/16 :06/02/16	
Benzo(g,h,i)perylene	0.318	ug/L	0.010	0.010	0.229	0.122	86% (70.1-134) 2 (50)		05/23/16 :06/02/16	
Benzo(k)fluoranthene	0.206	ug/L	0.010	0.010	0.229	0.0314	76% (61.1-157) 13 (50)		05/23/16 :06/02/16	
Chrysene	0.329	ug/L	0.010	0.010	0.229	0.0720	112% (76.7-146 11 (50)		05/23/16 :06/02/16	
Dibenzo(a,h)anthracene	0.220	ug/L	0.010	0.010	0.229	0.0189	88% (63.9-140) 13 (50)		05/23/16 :06/02/16	
Fluoranthene	0.369	ug/L	0.010	0.010	0.229	0.141	100% (77.5-134 0 (50)		05/23/16 :06/02/16	
Fluorene	0.278	ug/L	0.020	0.020	0.229	0.0200	113% (61.2-157 2 (50)		05/23/16 :06/02/16	
Indeno(1,2,3-cd)pyrene	0.278	ug/L	0.010	0.010	0.229	0.0754	89% (68.4-135) 9 (50)		05/23/16 :06/02/16	
1-Methylnaphthalene	0.190	ug/L	0.040	0.040	0.229	ND	83% (79.6-159) 4 (50)		05/23/16 :06/02/16	
2-Methylnaphthalene	0.189	ug/L	0.040	0.040	0.229	ND	83% (76-161) 7 (50)		05/23/16 :06/02/16	
Naphthalene	0.267	ug/L	0.040	0.040	0.229	ND	117% (60.6-164 8 (50)		05/23/16 :06/02/16	
Phenanthrene	0.363	ug/L	0.020	0.020	0.229	0.125	104% (77.4-140 5 (50)		05/23/16 :06/02/16	
Pyrene	0.345	ug/L	0.010	0.010	0.229	0.126	96% (81.1-141) 1 (50)		05/23/16 :06/02/16	
Butyl benzyl phthalate	3.22	ug/L	1.0	0.50	2.29	ND	141% (54.7-176 6 (50)		05/23/16 :06/02/16	
Di-n-butyl phthalate	3.50	ug/L	1.0	0.50	2.29	0.598	127% (74.3-149 9 (50)		05/23/16 :06/02/16	
Diethyl phthalate	2.97	ug/L	1.0	0.50	2.29	ND	130% (75.5-173 4 (50)		05/23/16 :06/02/16	
Dimethyl phthalate	2.68	ug/L	1.0	0.50	2.29	ND	117% (81.6-148 2 (50)		05/23/16 :06/02/16	
Di-n-octyl phthalate	3.25	ug/L	1.0	0.50	2.29	ND	142% (60.2-155 24 (50)		05/23/16 :06/02/16	
Bis(2-ethylhexyl) phthalate	4.79	ug/L	1.0	0.50	2.29	2.41	104% (64.4-162 6 (50)		05/23/16 :06/02/16	
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.18	ug/L			0.229		79% (60.4-153)		05/23/16 :06/02/16	
Fluoranthene-d10	0.25	ug/L			0.229		108% (69-149)		05/23/16 :06/02/16	

Reported: 06/17/16 14:19

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC

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Project: **Portland Harbor**  
Work Order: **W16E158**

Client: Director's Office  
Received: 05/19/16 15:15

**Qualifiers**

J Analyte was detected but at a concentration below the reporting limit; the result is an estimate.

**Definitions**

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

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Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-3696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody



Bureau of Environmental Services

Date: 5/19/16

Work Order #: W16E158

Collected By: MJS, JXB

Client Name: Director's Office Matrix: Stormwater  
 Project Name: Portland Harbor

Requested Analyses

Lab Number	2016 Stormwater Outfall Monitoring COC			Sample Date	Sample Time	Sample Type	Pesticides only required for samples from Outfalls 17 and 44										# of Containers	Remarks		
	Location ID	Sample Date	Sample Time				TSS	Total Metals (As, Cd, Cr, Cu, Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs + phthalates (low-level)	Pesticides (Low-level)	Conductivity (umhos/cm)	pH (pH units)	Temperature (Deg C)					
01	45_SW1	5/19/16	1402	G			●	●	●	●	●	●	●	●	29	6.2	16.3			
02	FDB		1355	G			●	●	●	●	●	●	●	●						
03	44_SW20		1416	G			●	●	●	●	●	●	●	●	47	6.3	17.5			
04	OWP			G			●	●	●	●	●	●	●	●						

Relinquished By: [Signature] Date: 5/19/16 Time: 1515  
 Received By: [Signature] Date: 5/19/16 Time: 1515  
 Printed Name: Jeremiah Bowden  
 Printed Name: Madeline Jank

### WPCL Cooler Receipt Form

Work Order Number: W16E158

Cooler Receipt Form Filled Out By: MZ

Project: Portland Harbor

Sample transport: Samples received on ice  Courier \_\_\_\_\_

Directly from field \_\_\_\_\_

Temperature (°C) 17

	Yes	No	NA
Is the COC present and signed?	<input checked="" type="checkbox"/>		
Are sample bottles intact?	<input checked="" type="checkbox"/>		
Do the COC and sample labels match?	<input checked="" type="checkbox"/>		
Are the appropriate containers used?	<input checked="" type="checkbox"/>		
Are samples appropriately preserved?	<input checked="" type="checkbox"/>		
Do VOA vials have Headspace?			<input checked="" type="checkbox"/>
Are samples received within holding times?	<input checked="" type="checkbox"/>		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	<u>1600541</u>	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
<del>5/19/16</del>	<del>1540</del>	<del>MZ</del>	<del>W16E158(01-04)</del>	<del>C</del>	<del>1</del>	<del>MZ</del>
5/19/16	1540	MZ	W16E158(01-04)	C	1	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

June 16, 2016

**Analytical Report for Service Request No: K1605397**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W16E158**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory May 21, 2016  
For your reference, these analyses have been assigned our service request number **K1605397**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wisconsin DNR	<a href="http://dnr.wi.gov/">http://dnr.wi.gov/</a>	998386840
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



# Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS ENVIRONMENTAL

**Client:** Portland, City of  
**Project:** Portland Harbor/ W16E158  
**Sample Matrix:** Water

**Service Request No.:** K1605397  
**Date Received:** 05/21/16

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

#### Sample Receipt

Four water samples were received for analysis at ALS Environmental on 05/21/16. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### Organochlorine Pesticides by EPA Method 8081

##### **Second Source Exceptions:**

The analysis of Chlorinated Pesticides by EPA 8081B requires the use of dual column confirmation. When the Initial Calibration Verification (ICV) criteria are met for both columns, the lower of the two sample results is generally reported. The criteria were not met for Endrin Aldehyde in CAL 14410. The data quality was not affected. No further corrective action was necessary.

##### **Calibration Verification Exceptions:**

The analysis of Chlorinated Pesticides by EPA 8081 requires the use of dual column confirmation. When the Continuing Calibration Verification (CCV) criterion is met for both columns, the lower of the two sample results is generally reported. The primary evaluation criteria were not met on the confirmation column for Endosulfan Sulfate. The results were reported from the column with an acceptable CCV. The data quality was not affected. No further corrective action was necessary.

##### **Method Blank Exceptions:**

The MDL is elevated for a few analytes in sample Method Blank KWG1604091-5. The chromatogram indicated the presence of non-target background components, which were apparently introduced as laboratory artifacts. The contamination prevented adequate resolution of the target compounds at the MDL. Note the level of background was relatively low compared to the MDL, so the affect on the results was minimal. The results are flagged to indicate the problem.

The Method Blank KWG1604091-5 contained low levels of 4,4'-DDE above the Method Reporting Limit (MRL). The field samples analyzed in this sequence did not contain the analyte in question. Since the apparent problem equates to a potential high bias, the data quality is not affected. No further corrective action was required.

Approved by \_\_\_\_\_



**Relative Percent Difference Exceptions:**

The Relative Percent Difference (RPD) for 4,4'-DDT in the replicate Laboratory Control Sample (LCS) analyses (KWG1604091-1 and KWG1604091-2) was outside control criteria. Note that the individual recoveries of this analyte met control criteria suggesting that the analysis was within control. The data was flagged to indicate the problem. No further corrective action was taken.

**Elevated Detection Limits:**

The reporting limit is elevated for all analytes in this sample. The sample extract was diluted prior to instrumental analysis due to relatively high levels of non-target background components. A semiquantitative screen was performed prior to final analysis. The results of the screening indicated the need to perform a dilution. The results are flagged to indicate the matrix interference.

The reporting limit is further elevated for several analytes in this sample. The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compounds at the reporting limit. The results are flagged to indicate the matrix interference.

No other anomalies associated with the analysis of these samples were observed.

**Chlorinated Biphenyl Congeners by EPA Method 1668A**

The analysis for PCB Congeners was performed at Pace Analytical in Minneapolis, MN. The data for this analysis is included in the corresponding section of this report.

Approved by \_\_\_\_\_





# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

**SUBCONTRACT ORDER**  
**City of Portland Water Pollution Control Lab**  
**W16E158**

*K1605397*

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

ALS Environmental  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

**WPCL Project Name**  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>	
<input checked="" type="checkbox"/> Standard	
<input type="checkbox"/> Rush _ day(s)	

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W16E158-01</b>	<b>Water</b>	<b>Sampled:05/19/16 14:02</b>		
Out-PCB Congeners 209	06/03/16 17:00	11/15/16 14:02		
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16E158-02</b>	<b>Water</b>	<b>Sampled:05/19/16 13:55</b>		
Out-PCB Congeners 209	06/03/16 17:00	11/15/16 13:55		
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16E158-03</b>	<b>Water</b>	<b>Sampled:05/19/16 14:16</b>		
Out-Pesticides Chlor LL	06/03/16 17:00	05/26/16 14:16		Report to MDL
Out-PCB Congeners 209	06/03/16 17:00	11/15/16 14:16		
<i>Containers Supplied:</i> G amber 1L (A)      G amber 1L (E)				
<b>Sample ID: W16E158-04</b>	<b>Water</b>	<b>Sampled:05/19/16 00:00</b>		
Out-PCB Congeners 209	06/03/16 17:00	11/15/16 00:00		
<i>Containers Supplied:</i> G amber 1L (A)				

*ALS called Strick @ 1600 -mz*

	<i>5/20/16 13:35</i>	<i>Received ALS 5-20-16</i>	<i>13:35</i>
Released By	Date	Received By	Date
Released By	Date	Received By	Date



PC H2

### Cooler Receipt and Preservation Form

Client City of Portland WRCL Service Request K16 05397

Received: 5-20-16 Opened: 5-20-16 By: bw Unloaded: 5-20-16 By: bw

- 1. Samples were received via?  Mail  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- 2. Samples were received in: (circle)  Cooler  Box  Envelope  Other \_\_\_\_\_ NA
- 3. Were custody seals on coolers? NA  Y  N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y  N  If present, were they signed and dated? Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
1.9	1.7	—	—	-0.2	370	NA		NA	

- 4. Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves \_\_\_\_\_
- 5. Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
- 6. Did all bottles arrive in good condition (unbroken)? Indicate in the table below. NA  Y  N
- 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
- 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA  Y  N
- 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
- 10. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below  NA  Y  N
- 11. Were VOA vials received without headspace? Indicate in the table below.  NA  Y  N
- 12. Was C12/Res negative? NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Out of	Head-	Broke	pH	Reagent	Volume	Reagent Lot	Initials	Time
	Bottle Type	Temp	space				added	Number		

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Organochlorine Pesticides

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W16E158  
**Sample Matrix:** Water

**Service Request:** K1605397  
**Date Collected:** 05/19/2016  
**Date Received:** 05/21/2016

Organochlorine Pesticides

**Sample Name:** W16E158-03  
**Lab Code:** K1605397-003  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	10	1.9	10	05/24/16	06/07/16	KWG1604091	
beta-BHC	ND	Ui	10	5.9	10	05/24/16	06/07/16	KWG1604091	
gamma-BHC (Lindane)	ND	Ui	10	9.5	10	05/24/16	06/07/16	KWG1604091	
delta-BHC	ND	Ui	43	43	10	05/24/16	06/07/16	KWG1604091	
Heptachlor	ND	U	10	1.3	10	05/24/16	06/07/16	KWG1604091	
Aldrin	ND	Ui	10	7.2	10	05/24/16	06/07/16	KWG1604091	
Heptachlor Epoxide	ND	U	10	6.9	10	05/24/16	06/07/16	KWG1604091	
gamma-Chlordane†	ND	U	10	2.1	10	05/24/16	06/07/16	KWG1604091	
Endosulfan I	ND	U	10	1.5	10	05/24/16	06/07/16	KWG1604091	
alpha-Chlordane	ND	U	10	1.7	10	05/24/16	06/07/16	KWG1604091	
Dieldrin	ND	Ui	10	8.1	10	05/24/16	06/07/16	KWG1604091	
4,4'-DDE	ND	U	10	1.1	10	05/24/16	06/07/16	KWG1604091	
Endrin	ND	U	10	1.8	10	05/24/16	06/07/16	KWG1604091	
Endosulfan II	ND	U	10	2.0	10	05/24/16	06/07/16	KWG1604091	
4,4'-DDD	ND	U	10	2.8	10	05/24/16	06/07/16	KWG1604091	
Endrin Aldehyde	ND	Ui	12	12	10	05/24/16	06/07/16	KWG1604091	
Endosulfan Sulfate	ND	U	10	8.4	10	05/24/16	06/07/16	KWG1604091	
4,4'-DDT	ND	U	10	3.0	10	05/24/16	06/07/16	KWG1604091	
Endrin Ketone	ND	U	10	2.8	10	05/24/16	06/07/16	KWG1604091	
Methoxychlor	ND	U	10	2.2	10	05/24/16	06/07/16	KWG1604091	
Toxaphene	ND	U	500	190	10	05/24/16	06/07/16	KWG1604091	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	58	20-106	06/07/16	Acceptable
Decachlorobiphenyl	43	19-127	06/07/16	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W16E158  
**Sample Matrix:** Water

**Service Request:** K1605397  
**Date Collected:** 05/19/2016  
**Date Received:** 05/21/2016

**Organochlorine Pesticides**

**Sample Name:** W16E158-03  
**Lab Code:** K1605397-003

**Units:** ng/L  
**Basis:** NA

† Analyte Comments

gamma-Chlordane

For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W16E158  
**Sample Matrix:** Water

**Service Request:** K1605397  
**Date Collected:** NA  
**Date Received:** NA

**Organochlorine Pesticides**

**Sample Name:** Method Blank  
**Lab Code:** KWG1604091-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	1.0	0.19	1	05/24/16	06/07/16	KWG1604091	
beta-BHC	ND	U	1.0	0.47	1	05/24/16	06/07/16	KWG1604091	
gamma-BHC (Lindane)	ND	U	1.0	0.22	1	05/24/16	06/07/16	KWG1604091	
delta-BHC	ND	Ui	1.1	1.1	1	05/24/16	06/07/16	KWG1604091	
Heptachlor	ND	Ui	1.0	0.42	1	05/24/16	06/07/16	KWG1604091	
Aldrin	ND	U	1.0	0.20	1	05/24/16	06/07/16	KWG1604091	
Heptachlor Epoxide	ND	U	1.0	0.69	1	05/24/16	06/07/16	KWG1604091	
gamma-Chlordane†	ND	Ui	1.0	0.48	1	05/24/16	06/07/16	KWG1604091	
Endosulfan I	ND	U	1.0	0.15	1	05/24/16	06/07/16	KWG1604091	
alpha-Chlordane	<b>0.79</b>	J	1.0	0.17	1	05/24/16	06/07/16	KWG1604091	
Dieldrin	ND	U	1.0	0.23	1	05/24/16	06/07/16	KWG1604091	
4,4'-DDE	<b>1.2</b>		1.0	0.11	1	05/24/16	06/07/16	KWG1604091	
Endrin	ND	U	1.0	0.18	1	05/24/16	06/07/16	KWG1604091	
Endosulfan II	ND	U	1.0	0.20	1	05/24/16	06/07/16	KWG1604091	
4,4'-DDD	ND	U	1.0	0.28	1	05/24/16	06/07/16	KWG1604091	
Endrin Aldehyde	ND	U	1.0	0.22	1	05/24/16	06/07/16	KWG1604091	
Endosulfan Sulfate	ND	U	1.0	0.84	1	05/24/16	06/07/16	KWG1604091	
4,4'-DDT	ND	Ui	1.0	0.95	1	05/24/16	06/07/16	KWG1604091	
Endrin Ketone	ND	U	1.0	0.28	1	05/24/16	06/07/16	KWG1604091	
Methoxychlor	ND	Ui	4.8	4.8	1	05/24/16	06/07/16	KWG1604091	
Toxaphene	ND	U	50	19	1	05/24/16	06/07/16	KWG1604091	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	73	20-106	06/07/16	Acceptable
Decachlorobiphenyl	78	19-127	06/07/16	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W16E158  
**Sample Matrix:** Water

**Service Request:** K1605397  
**Date Collected:** NA  
**Date Received:** NA

**Organochlorine Pesticides**

**Sample Name:** Method Blank  
**Lab Code:** KWG1604091-5

**Units:** ng/L  
**Basis:** NA

† Analyte Comments

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gamma-Chlordane                      For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

**Comments:** \_\_\_\_\_

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**Client:** Portland, City of  
**Project:** Portland Harbor/W16E158  
**Sample Matrix:** Water

**Service Request:** K1605397

**Surrogate Recovery Summary  
 Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>	<u>Sur2</u>
W16E158-03	K1605397-003	58 D	43 D
Method Blank	KWG1604091-5	73	78
Lab Control Sample	KWG1604091-1	62	68
Duplicate Lab Control Sample	KWG1604091-2	65	79

**Surrogate Recovery Control Limits (%)**

---

Sur1 = Tetrachloro-m-xylene	20-106
Sur2 = Decachlorobiphenyl	19-127

---

Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.

**Client:** Portland, City of  
**Project:** Portland Harbor/W16E158  
**Sample Matrix:** Water

**Service Request:** K1605397  
**Date Extracted:** 05/24/2016  
**Date Analyzed:** 06/07/2016

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1604091

Analyte Name	Lab Control Sample KWG1604091-1 Lab Control Spike			Duplicate Lab Control Sample KWG1604091-2 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
alpha-BHC	7.64	10.0	76	7.75	10.0	78	36-122	1	30
beta-BHC	7.28	10.0	73	7.43	10.0	74	42-125	2	30
gamma-BHC (Lindane)	7.80	10.0	78	7.80	10.0	78	44-117	0	30
delta-BHC	7.70	10.0	77	7.32	10.0	73	48-123	5	30
Heptachlor	7.40	10.0	74	7.27	10.0	73	40-115	2	30
Aldrin	6.23	10.0	62	6.54	10.0	65	10-102	5	30
Heptachlor Epoxide	6.87	10.0	69	7.35	10.0	74	49-109	7	30
gamma-Chlordane	7.33	10.0	73	6.63	10.0	66	47-113	10	30
Endosulfan I	5.32	10.0	53	5.85	10.0	59	35-115	10	30
alpha-Chlordane	6.88	10.0	69	7.23	10.0	72	45-115	5	30
Dieldrin	7.55	10.0	76	6.98	10.0	70	50-115	8	30
4,4'-DDE	7.43	10.0	74	7.53	10.0	75	41-116	1	30
Endrin	8.47	10.0	85	8.68	10.0	87	48-126	2	30
Endosulfan II	7.04	10.0	70	7.65	10.0	77	28-128	8	30
4,4'-DDD	7.05	10.0	71	7.83	10.0	78	33-132	11	30
Endrin Aldehyde	6.87	10.0	69	7.24	10.0	72	27-104	5	30
Endosulfan Sulfate	7.00	10.0	70	7.00	10.0	70	38-118	0	30
4,4'-DDT	8.73	10.0	87	14.1	10.0	141	42-143	47 *	30
Endrin Ketone	5.60	10.0	56	5.95	10.0	59	30-124	6	30
Methoxychlor	6.20	10.0	62	6.70	10.0	67	43-143	8	30
Toxaphene	252	400	63	291	400	73	36-137	14	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Report Prepared for:**

Howard Holmes  
ALS Environmental  
1317 S. 13th Avenue  
Kelso WA 98626

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Prepared Date:**

June 15, 2016

**Report Information:**

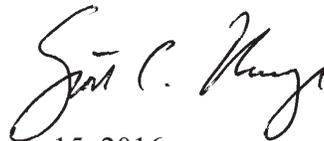
**Pace Project #: 10349645**  
**Sample Receipt Date: 05/24/2016**  
**Client Project #: K1605397**  
**Client Sub PO #: 51K1605397**  
**State Cert #: C755**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



June 15, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.

## **DISCUSSION**

This report presents the results from the analyses performed on four samples submitted by a representative of ALS Environmental. The samples were analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the amount of sample extracted.

The isotopically-labeled PCB internal standards in the sample extracts were recovered at 48-95%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the sample material.

Laboratory spike samples were also prepared with the sample batch using reference material that had been fortified with native standards. The results show that the spiked native compounds were recovered at 91-123%, with relative percent differences of 0.0-8.5%. These results were within the target ranges for this method. Matrix spikes were not prepared with the sample batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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# Appendix A

## Sample Management

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

Project Number: K1605397  
 Project Manager: Howard Holmes  
 QAP: LAB QAP

10349645

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Lab ID	CI Biphen Cong 1668A
				Date	Time	Time		
K1605397-001	W16E158-01	1	Water	5/19/16	1402	Pace MN	X	
K1605397-002	W16E158-02	3	Water	5/19/16	1355	Pace MN	X	
K1605397-003	W16E158-03		Water	5/19/16	1416	Pace MN	X	
K1605397-004	W16E158-04		Water	5/19/16	0000	Pace MN	X	

Test Comments: Cl Biphen Cong - 1668A K1605397-001,2,3,4

Full list 209

Folder Comments: Tier II

City of Portland EDD

HA

<b>Special Instructions/Comments</b> Please provide the electronic (PDF and EDD) report to the following e-mail address: ALKLS.Data@alsglobal.com.  Report 4 EDD to City of Portland cc-Portland EDD to ALS-Kelso Invoice to ALS-Kelso H - Test is On Hold P - Test is Authorized for Prep Only	<b>Turnaround Requirements</b> RUSH (Surcharges Apply)  PLEASE CIRCLE WORK DAYS 1 2 3 4 5 <input checked="" type="checkbox"/> STANDARD Requested FAX Date: _____ Requested Report Date: 06/07/16	<b>Report Requirements</b> I. Results Only _____ <input checked="" type="checkbox"/> II. Results + QC Summaries III. Results + QC and Calibration Summaries _____ IV. Data Validation Report with Raw Data _____ PQL/MDL/J Y _____ EDD Y _____	<b>Invoice Information</b> PO# 51K1605397  Bill to _____

Relinquished By: Yvonne Smith 5/23/16 Received By: CLC Airbill Number: 52414 1245 Airbill Number: TE 4.0 °C

**Sample Condition Upon Receipt**

Client Name: ALS Environmental

Project #: **WO# : 10349645**



Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  Speedee  Other: \_\_\_\_\_  
 Tracking Number: 6447 9274 3269

Custody Seal on Cooler/Box Present?  Yes  No      Seals Intact?  Yes  No      Optional: Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_  
 Packing Material:  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_      Temp Blank?  Yes  No  
 Thermometer Used:  151401163  151401164  B88A912167504  B88A0143310098      Type of Ice:  Wet  Blue  None  Samples on ice, cooling process has begun  
 Cooler Temp Read (°C): 4.0      Cooler Temp Corrected (°C): 4.0      Biological Tissue Frozen?  Yes  No  N/A  
 Temp should be above freezing to 6°C      Correction Factor: true      Date and Initials of Person Examining Contents: 5-24-16 AA

USDA Regulated Soil (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes  No  
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
 If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

			COMMENTS:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.	
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.	
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.	
Sampler Name and/or Signature on COC?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.	
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.	
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.	
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.	
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.	
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.	
-Pace Containers Used?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.	
Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.	Note if sediment is visible in the dissolved container
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.	
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>			
All containers needing acid/base preservation have been checked?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.	<input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH >12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		Sample #
Headspace in VOA Vials (>6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.	Initial when completed: _____ Lot # of added preservative: _____
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.	
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		
Pace Trip Blank Lot # (if purchased):			

**CLIENT NOTIFICATION/RESOLUTION**

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_      Field Data Required?  Yes  No  
 Comments/Resolution: \_\_\_\_\_

Project Manager Review: [Signature] Date: 05/25/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).



**Environmental**

# PURCHASE ORDER

FOR SUBCONTRACTED ANALYSES

Service Request: K1603397

Date: 5/22/2016  
Contact: Howard Holmes  
Email: howard.holmes@alsglobal.com

Company: Pace Analytical Services  
Address: 1700 Elm Street, Suite 200  
Minneapolis MN, 55414  
Phone: 612.607.1700

Bill To: ALS Environmental  
1317 South 13th Avenue  
Kelso WA, 98626

Ship To: ALS Environmental  
ALKLS.Data@alsglobal.com

Phone: 1-360-577-7222

Phone: 360-501-3364

Item/Description	Quantity	Unit Price
1668A/CI Biphphen Cong	4	<del>████████</del> \$650

Comments:

Empty rectangular box for comments.

ALS Group USA, Corp.  
www.alsglobal.com  
An ALS Limited Company

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

## REPORT OF LABORATORY ANALYSIS

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# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	W16E158-01		
Lab Sample ID	10349645001		
Filename	P160613A_14		
Injected By	BAL		
Total Amount Extracted	998 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	05/19/2016 14:02
ICAL ID	P160613A07	Received	05/24/2016 12:45
CCal Filename(s)	P160613A_06	Extracted	06/07/2016 11:55
Method Blank ID	BLANK-50576	Analyzed	06/13/2016 20:35

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	7.645	2.87	2.0	1.35	67
13C-4-MoCB	3	10.053	2.80	2.0	1.51	75
13C-2,2'-DiCB	4	10.293	1.59	2.0	1.26	63
13C-4,4'-DiCB	15	16.737	1.58	2.0	1.47	74
13C-2,2',6-TrCB	19	13.682	1.08	2.0	1.31	65
13C-3,4,4'-TrCB	37	24.157	1.02	2.0	1.50	75
13C-2,2',6,6'-TeCB	54	16.963	0.82	2.0	1.36	68
13C-3,4,4',5'-TeCB	81	31.105	0.80	2.0	1.74	87
13C-3,3',4,4'-TeCB	77	31.675	0.80	2.0	1.67	83
13C-2,2',4,6,6'-PeCB	104	22.765	1.64	2.0	1.02	51
13C-2,3,3',4,4'-PeCB	105	35.202	1.62	2.0	1.57	79
13C-2,3,4,4',5'-PeCB	114	34.532	1.56	2.0	1.63	81
13C-2,3',4,4',5'-PeCB	118	34.012	1.66	2.0	1.66	83
13C-2,3',4,4',5'-PeCB	123	33.660	1.54	2.0	1.73	86
13C-3,3',4,4',5'-PeCB	126	38.372	1.54	2.0	1.75	87
13C-2,2',4,4',6,6'-HxCB	155	28.623	1.25	2.0	1.15	57
13C-HxCB (156/157)	156/157	41.362	1.26	4.0	3.18	79
13C-2,3',4,4',5,5'-HxCB	167	40.188	1.24	2.0	1.64	82
13C-3,3',4,4',5,5'-HxCB	169	44.683	1.34	2.0	1.72	86
13C-2,2',3,4',5,6,6'-HpCB	188	34.448	1.06	2.0	1.19	59
13C-2,3,3',4,4',5,5'-HpCB	189	47.158	1.08	2.0	1.64	82
13C-2,2',3,3',5,5',6,6'-OxCB	202	39.853	0.93	2.0	1.33	67
13C-2,3,3',4,4',5,5',6-OxCB	205	50.132	0.88	2.0	1.59	79
13C-2,2',3,3',4,4',5,5',6-NoCB	206	52.417	0.75	2.0	1.42	71
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	46.576	0.74	2.0	1.42	71
13C--DeCB	209	54.810	0.68	2.0	1.38	69
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	19.931	1.07	2.0	1.75	88
13C-2,3,3',5,5'-PeCB	111	31.659	1.61	2.0	1.55	77
13C-2,2',3,3',5,5',6-HpCB	178	37.550	1.02	2.0	1.54	77
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	12.472	1.57	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	21.809	0.83	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	28.909	1.61	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	37.114	1.25	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	49.507	0.88	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16E158-01  
 Lab Sample ID 10349645001  
 Filename P160613A\_14

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.250
2		---	---	ND	---	0.250
3		---	---	ND	---	0.250
4		---	---	ND	---	0.250
5		---	---	ND	---	0.250
6		---	---	ND	---	0.250
7		---	---	ND	---	0.250
8		---	---	ND	---	0.250
9		---	---	ND	---	0.250
10		---	---	ND	---	0.250
11		---	---	ND	---	2.45
12	12/13	---	---	ND	---	0.501
13	12/13	---	---	ND	---	0.501
14		---	---	ND	---	0.250
15		---	---	ND	---	0.331
16		---	---	ND	---	0.250
17		---	---	ND	---	0.250
18	18/30	---	---	ND	---	0.501
19		---	---	ND	---	0.250
20	20/28	---	---	ND	---	1.29
21	21/33	---	---	ND	---	1.35
22		---	---	ND	---	0.952
23		---	---	ND	---	0.250
24		---	---	ND	---	0.250
25		---	---	ND	---	0.250
26	26/29	---	---	ND	---	0.501
27		---	---	ND	---	0.250
28	20/28	---	---	ND	---	1.29
29	26/29	---	---	ND	---	0.501
30	18/30	---	---	ND	---	0.501
31		---	---	ND	---	1.30
32		---	---	ND	---	0.250
33	21/33	---	---	ND	---	1.35
34		---	---	ND	---	0.250
35		---	---	ND	---	0.250
36		---	---	ND	---	0.250
37		---	---	ND	---	0.531
38		---	---	ND	---	0.250
39		---	---	ND	---	0.250
40	40/41/71	---	---	ND	---	1.50
41	40/41/71	---	---	ND	---	1.50
42		---	---	ND	---	0.501
43	43/73	---	---	ND	---	0.501
44	44/47/65	---	---	ND	---	1.50
45	45/51	---	---	ND	---	1.00
46		---	---	ND	---	0.501
47	44/47/65	---	---	ND	---	1.50
48		---	---	ND	---	0.501

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
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ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W16E158-01  
Lab Sample ID 10349645001  
Filename P160613A\_14

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.00
50	50/53	---	---	ND	---	1.00
51	45/51	---	---	ND	---	1.00
52		---	---	ND	---	1.54
53	50/53	---	---	ND	---	1.00
54		---	---	ND	---	0.501
55		---	---	ND	---	0.501
56		---	---	ND	---	0.501
57		---	---	ND	---	0.501
58		---	---	ND	---	0.501
59	59/62/75	---	---	ND	---	1.50
60		---	---	ND	---	0.501
61	61/70/74/76	---	---	ND	---	2.00
62	59/62/75	---	---	ND	---	1.50
63		---	---	ND	---	0.501
64		---	---	ND	---	0.501
65	44/47/65	---	---	ND	---	1.50
66		---	---	ND	---	0.842
67		---	---	ND	---	0.501
68		---	---	ND	---	0.501
69	49/69	---	---	ND	---	1.00
70	61/70/74/76	---	---	ND	---	2.00
71	40/41/71	---	---	ND	---	1.50
72		---	---	ND	---	0.501
73	43/73	---	---	ND	---	0.501
74	61/70/74/76	---	---	ND	---	2.00
75	59/62/75	---	---	ND	---	1.50
76	61/70/74/76	---	---	ND	---	2.00
77		---	---	ND	---	0.501
78		---	---	ND	---	0.501
79		---	---	ND	---	0.501
80		---	---	ND	---	0.501
81		---	---	ND	---	0.501
82		---	---	ND	---	0.501
83		---	---	ND	---	0.501
84		---	---	ND	---	0.501
85	85/116/117	---	---	ND	---	1.50
86	86/87/97/108/119/125	---	---	ND	---	3.01
87	86/87/97/108/119/125	---	---	ND	---	3.01
88	88/91	---	---	ND	---	1.00
89		---	---	ND	---	0.501
90	90/101/113	---	---	ND	---	1.50
91	88/91	---	---	ND	---	1.00
92		---	---	ND	---	0.501
93	93/98/100/102	---	---	ND	---	2.00
94		---	---	ND	---	0.501
95		---	---	ND	---	0.952
96		---	---	ND	---	0.501

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W16E158-01  
Lab Sample ID 10349645001  
Filename P160613A\_14

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.01
98	93/98/100/102	---	---	ND	---	2.00
99		---	---	ND	---	0.501
100	93/98/100/102	---	---	ND	---	2.00
101	90/101/113	---	---	ND	---	1.50
102	93/98/100/102	---	---	ND	---	2.00
103		---	---	ND	---	0.501
104		---	---	ND	---	0.501
105		---	---	ND	---	0.501
106		---	---	ND	---	0.501
107	107/124	---	---	ND	---	1.00
108	86/87/97/108/119/125	---	---	ND	---	3.01
109		---	---	ND	---	0.501
110	110/115	---	---	ND	---	1.00
111		---	---	ND	---	0.501
112		---	---	ND	---	0.501
113	90/101/113	---	---	ND	---	1.50
114		---	---	ND	---	0.501
115	110/115	---	---	ND	---	1.00
116	85/116/117	---	---	ND	---	1.50
117	85/116/117	---	---	ND	---	1.50
118		---	---	ND	---	0.641
119	86/87/97/108/119/125	---	---	ND	---	3.01
120		---	---	ND	---	0.501
121		---	---	ND	---	0.501
122		---	---	ND	---	0.501
123		---	---	ND	---	0.501
124	107/124	---	---	ND	---	1.00
125	86/87/97/108/119/125	---	---	ND	---	3.01
126		---	---	ND	---	0.501
127		---	---	ND	---	0.501
128	128/166	---	---	ND	---	1.00
129	129/138/163	---	---	ND	---	1.50
130		---	---	ND	---	0.501
131		---	---	ND	---	0.501
132		---	---	ND	---	0.501
133		---	---	ND	---	0.501
134	134/143	---	---	ND	---	1.00
135	135/151	---	---	ND	---	1.00
136		---	---	ND	---	0.501
137		---	---	ND	---	0.501
138	129/138/163	---	---	ND	---	1.50
139	139/140	---	---	ND	---	1.00
140	139/140	---	---	ND	---	1.00
141		---	---	ND	---	0.501
142		---	---	ND	---	0.501
143	134/143	---	---	ND	---	1.00
144		---	---	ND	---	0.501

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16E158-01  
 Lab Sample ID 10349645001  
 Filename P160613A\_14

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.501
146		---	---	ND	---	0.501
147	147/149	---	---	ND	---	1.00
148		---	---	ND	---	0.501
149	147/149	---	---	ND	---	1.00
150		---	---	ND	---	0.501
151	135/151	---	---	ND	---	1.00
152		---	---	ND	---	0.501
153	153/168	---	---	ND	---	1.00
154		---	---	ND	---	0.501
155		---	---	ND	---	0.501
156	156/157	---	---	ND	---	1.00
157	156/157	---	---	ND	---	1.00
158		---	---	ND	---	0.501
159		---	---	ND	---	0.501
160		---	---	ND	---	0.501
161		---	---	ND	---	0.501
162		---	---	ND	---	0.501
163	129/138/163	---	---	ND	---	1.50
164		---	---	ND	---	0.501
165		---	---	ND	---	0.501
166	128/166	---	---	ND	---	1.00
167		---	---	ND	---	0.501
168	153/168	---	---	ND	---	1.00
169		---	---	ND	---	0.501
170		---	---	ND	---	0.501
171	171/173	---	---	ND	---	1.00
172		---	---	ND	---	0.501
173	171/173	---	---	ND	---	1.00
174		---	---	ND	---	0.501
175		---	---	ND	---	0.501
176		---	---	ND	---	0.501
177		---	---	ND	---	0.501
178		---	---	ND	---	0.501
179		---	---	ND	---	0.501
180	180/193	---	---	ND	---	1.00
181		---	---	ND	---	0.501
182		---	---	ND	---	0.501
183	183/185	---	---	ND	---	1.00
184		---	---	ND	---	0.501
185	183/185	---	---	ND	---	1.00
186		---	---	ND	---	0.501
187		---	---	ND	---	0.501
188		---	---	ND	---	0.501
189		---	---	ND	---	0.501
190		---	---	ND	---	0.501
191		---	---	ND	---	0.501
192		---	---	ND	---	0.501

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      W16E158-01  
 Lab Sample ID        10349645001  
 Filename                P160613A\_14

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.00
194		---	---	ND	---	0.751
195		---	---	ND	---	0.751
196		---	---	ND	---	0.751
197	197/200	---	---	ND	---	1.50
198	198/199	---	---	ND	---	1.50
199	198/199	---	---	ND	---	1.50
200	197/200	---	---	ND	---	1.50
201		---	---	ND	---	0.751
202		---	---	ND	---	0.751
203		---	---	ND	---	0.751
204		---	---	ND	---	0.751
205		---	---	ND	---	0.751
206		---	---	ND	---	0.751
207		---	---	ND	---	0.751
208		---	---	ND	---	0.751
209		---	---	ND	---	0.751

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID            W16E158-01  
Lab Sample ID              10349645001  
Filename                     P160613A\_14

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	W16E158-02		
Lab Sample ID	10349645002		
Filename	P160613A_15		
Injected By	BAL		
Total Amount Extracted	1000 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	05/19/2016 13:55
ICAL ID	P160613A07	Received	05/24/2016 12:45
CCal Filename(s)	P160613A_06	Extracted	06/07/2016 11:55
Method Blank ID	BLANK-50576	Analyzed	06/13/2016 21:34

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	7.633	3.14	2.0	1.34	67
13C-4-MoCB	3	10.041	2.73	2.0	1.43	72
13C-2,2'-DiCB	4	10.281	1.59	2.0	1.20	60
13C-4,4'-DiCB	15	16.737	1.48	2.0	1.43	71
13C-2,2',6-TrCB	19	13.658	1.00	2.0	1.32	66
13C-3,4,4'-TrCB	37	24.140	1.04	2.0	1.43	71
13C-2,2',6,6'-TeCB	54	16.963	0.81	2.0	1.30	65
13C-3,4,4',5'-TeCB	81	31.072	0.79	2.0	1.58	79
13C-3,3',4,4'-TeCB	77	31.676	0.79	2.0	1.53	76
13C-2,2',4,6,6'-PeCB	104	22.749	1.56	2.0	0.952	48
13C-2,3,3',4,4'-PeCB	105	35.170	1.59	2.0	1.50	75
13C-2,3,4,4',5'-PeCB	114	34.516	1.61	2.0	1.55	78
13C-2,3',4,4',5'-PeCB	118	33.979	1.60	2.0	1.54	77
13C-2,3',4,4',5'-PeCB	123	33.644	1.57	2.0	1.57	79
13C-3,3',4,4',5'-PeCB	126	38.356	1.60	2.0	1.63	81
13C-2,2',4,4',6,6'-HxCB	155	28.624	1.28	2.0	0.971	49
13C-HxCB (156/157)	156/157	41.363	1.30	4.0	2.93	73
13C-2,3',4,4',5,5'-HxCB	167	40.173	1.31	2.0	1.50	75
13C-3,3',4,4',5,5'-HxCB	169	44.667	1.19	2.0	1.55	78
13C-2,2',3,4',5,6,6'-HpCB	188	34.432	0.99	2.0	0.990	50
13C-2,3,3',4,4',5,5'-HpCB	189	47.138	1.09	2.0	1.42	71
13C-2,2',3,3',5,5',6,6'-OxCB	202	39.837	0.89	2.0	1.12	56
13C-2,3,3',4,4',5,5',6-OxCB	205	50.113	0.84	2.0	1.38	69
13C-2,2',3,3',4,4',5,5',6-NoCB	206	52.419	0.80	2.0	1.25	62
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	46.556	0.82	2.0	1.20	60
13C--DeCB	209	54.791	0.71	2.0	1.14	57
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	19.914	1.02	2.0	1.53	76
13C-2,3,3',5,5'-PeCB	111	31.659	1.54	2.0	1.39	70
13C-2,2',3,3',5,5',6-HpCB	178	37.535	1.04	2.0	1.34	67
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	12.460	1.56	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	21.809	0.81	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	28.892	1.61	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	37.115	1.24	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	49.487	0.88	2.0	NA	NA

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16E158-02  
 Lab Sample ID 10349645002  
 Filename P160613A\_15

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.250
2		---	---	ND	---	0.250
3		---	---	ND	---	0.250
4		---	---	ND	---	0.250
5		---	---	ND	---	0.250
6		---	---	ND	---	0.250
7		---	---	ND	---	0.250
8		---	---	ND	---	0.250
9		---	---	ND	---	0.250
10		---	---	ND	---	0.250
11		---	---	ND	---	2.45
12	12/13	---	---	ND	---	0.500
13	12/13	---	---	ND	---	0.500
14		---	---	ND	---	0.250
15		---	---	ND	---	0.330
16		---	---	ND	---	0.250
17		---	---	ND	---	0.250
18	18/30	---	---	ND	---	0.500
19		---	---	ND	---	0.250
20	20/28	---	---	ND	---	1.29
21	21/33	---	---	ND	---	1.35
22		---	---	ND	---	0.950
23		---	---	ND	---	0.250
24		---	---	ND	---	0.250
25		---	---	ND	---	0.250
26	26/29	---	---	ND	---	0.500
27		---	---	ND	---	0.250
28	20/28	---	---	ND	---	1.29
29	26/29	---	---	ND	---	0.500
30	18/30	---	---	ND	---	0.500
31		---	---	ND	---	1.30
32		---	---	ND	---	0.250
33	21/33	---	---	ND	---	1.35
34		---	---	ND	---	0.250
35		---	---	ND	---	0.250
36		---	---	ND	---	0.250
37		---	---	ND	---	0.530
38		---	---	ND	---	0.250
39		---	---	ND	---	0.250
40	40/41/71	---	---	ND	---	1.50
41	40/41/71	---	---	ND	---	1.50
42		---	---	ND	---	0.500
43	43/73	---	---	ND	---	0.500
44	44/47/65	---	---	ND	---	1.50
45	45/51	---	---	ND	---	1.00
46		---	---	ND	---	0.500
47	44/47/65	---	---	ND	---	1.50
48		---	---	ND	---	0.500

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16E158-02  
 Lab Sample ID 10349645002  
 Filename P160613A\_15

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.00
50	50/53	---	---	ND	---	1.00
51	45/51	---	---	ND	---	1.00
52		---	---	ND	---	1.54
53	50/53	---	---	ND	---	1.00
54		---	---	ND	---	0.500
55		---	---	ND	---	0.500
56		---	---	ND	---	0.500
57		---	---	ND	---	0.500
58		---	---	ND	---	0.500
59	59/62/75	---	---	ND	---	1.50
60		---	---	ND	---	0.500
61	61/70/74/76	---	---	ND	---	2.00
62	59/62/75	---	---	ND	---	1.50
63		---	---	ND	---	0.500
64		---	---	ND	---	0.500
65	44/47/65	---	---	ND	---	1.50
66		---	---	ND	---	0.840
67		---	---	ND	---	0.500
68		---	---	ND	---	0.500
69	49/69	---	---	ND	---	1.00
70	61/70/74/76	---	---	ND	---	2.00
71	40/41/71	---	---	ND	---	1.50
72		---	---	ND	---	0.500
73	43/73	---	---	ND	---	0.500
74	61/70/74/76	---	---	ND	---	2.00
75	59/62/75	---	---	ND	---	1.50
76	61/70/74/76	---	---	ND	---	2.00
77		---	---	ND	---	0.500
78		---	---	ND	---	0.500
79		---	---	ND	---	0.500
80		---	---	ND	---	0.500
81		---	---	ND	---	0.500
82		---	---	ND	---	0.500
83		---	---	ND	---	0.500
84		---	---	ND	---	0.500
85	85/116/117	---	---	ND	---	1.50
86	86/87/97/108/119/125	---	---	ND	---	3.00
87	86/87/97/108/119/125	---	---	ND	---	3.00
88	88/91	---	---	ND	---	1.00
89		---	---	ND	---	0.500
90	90/101/113	---	---	ND	---	1.50
91	88/91	---	---	ND	---	1.00
92		---	---	ND	---	0.500
93	93/98/100/102	---	---	ND	---	2.00
94		---	---	ND	---	0.500
95		---	---	ND	---	0.950
96		---	---	ND	---	0.500

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W16E158-02  
Lab Sample ID 10349645002  
Filename P160613A\_15

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.00
98	93/98/100/102	---	---	ND	---	2.00
99		---	---	ND	---	0.500
100	93/98/100/102	---	---	ND	---	2.00
101	90/101/113	---	---	ND	---	1.50
102	93/98/100/102	---	---	ND	---	2.00
103		---	---	ND	---	0.500
104		---	---	ND	---	0.500
105		---	---	ND	---	0.500
106		---	---	ND	---	0.500
107	107/124	---	---	ND	---	1.00
108	86/87/97/108/119/125	---	---	ND	---	3.00
109		---	---	ND	---	0.500
110	110/115	---	---	ND	---	1.00
111		---	---	ND	---	0.500
112		---	---	ND	---	0.500
113	90/101/113	---	---	ND	---	1.50
114		---	---	ND	---	0.500
115	110/115	---	---	ND	---	1.00
116	85/116/117	---	---	ND	---	1.50
117	85/116/117	---	---	ND	---	1.50
118		---	---	ND	---	0.640
119	86/87/97/108/119/125	---	---	ND	---	3.00
120		---	---	ND	---	0.500
121		---	---	ND	---	0.500
122		---	---	ND	---	0.500
123		---	---	ND	---	0.500
124	107/124	---	---	ND	---	1.00
125	86/87/97/108/119/125	---	---	ND	---	3.00
126		---	---	ND	---	0.500
127		---	---	ND	---	0.500
128	128/166	---	---	ND	---	1.00
129	129/138/163	---	---	ND	---	1.50
130		---	---	ND	---	0.500
131		---	---	ND	---	0.500
132		---	---	ND	---	0.500
133		---	---	ND	---	0.500
134	134/143	---	---	ND	---	1.00
135	135/151	---	---	ND	---	1.00
136		---	---	ND	---	0.500
137		---	---	ND	---	0.500
138	129/138/163	---	---	ND	---	1.50
139	139/140	---	---	ND	---	1.00
140	139/140	---	---	ND	---	1.00
141		---	---	ND	---	0.500
142		---	---	ND	---	0.500
143	134/143	---	---	ND	---	1.00
144		---	---	ND	---	0.500

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16E158-02  
 Lab Sample ID 10349645002  
 Filename P160613A\_15

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.500
146		---	---	ND	---	0.500
147	147/149	---	---	ND	---	1.00
148		---	---	ND	---	0.500
149	147/149	---	---	ND	---	1.00
150		---	---	ND	---	0.500
151	135/151	---	---	ND	---	1.00
152		---	---	ND	---	0.500
153	153/168	---	---	ND	---	1.00
154		---	---	ND	---	0.500
155		---	---	ND	---	0.500
156	156/157	---	---	ND	---	1.00
157	156/157	---	---	ND	---	1.00
158		---	---	ND	---	0.500
159		---	---	ND	---	0.500
160		---	---	ND	---	0.500
161		---	---	ND	---	0.500
162		---	---	ND	---	0.500
163	129/138/163	---	---	ND	---	1.50
164		---	---	ND	---	0.500
165		---	---	ND	---	0.500
166	128/166	---	---	ND	---	1.00
167		---	---	ND	---	0.500
168	153/168	---	---	ND	---	1.00
169		---	---	ND	---	0.500
170		---	---	ND	---	0.500
171	171/173	---	---	ND	---	1.00
172		---	---	ND	---	0.500
173	171/173	---	---	ND	---	1.00
174		---	---	ND	---	0.500
175		---	---	ND	---	0.500
176		---	---	ND	---	0.500
177		---	---	ND	---	0.500
178		---	---	ND	---	0.500
179		---	---	ND	---	0.500
180	180/193	---	---	ND	---	1.00
181		---	---	ND	---	0.500
182		---	---	ND	---	0.500
183	183/185	---	---	ND	---	1.00
184		---	---	ND	---	0.500
185	183/185	---	---	ND	---	1.00
186		---	---	ND	---	0.500
187		---	---	ND	---	0.500
188		---	---	ND	---	0.500
189		---	---	ND	---	0.500
190		---	---	ND	---	0.500
191		---	---	ND	---	0.500
192		---	---	ND	---	0.500

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      W16E158-02  
 Lab Sample ID        10349645002  
 Filename                P160613A\_15

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.00
194		---	---	ND	---	0.750
195		---	---	ND	---	0.750
196		---	---	ND	---	0.750
197	197/200	---	---	ND	---	1.50
198	198/199	---	---	ND	---	1.50
199	198/199	---	---	ND	---	1.50
200	197/200	---	---	ND	---	1.50
201		---	---	ND	---	0.750
202		---	---	ND	---	0.750
203		---	---	ND	---	0.750
204		---	---	ND	---	0.750
205		---	---	ND	---	0.750
206		---	---	ND	---	0.750
207		---	---	ND	---	0.750
208		---	---	ND	---	0.750
209		---	---	ND	---	0.750

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID            W16E158-02  
Lab Sample ID              10349645002  
Filename                     P160613A\_15

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	W16E158-03	Matrix	Water
Lab Sample ID	10349645003	Dilution	5
Filename	P160613A_16	Collected	05/19/2016 14:16
Injected By	BAL	Received	05/24/2016 12:45
Total Amount Extracted	985 mL	Extracted	06/07/2016 11:55
% Moisture	NA	Analyzed	06/13/2016 22:33
Dry Weight Extracted	NA		
ICAL ID	P160613A07		
CCal Filename(s)	P160613A_06		
Method Blank ID	BLANK-50576		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	7.645	3.08	2.0	1.34	67
13C-4-MoCB	3	10.053	3.07	2.0	1.47	74
13C-2,2'-DiCB	4	10.292	1.72	2.0	1.21	61
13C-4,4'-DiCB	15	16.736	1.49	2.0	1.41	71
13C-2,2',6-TrCB	19	13.669	1.04	2.0	1.32	66
13C-3,4,4'-TrCB	37	24.155	1.15	2.0	1.56	78
13C-2,2',6,6'-TeCB	54	16.979	0.80	2.0	1.40	70
13C-3,4,4',5'-TeCB	81	31.102	0.75	2.0	1.74	87
13C-3,3',4,4'-TeCB	77	31.673	0.74	2.0	1.70	85
13C-2,2',4,6,6'-PeCB	104	22.764	1.60	2.0	1.04	52
13C-2,3,3',4,4'-PeCB	105	35.199	1.58	2.0	1.57	78
13C-2,3,4,4',5'-PeCB	114	34.528	1.57	2.0	1.66	83
13C-2,3',4,4',5'-PeCB	118	33.992	1.58	2.0	1.68	84
13C-2,3',4,4',5'-PeCB	123	33.657	1.58	2.0	1.67	84
13C-3,3',4,4',5'-PeCB	126	38.368	1.57	2.0	1.66	83
13C-2,2',4,4',6,6'-HxCB	155	28.621	1.23	2.0	1.13	57
13C-HxCB (156/157)	156/157	41.358	1.31	4.0	3.21	80
13C-2,3',4,4',5,5'-HxCB	167	40.185	1.27	2.0	1.63	82
13C-3,3',4,4',5,5'-HxCB	169	44.695	1.32	2.0	1.63	82
13C-2,2',3,4',5,6,6'-HpCB	188	34.444	1.05	2.0	1.16	58
13C-2,3,3',4,4',5,5'-HpCB	189	47.174	1.08	2.0	1.66	83
13C-2,2',3,3',5,5',6,6'-OxCB	202	39.849	0.87	2.0	1.34	67
13C-2,3,3',4,4',5,5',6-OxCB	205	50.105	0.89	2.0	1.61	80
13C-2,2',3,3',4,4',5,5',6-NoCB	206	52.412	0.80	2.0	1.43	71
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	46.571	0.78	2.0	1.46	73
13C--DeCB	209	54.761	0.70	2.0	1.33	67
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	19.930	1.04	2.0	1.68	84
13C-2,3,3',5,5'-PeCB	111	31.673	1.65	2.0	1.51	75
13C-2,2',3,3',5,5',6-HpCB	178	37.547	1.08	2.0	1.46	73
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	12.471	1.58	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	21.824	0.81	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	28.889	1.65	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	37.111	1.31	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	49.524	0.93	2.0	NA	NA

Conc = Concentration  
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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16E158-03  
 Lab Sample ID 10349645003  
 Filename P160613A\_16

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.254
2		---	---	ND	---	0.254
3		---	---	ND	---	0.254
4		---	---	ND	---	0.254
5		---	---	ND	---	0.254
6		---	---	ND	---	0.254
7		---	---	ND	---	0.254
8		---	---	ND	---	0.254
9		---	---	ND	---	0.254
10		---	---	ND	---	0.254
11		---	---	ND	---	2.49
12	12/13	---	---	ND	---	0.508
13	12/13	---	---	ND	---	0.508
14		---	---	ND	---	0.254
15		---	---	ND	---	0.335
16		---	---	ND	---	0.254
17		---	---	ND	---	0.254
18	18/30	---	---	ND	---	0.508
19		---	---	ND	---	0.254
20	20/28	---	---	ND	---	1.31
21	21/33	---	---	ND	---	1.37
22		---	---	ND	---	0.964
23		---	---	ND	---	0.254
24		---	---	ND	---	0.254
25		---	---	ND	---	0.254
26	26/29	---	---	ND	---	0.508
27		---	---	ND	---	0.254
28	20/28	---	---	ND	---	1.31
29	26/29	---	---	ND	---	0.508
30	18/30	---	---	ND	---	0.508
31		---	---	ND	---	1.32
32		---	---	ND	---	0.254
33	21/33	---	---	ND	---	1.37
34		---	---	ND	---	0.254
35		---	---	ND	---	0.254
36		---	---	ND	---	0.254
37		---	---	ND	---	0.538
38		---	---	ND	---	0.254
39		---	---	ND	---	0.254
40	40/41/71	---	---	ND	---	1.52
41	40/41/71	---	---	ND	---	1.52
42		---	---	ND	---	0.508
43	43/73	---	---	ND	---	0.508
44	44/47/65	---	---	ND	---	1.52
45	45/51	---	---	ND	---	1.02
46		---	---	ND	---	0.508
47	44/47/65	---	---	ND	---	1.52
48		---	---	ND	---	0.508

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W16E158-03  
Lab Sample ID 10349645003  
Filename P160613A\_16

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.02
50	50/53	---	---	ND	---	1.02
51	45/51	---	---	ND	---	1.02
52		---	---	ND	---	1.56
53	50/53	---	---	ND	---	1.02
54		---	---	ND	---	0.508
55		---	---	ND	---	0.508
56		---	---	ND	---	0.508
57		---	---	ND	---	0.508
58		---	---	ND	---	0.508
59	59/62/75	---	---	ND	---	1.52
60		---	---	ND	---	0.508
61	61/70/74/76	---	---	ND	---	2.03
62	59/62/75	---	---	ND	---	1.52
63		---	---	ND	---	0.508
64		---	---	ND	---	0.508
65	44/47/65	---	---	ND	---	1.52
66		---	---	ND	---	0.853
67		---	---	ND	---	0.508
68		---	---	ND	---	0.508
69	49/69	---	---	ND	---	1.02
70	61/70/74/76	---	---	ND	---	2.03
71	40/41/71	---	---	ND	---	1.52
72		---	---	ND	---	0.508
73	43/73	---	---	ND	---	0.508
74	61/70/74/76	---	---	ND	---	2.03
75	59/62/75	---	---	ND	---	1.52
76	61/70/74/76	---	---	ND	---	2.03
77		---	---	ND	---	0.508
78		---	---	ND	---	0.508
79		---	---	ND	---	0.508
80		---	---	ND	---	0.508
81		---	---	ND	---	0.508
82		---	---	ND	---	0.508
83		---	---	ND	---	0.508
84		---	---	ND	---	0.508
85	85/116/117	---	---	ND	---	1.52
86	86/87/97/108/119/125	---	---	ND	---	3.05
87	86/87/97/108/119/125	---	---	ND	---	3.05
88	88/91	---	---	ND	---	1.02
89		---	---	ND	---	0.508
90	90/101/113	---	---	ND	---	1.52
91	88/91	---	---	ND	---	1.02
92		---	---	ND	---	0.508
93	93/98/100/102	---	---	ND	---	2.03
94		---	---	ND	---	0.508
95		---	---	ND	---	0.964
96		---	---	ND	---	0.508

Conc = Concentration  
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ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W16E158-03  
Lab Sample ID 10349645003  
Filename P160613A\_16

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.05
98	93/98/100/102	---	---	ND	---	2.03
99		---	---	ND	---	0.508
100	93/98/100/102	---	---	ND	---	2.03
101	90/101/113	---	---	ND	---	1.52
102	93/98/100/102	---	---	ND	---	2.03
103		---	---	ND	---	0.508
104		---	---	ND	---	0.508
105		---	---	ND	---	0.508
106		---	---	ND	---	0.508
107	107/124	---	---	ND	---	1.02
108	86/87/97/108/119/125	---	---	ND	---	3.05
109		---	---	ND	---	0.508
110	110/115	---	---	ND	---	1.02
111		---	---	ND	---	0.508
112		---	---	ND	---	0.508
113	90/101/113	---	---	ND	---	1.52
114		---	---	ND	---	0.508
115	110/115	---	---	ND	---	1.02
116	85/116/117	---	---	ND	---	1.52
117	85/116/117	---	---	ND	---	1.52
118		---	---	ND	---	0.650
119	86/87/97/108/119/125	---	---	ND	---	3.05
120		---	---	ND	---	0.508
121		---	---	ND	---	0.508
122		---	---	ND	---	0.508
123		---	---	ND	---	0.508
124	107/124	---	---	ND	---	1.02
125	86/87/97/108/119/125	---	---	ND	---	3.05
126		---	---	ND	---	0.508
127		---	---	ND	---	0.508
128	128/166	---	---	ND	---	1.02
129	129/138/163	---	---	ND	---	1.52
130		---	---	ND	---	0.508
131		---	---	ND	---	0.508
132		---	---	ND	---	0.508
133		---	---	ND	---	0.508
134	134/143	---	---	ND	---	1.02
135	135/151	---	---	ND	---	1.02
136		---	---	ND	---	0.508
137		---	---	ND	---	0.508
138	129/138/163	---	---	ND	---	1.52
139	139/140	---	---	ND	---	1.02
140	139/140	---	---	ND	---	1.02
141		---	---	ND	---	0.508
142		---	---	ND	---	0.508
143	134/143	---	---	ND	---	1.02
144		---	---	ND	---	0.508

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W16E158-03  
Lab Sample ID 10349645003  
Filename P160613A\_16

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.508
146		---	---	ND	---	0.508
147	147/149	---	---	ND	---	1.02
148		---	---	ND	---	0.508
149	147/149	---	---	ND	---	1.02
150		---	---	ND	---	0.508
151	135/151	---	---	ND	---	1.02
152		---	---	ND	---	0.508
153	153/168	---	---	ND	---	1.02
154		---	---	ND	---	0.508
155		---	---	ND	---	0.508
156	156/157	---	---	ND	---	1.02
157	156/157	---	---	ND	---	1.02
158		---	---	ND	---	0.508
159		---	---	ND	---	0.508
160		---	---	ND	---	0.508
161		---	---	ND	---	0.508
162		---	---	ND	---	0.508
163	129/138/163	---	---	ND	---	1.52
164		---	---	ND	---	0.508
165		---	---	ND	---	0.508
166	128/166	---	---	ND	---	1.02
167		---	---	ND	---	0.508
168	153/168	---	---	ND	---	1.02
169		---	---	ND	---	0.508
170		---	---	ND	---	0.508
171	171/173	---	---	ND	---	1.02
172		---	---	ND	---	0.508
173	171/173	---	---	ND	---	1.02
174		---	---	ND	---	0.508
175		---	---	ND	---	0.508
176		---	---	ND	---	0.508
177		---	---	ND	---	0.508
178		---	---	ND	---	0.508
179		---	---	ND	---	0.508
180	180/193	---	---	ND	---	1.02
181		---	---	ND	---	0.508
182		---	---	ND	---	0.508
183	183/185	---	---	ND	---	1.02
184		---	---	ND	---	0.508
185	183/185	---	---	ND	---	1.02
186		---	---	ND	---	0.508
187		---	---	ND	---	0.508
188		---	---	ND	---	0.508
189		---	---	ND	---	0.508
190		---	---	ND	---	0.508
191		---	---	ND	---	0.508
192		---	---	ND	---	0.508

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      W16E158-03  
 Lab Sample ID        10349645003  
 Filename                P160613A\_16

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.02
194		---	---	ND	---	0.761
195		---	---	ND	---	0.761
196		---	---	ND	---	0.761
197	197/200	---	---	ND	---	1.52
198	198/199	---	---	ND	---	1.52
199	198/199	---	---	ND	---	1.52
200	197/200	---	---	ND	---	1.52
201		---	---	ND	---	0.761
202		---	---	ND	---	0.761
203		---	---	ND	---	0.761
204		---	---	ND	---	0.761
205		---	---	ND	---	0.761
206		---	---	ND	---	0.761
207		---	---	ND	---	0.761
208		---	---	ND	---	0.761
209		---	---	ND	---	0.761

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           W16E158-03  
Lab Sample ID             10349645003  
Filename                    P160613A\_16

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	W16E158-04		
Lab Sample ID	10349645004		
Filename	P160613A_17		
Injected By	BAL		
Total Amount Extracted	985 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	05/19/2016
ICAL ID	P160613A07	Received	05/24/2016 12:45
CCal Filename(s)	P160613A_06	Extracted	06/07/2016 11:55
Method Blank ID	BLANK-50576	Analyzed	06/13/2016 23:32

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	7.645	3.12	2.0	1.32	66
13C-4-MoCB	3	10.041	3.28	2.0	1.38	69
13C-2,2'-DiCB	4	10.281	1.58	2.0	1.12	56
13C-4,4'-DiCB	15	16.737	1.60	2.0	1.44	72
13C-2,2',6-TrCB	19	13.670	1.09	2.0	1.27	63
13C-3,4,4'-TrCB	37	24.140	1.02	2.0	1.58	79
13C-2,2',6,6'-TeCB	54	16.962	0.82	2.0	1.24	62
13C-3,4,4',5'-TeCB	81	31.088	0.78	2.0	1.85	92
13C-3,3',4,4'-TeCB	77	31.658	0.78	2.0	1.75	88
13C-2,2',4,6,6'-PeCB	104	22.765	1.61	2.0	0.997	50
13C-2,3,3',4,4'-PeCB	105	35.202	1.58	2.0	1.74	87
13C-2,3,4,4',5'-PeCB	114	34.532	1.62	2.0	1.80	90
13C-2,3',4,4',5'-PeCB	118	33.995	1.55	2.0	1.83	92
13C-2,3',4,4',5'-PeCB	123	33.659	1.57	2.0	1.88	94
13C-3,3',4,4',5'-PeCB	126	38.355	1.65	2.0	1.90	95
13C-2,2',4,4',6,6'-HxCB	155	28.622	1.32	2.0	1.07	54
13C-HxCB (156/157)	156/157	41.363	1.27	4.0	3.48	87
13C-2,3',4,4',5,5'-HxCB	167	40.188	1.27	2.0	1.73	86
13C-3,3',4,4',5,5'-HxCB	169	44.683	1.22	2.0	1.82	91
13C-2,2',3,4',5,6,6'-HpCB	188	34.431	0.99	2.0	1.03	52
13C-2,3,3',4,4',5,5'-HpCB	189	47.158	1.09	2.0	1.62	81
13C-2,2',3,3',5,5',6,6'-OxCB	202	39.836	0.89	2.0	1.21	61
13C-2,3,3',4,4',5,5',6-OxCB	205	50.111	0.88	2.0	1.54	77
13C-2,2',3,3',4,4',5,5',6-NoCB	206	52.418	0.82	2.0	1.41	70
13C-2,2',3,3',4,4',5,5',6-NoCB	208	46.576	0.80	2.0	1.32	66
13C--DeCB	209	54.768	0.75	2.0	1.34	67
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	19.931	1.05	2.0	1.64	82
13C-2,3,3',5,5'-PeCB	111	31.658	1.57	2.0	1.60	80
13C-2,2',3,3',5,5',6-HpCB	178	37.550	1.05	2.0	1.50	75
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	12.460	1.60	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	21.809	0.78	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	28.891	1.52	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	37.114	1.34	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	49.486	0.90	2.0	NA	NA

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 EML =Method Specified Reporting Limit (1668A)  
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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16E158-04  
 Lab Sample ID 10349645004  
 Filename P160613A\_17

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.254
2		---	---	ND	---	0.254
3		---	---	ND	---	0.254
4		---	---	ND	---	0.254
5		---	---	ND	---	0.254
6		---	---	ND	---	0.254
7		---	---	ND	---	0.254
8		---	---	ND	---	0.254
9		---	---	ND	---	0.254
10		---	---	ND	---	0.254
11		---	---	ND	---	2.49
12	12/13	---	---	ND	---	0.508
13	12/13	---	---	ND	---	0.508
14		---	---	ND	---	0.254
15		---	---	ND	---	0.335
16		---	---	ND	---	0.254
17		---	---	ND	---	0.254
18	18/30	---	---	ND	---	0.508
19		---	---	ND	---	0.254
20	20/28	---	---	ND	---	1.31
21	21/33	---	---	ND	---	1.37
22		---	---	ND	---	0.964
23		---	---	ND	---	0.254
24		---	---	ND	---	0.254
25		---	---	ND	---	0.254
26	26/29	---	---	ND	---	0.508
27		---	---	ND	---	0.254
28	20/28	---	---	ND	---	1.31
29	26/29	---	---	ND	---	0.508
30	18/30	---	---	ND	---	0.508
31		---	---	ND	---	1.32
32		---	---	ND	---	0.254
33	21/33	---	---	ND	---	1.37
34		---	---	ND	---	0.254
35		---	---	ND	---	0.254
36		---	---	ND	---	0.254
37		---	---	ND	---	0.538
38		---	---	ND	---	0.254
39		---	---	ND	---	0.254
40	40/41/71	---	---	ND	---	1.52
41	40/41/71	---	---	ND	---	1.52
42		---	---	ND	---	0.508
43	43/73	---	---	ND	---	0.508
44	44/47/65	---	---	ND	---	1.52
45	45/51	---	---	ND	---	1.02
46		---	---	ND	---	0.508
47	44/47/65	---	---	ND	---	1.52
48		---	---	ND	---	0.508

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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 I = Interference  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16E158-04  
 Lab Sample ID 10349645004  
 Filename P160613A\_17

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.02
50	50/53	---	---	ND	---	1.02
51	45/51	---	---	ND	---	1.02
52		---	---	ND	---	1.56
53	50/53	---	---	ND	---	1.02
54		---	---	ND	---	0.508
55		---	---	ND	---	0.508
56		---	---	ND	---	0.508
57		---	---	ND	---	0.508
58		---	---	ND	---	0.508
59	59/62/75	---	---	ND	---	1.52
60		---	---	ND	---	0.508
61	61/70/74/76	---	---	ND	---	2.03
62	59/62/75	---	---	ND	---	1.52
63		---	---	ND	---	0.508
64		---	---	ND	---	0.508
65	44/47/65	---	---	ND	---	1.52
66		---	---	ND	---	0.853
67		---	---	ND	---	0.508
68		---	---	ND	---	0.508
69	49/69	---	---	ND	---	1.02
70	61/70/74/76	---	---	ND	---	2.03
71	40/41/71	---	---	ND	---	1.52
72		---	---	ND	---	0.508
73	43/73	---	---	ND	---	0.508
74	61/70/74/76	---	---	ND	---	2.03
75	59/62/75	---	---	ND	---	1.52
76	61/70/74/76	---	---	ND	---	2.03
77		---	---	ND	---	0.508
78		---	---	ND	---	0.508
79		---	---	ND	---	0.508
80		---	---	ND	---	0.508
81		---	---	ND	---	0.508
82		---	---	ND	---	0.508
83		---	---	ND	---	0.508
84		---	---	ND	---	0.508
85	85/116/117	---	---	ND	---	1.52
86	86/87/97/108/119/125	---	---	ND	---	3.05
87	86/87/97/108/119/125	---	---	ND	---	3.05
88	88/91	---	---	ND	---	1.02
89		---	---	ND	---	0.508
90	90/101/113	---	---	ND	---	1.52
91	88/91	---	---	ND	---	1.02
92		---	---	ND	---	0.508
93	93/98/100/102	---	---	ND	---	2.03
94		---	---	ND	---	0.508
95		---	---	ND	---	0.964
96		---	---	ND	---	0.508

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W16E158-04  
Lab Sample ID 10349645004  
Filename P160613A\_17

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.05
98	93/98/100/102	---	---	ND	---	2.03
99		---	---	ND	---	0.508
100	93/98/100/102	---	---	ND	---	2.03
101	90/101/113	---	---	ND	---	1.52
102	93/98/100/102	---	---	ND	---	2.03
103		---	---	ND	---	0.508
104		---	---	ND	---	0.508
105		---	---	ND	---	0.508
106		---	---	ND	---	0.508
107	107/124	---	---	ND	---	1.02
108	86/87/97/108/119/125	---	---	ND	---	3.05
109		---	---	ND	---	0.508
110	110/115	---	---	ND	---	1.02
111		---	---	ND	---	0.508
112		---	---	ND	---	0.508
113	90/101/113	---	---	ND	---	1.52
114		---	---	ND	---	0.508
115	110/115	---	---	ND	---	1.02
116	85/116/117	---	---	ND	---	1.52
117	85/116/117	---	---	ND	---	1.52
118		---	---	ND	---	0.650
119	86/87/97/108/119/125	---	---	ND	---	3.05
120		---	---	ND	---	0.508
121		---	---	ND	---	0.508
122		---	---	ND	---	0.508
123		---	---	ND	---	0.508
124	107/124	---	---	ND	---	1.02
125	86/87/97/108/119/125	---	---	ND	---	3.05
126		---	---	ND	---	0.508
127		---	---	ND	---	0.508
128	128/166	---	---	ND	---	1.02
129	129/138/163	---	---	ND	---	1.52
130		---	---	ND	---	0.508
131		---	---	ND	---	0.508
132		---	---	ND	---	0.508
133		---	---	ND	---	0.508
134	134/143	---	---	ND	---	1.02
135	135/151	---	---	ND	---	1.02
136		---	---	ND	---	0.508
137		---	---	ND	---	0.508
138	129/138/163	---	---	ND	---	1.52
139	139/140	---	---	ND	---	1.02
140	139/140	---	---	ND	---	1.02
141		---	---	ND	---	0.508
142		---	---	ND	---	0.508
143	134/143	---	---	ND	---	1.02
144		---	---	ND	---	0.508

Conc = Concentration  
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R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID      W16E158-04  
Lab Sample ID        10349645004  
Filename                P160613A\_17

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.508
146		---	---	ND	---	0.508
147	147/149	---	---	ND	---	1.02
148		---	---	ND	---	0.508
149	147/149	---	---	ND	---	1.02
150		---	---	ND	---	0.508
151	135/151	---	---	ND	---	1.02
152		---	---	ND	---	0.508
153	153/168	---	---	ND	---	1.02
154		---	---	ND	---	0.508
155		---	---	ND	---	0.508
156	156/157	---	---	ND	---	1.02
157	156/157	---	---	ND	---	1.02
158		---	---	ND	---	0.508
159		---	---	ND	---	0.508
160		---	---	ND	---	0.508
161		---	---	ND	---	0.508
162		---	---	ND	---	0.508
163	129/138/163	---	---	ND	---	1.52
164		---	---	ND	---	0.508
165		---	---	ND	---	0.508
166	128/166	---	---	ND	---	1.02
167		---	---	ND	---	0.508
168	153/168	---	---	ND	---	1.02
169		---	---	ND	---	0.508
170		---	---	ND	---	0.508
171	171/173	---	---	ND	---	1.02
172		---	---	ND	---	0.508
173	171/173	---	---	ND	---	1.02
174		---	---	ND	---	0.508
175		---	---	ND	---	0.508
176		---	---	ND	---	0.508
177		---	---	ND	---	0.508
178		---	---	ND	---	0.508
179		---	---	ND	---	0.508
180	180/193	---	---	ND	---	1.02
181		---	---	ND	---	0.508
182		---	---	ND	---	0.508
183	183/185	---	---	ND	---	1.02
184		---	---	ND	---	0.508
185	183/185	---	---	ND	---	1.02
186		---	---	ND	---	0.508
187		---	---	ND	---	0.508
188		---	---	ND	---	0.508
189		---	---	ND	---	0.508
190		---	---	ND	---	0.508
191		---	---	ND	---	0.508
192		---	---	ND	---	0.508

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      W16E158-04  
 Lab Sample ID        10349645004  
 Filename                P160613A\_17

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.02
194		---	---	ND	---	0.761
195		---	---	ND	---	0.761
196		---	---	ND	---	0.761
197	197/200	---	---	ND	---	1.52
198	198/199	---	---	ND	---	1.52
199	198/199	---	---	ND	---	1.52
200	197/200	---	---	ND	---	1.52
201		---	---	ND	---	0.761
202		---	---	ND	---	0.761
203		---	---	ND	---	0.761
204		---	---	ND	---	0.761
205		---	---	ND	---	0.761
206		---	---	ND	---	0.761
207		---	---	ND	---	0.761
208		---	---	ND	---	0.761
209		---	---	ND	---	0.761

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

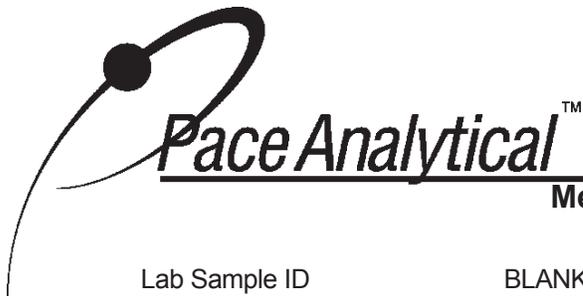
Client Sample ID            W16E158-04  
Lab Sample ID                10349645004  
Filename                        P160613A\_17

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-50576	Matrix	Water
Filename	P160614A_06	Extracted	06/07/2016 11:55
Injected By	BAL	Analyzed	06/14/2016 13:31
Total Amount Extracted	1040 mL	Dilution	5
ICAL ID	P160614A02		
CCal Filename(s)	P160614A_01		

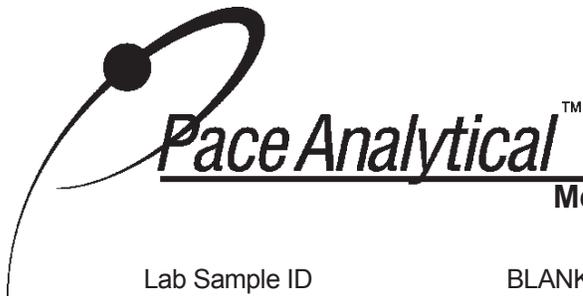
PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	7.645	3.21	2.0	1.30	65
13C-4-MoCB	3	10.041	3.17	2.0	1.40	70
13C-2,2'-DiCB	4	10.281	1.57	2.0	1.17	58
13C-4,4'-DiCB	15	16.737	1.56	2.0	1.41	71
13C-2,2',6-TrCB	19	13.670	1.03	2.0	1.36	68
13C-3,4,4'-TrCB	37	24.157	1.06	2.0	1.42	71
13C-2,2',6,6'-TeCB	54	16.962	0.81	2.0	1.28	64
13C-3,4,4',5-TeCB	81	31.089	0.75	2.0	1.56	78
13C-3,3',4,4'-TeCB	77	31.676	0.80	2.0	1.53	77
13C-2,2',4,6,6'-PeCB	104	22.765	1.62	2.0	0.972	49
13C-2,3,3',4,4'-PeCB	105	35.203	1.54	2.0	1.57	78
13C-2,3,4,4',5-PeCB	114	34.532	1.57	2.0	1.51	76
13C-2,3',4,4',5-PeCB	118	33.995	1.59	2.0	1.52	76
13C-2,3',4,4',5'-PeCB	123	33.660	1.54	2.0	1.54	77
13C-3,3',4,4',5-PeCB	126	38.356	1.61	2.0	1.61	80
13C-2,2',4,4',6,6'-HxCB	155	28.624	1.29	2.0	1.02	51
13C-HxCB (156/157)	156/157	41.363	1.28	4.0	3.14	79
13C-2,3',4,4',5,5'-HxCB	167	40.189	1.20	2.0	1.53	76
13C-3,3',4,4',5,5'-HxCB	169	44.667	1.25	2.0	1.67	83
13C-2,2',3,4',5,6,6'-HpCB	188	34.448	1.04	2.0	0.949	47
13C-2,3,3',4,4',5,5'-HpCB	189	47.181	1.07	2.0	1.50	75
13C-2,2',3,3',5,5',6,6'-OoCB	202	39.837	0.88	2.0	1.15	58
13C-2,3,3',4,4',5,5',6-OoCB	205	50.134	0.91	2.0	1.46	73
13C-2,2',3,3',4,4',5,5',6-NoCB	206	52.441	0.78	2.0	1.31	66
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	46.556	0.77	2.0	1.28	64
13C-DeCB	209	54.769	0.75	2.0	1.26	63
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	19.931	1.02	2.0	1.72	86
13C-2,3,3',5,5'-PeCB	111	31.659	1.52	2.0	1.48	74
13C-2,2',3,3',5,5',6-HpCB	178	37.534	1.02	2.0	1.47	73
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	12.459	1.56	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	21.809	0.81	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	28.892	1.57	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	37.115	1.25	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	49.509	0.90	2.0	NA	NA

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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R = Recovery outside of Method 1668A control limits  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-50576  
 Filename P160614A\_06

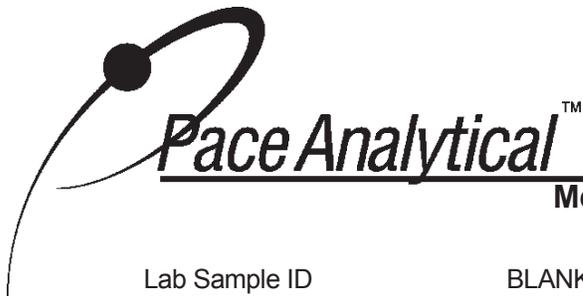
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		--	--	ND	--	0.239
2		--	--	ND	--	0.239
3		--	--	ND	--	0.239
4		--	--	ND	--	0.239
5		--	--	ND	--	0.239
6		--	--	ND	--	0.239
7		--	--	ND	--	0.239
8		--	--	ND	--	0.239
9		--	--	ND	--	0.239
10		--	--	ND	--	0.239
11		--	--	ND	--	2.35
12	12/13	--	--	ND	--	0.479
13	12/13	--	--	ND	--	0.479
14		--	--	ND	--	0.239
15		--	--	ND	--	0.316
16		--	--	ND	--	0.239
17		--	--	ND	--	0.239
18	18/30	--	--	ND	--	0.479
19		--	--	ND	--	0.239
20	20/28	--	--	ND	--	1.24
21	21/33	--	--	ND	--	1.29
22		--	--	ND	--	0.910
23		--	--	ND	--	0.239
24		--	--	ND	--	0.239
25		--	--	ND	--	0.239
26	26/29	--	--	ND	--	0.479
27		--	--	ND	--	0.239
28	20/28	--	--	ND	--	1.24
29	26/29	--	--	ND	--	0.479
30	18/30	--	--	ND	--	0.479
31		--	--	ND	--	1.25
32		--	--	ND	--	0.239
33	21/33	--	--	ND	--	1.29
34		--	--	ND	--	0.239
35		--	--	ND	--	0.239
36		--	--	ND	--	0.239
37		--	--	ND	--	0.508
38		--	--	ND	--	0.239
39		--	--	ND	--	0.239
40	40/41/71	--	--	ND	--	1.44
41	40/41/71	--	--	ND	--	1.44
42		--	--	ND	--	0.479
43	43/73	--	--	ND	--	0.479
44	44/47/65	--	--	ND	--	1.44
45	45/51	--	--	ND	--	0.958

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-50576  
 Filename P160614A\_06

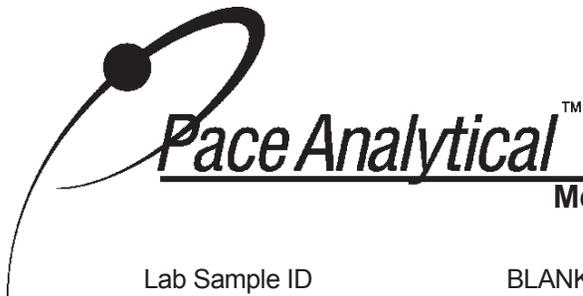
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		--	--	ND	--	0.479
47	44/47/65	--	--	ND	--	1.44
48		--	--	ND	--	0.479
49	49/69	--	--	ND	--	0.958
50	50/53	--	--	ND	--	0.958
51	45/51	--	--	ND	--	0.958
52		--	--	ND	--	1.48
53	50/53	--	--	ND	--	0.958
54		--	--	ND	--	0.479
55		--	--	ND	--	0.479
56		--	--	ND	--	0.479
57		--	--	ND	--	0.479
58		--	--	ND	--	0.479
59	59/62/75	--	--	ND	--	1.44
60		--	--	ND	--	0.479
61	61/70/74/76	--	--	ND	--	1.92
62	59/62/75	--	--	ND	--	1.44
63		--	--	ND	--	0.479
64		--	--	ND	--	0.479
65	44/47/65	--	--	ND	--	1.44
66		--	--	ND	--	0.805
67		--	--	ND	--	0.479
68		--	--	ND	--	0.479
69	49/69	--	--	ND	--	0.958
70	61/70/74/76	--	--	ND	--	1.92
71	40/41/71	--	--	ND	--	1.44
72		--	--	ND	--	0.479
73	43/73	--	--	ND	--	0.479
74	61/70/74/76	--	--	ND	--	1.92
75	59/62/75	--	--	ND	--	1.44
76	61/70/74/76	--	--	ND	--	1.92
77		--	--	ND	--	0.00917
78		--	--	ND	--	0.479
79		--	--	ND	--	0.479
80		--	--	ND	--	0.479
81		--	--	ND	--	0.0104
82		--	--	ND	--	0.479
83		--	--	ND	--	0.479
84		--	--	ND	--	0.479
85	85/116/117	--	--	ND	--	1.44
86	86/87/97/108/119/125	--	--	ND	--	2.87
87	86/87/97/108/119/125	--	--	ND	--	2.87
88	88/91	--	--	ND	--	0.958
89		--	--	ND	--	0.479
90	90/101/113	--	--	ND	--	1.44

Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
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 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-50576  
Filename P160614A\_06

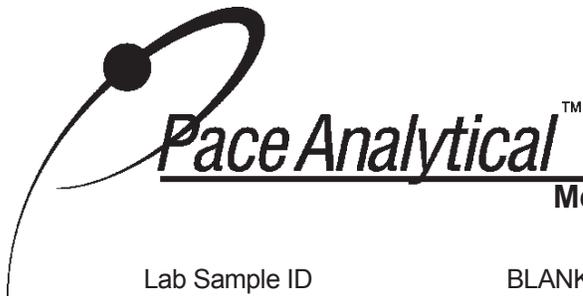
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	--	--	ND	--	0.958
92		--	--	ND	--	0.479
93	93/98/100/102	--	--	ND	--	1.92
94		--	--	ND	--	0.479
95		--	--	ND	--	0.910
96		--	--	ND	--	0.479
97	86/87/97/108/119/125	--	--	ND	--	2.87
98	93/98/100/102	--	--	ND	--	1.92
99		--	--	ND	--	0.479
100	93/98/100/102	--	--	ND	--	1.92
101	90/101/113	--	--	ND	--	1.44
102	93/98/100/102	--	--	ND	--	1.92
103		--	--	ND	--	0.479
104		--	--	ND	--	0.479
105		--	--	ND	--	0.0110
106		--	--	ND	--	0.479
107	107/124	--	--	ND	--	0.958
108	86/87/97/108/119/125	--	--	ND	--	2.87
109		--	--	ND	--	0.479
110	110/115	--	--	ND	--	0.958
111		--	--	ND	--	0.479
112		--	--	ND	--	0.479
113	90/101/113	--	--	ND	--	1.44
114		--	--	ND	--	0.0110
115	110/115	--	--	ND	--	0.958
116	85/116/117	--	--	ND	--	1.44
117	85/116/117	--	--	ND	--	1.44
118		--	--	ND	--	0.00931
119	86/87/97/108/119/125	--	--	ND	--	2.87
120		--	--	ND	--	0.479
121		--	--	ND	--	0.479
122		--	--	ND	--	0.479
123		--	--	ND	--	0.00868
124	107/124	--	--	ND	--	0.958
125	86/87/97/108/119/125	--	--	ND	--	2.87
126		--	--	ND	--	0.0112
127		--	--	ND	--	0.479
128	128/166	--	--	ND	--	0.958
129	129/138/163	--	--	ND	--	1.44
130		--	--	ND	--	0.479
131		--	--	ND	--	0.479
132		--	--	ND	--	0.479
133		--	--	ND	--	0.479
134	134/143	--	--	ND	--	0.958
135	135/151	--	--	ND	--	0.958

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-50576  
 Filename P160614A\_06

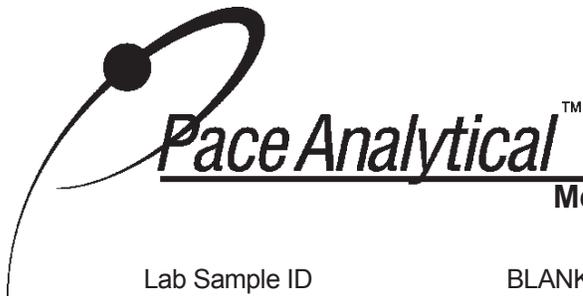
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		--	--	ND	--	0.479
137		--	--	ND	--	0.479
138	129/138/163	--	--	ND	--	1.44
139	139/140	--	--	ND	--	0.958
140	139/140	--	--	ND	--	0.958
141		--	--	ND	--	0.479
142		--	--	ND	--	0.479
143	134/143	--	--	ND	--	0.958
144		--	--	ND	--	0.479
145		--	--	ND	--	0.479
146		--	--	ND	--	0.479
147	147/149	--	--	ND	--	0.958
148		--	--	ND	--	0.479
149	147/149	--	--	ND	--	0.958
150		--	--	ND	--	0.479
151	135/151	--	--	ND	--	0.958
152		--	--	ND	--	0.479
153	153/168	--	--	ND	--	0.958
154		--	--	ND	--	0.479
155		--	--	ND	--	0.479
156	156/157	--	--	ND	--	0.0140
157	156/157	--	--	ND	--	0.0140
158		--	--	ND	--	0.479
159		--	--	ND	--	0.479
160		--	--	ND	--	0.479
161		--	--	ND	--	0.479
162		--	--	ND	--	0.479
163	129/138/163	--	--	ND	--	1.44
164		--	--	ND	--	0.479
165		--	--	ND	--	0.479
166	128/166	--	--	ND	--	0.958
167		--	--	ND	--	0.0105
168	153/168	--	--	ND	--	0.958
169		--	--	ND	--	0.0145
170		--	--	ND	--	0.479
171	171/173	--	--	ND	--	0.958
172		--	--	ND	--	0.479
173	171/173	--	--	ND	--	0.958
174		--	--	ND	--	0.479
175		--	--	ND	--	0.479
176		--	--	ND	--	0.479
177		--	--	ND	--	0.479
178		--	--	ND	--	0.479
179		--	--	ND	--	0.479
180	180/193	--	--	ND	--	0.958

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-50576  
 Filename P160614A\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		--	--	ND	--	0.479
182		--	--	ND	--	0.479
183	183/185	--	--	ND	--	0.958
184		--	--	ND	--	0.479
185	183/185	--	--	ND	--	0.958
186		--	--	ND	--	0.479
187		--	--	ND	--	0.479
188		--	--	ND	--	0.479
189		--	--	ND	--	0.0136
190		--	--	ND	--	0.479
191		--	--	ND	--	0.479
192		--	--	ND	--	0.479
193	180/193	--	--	ND	--	0.958
194		--	--	ND	--	0.718
195		--	--	ND	--	0.718
196		--	--	ND	--	0.718
197	197/200	--	--	ND	--	1.44
198	198/199	--	--	ND	--	1.44
199	198/199	--	--	ND	--	1.44
200	197/200	--	--	ND	--	1.44
201		--	--	ND	--	0.718
202		--	--	ND	--	0.718
203		--	--	ND	--	0.718
204		--	--	ND	--	0.718
205		--	--	ND	--	0.718
206		--	--	ND	--	0.718
207		--	--	ND	--	0.718
208		--	--	ND	--	0.718
209		--	--	ND	--	0.718

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID           CBLKUT  
Lab Sample ID             BLANK-50576  
Filename                    P160614A\_06

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCS-50577	Matrix	Water
Filename	P160614A_12	Dilution	5
Total Amount Extracted	1040 mL	Extracted	06/07/2016 11:55
ICAL ID	P160614A02	Analyzed	06/14/2016 19:26
CCal Filename(s)	P160614A_01	Injected By	CVS
Method Blank ID	BLANK-50576		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	0.963	96	2.0	1.35	67
3	1.0	0.979	98	2.0	1.45	73
4	1.0	1.13	113	2.0	1.24	62
15	1.0	0.934	93	2.0	1.51	75
19	1.0	1.16	116	2.0	1.32	66
37	1.0	0.998	100	2.0	1.71	85
54	1.0	1.10	110	2.0	1.47	73
81	1.0	0.949	95	2.0	1.84	92
77	1.0	0.957	96	2.0	1.76	88
104	1.0	1.13	113	2.0	1.08	54
105	1.0	0.969	97	2.0	1.72	86
114	1.0	0.956	96	2.0	1.75	87
118	1.0	0.984	98	2.0	1.78	89
123	1.0	0.929	93	2.0	1.80	90
126	1.0	0.963	96	2.0	1.80	90
155	1.0	1.10	110	2.0	1.18	59
156/157	2.0	2.06	103	4.0	3.40	85
167	1.0	1.02	102	2.0	1.76	88
169	1.0	0.964	96	2.0	1.85	92
188	1.0	1.18	118	2.0	1.08	54
189	1.0	1.02	102	2.0	1.66	83
202	1.0	1.07	107	2.0	1.30	65
205	1.0	1.01	101	2.0	1.57	79
206	1.0	1.03	103	2.0	1.45	72
208	1.0	1.05	105	2.0	1.42	71
209	1.0	1.00	100	2.0	1.31	66

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCSD-50578	Matrix	Water
Filename	P160614A_13	Dilution	5
Total Amount Extracted	1040 mL	Extracted	06/07/2016 11:55
ICAL ID	P160614A02	Analyzed	06/14/2016 20:25
CCal Filename(s)	P160614A_01	Injected By	CVS
Method Blank ID	BLANK-50576		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	0.989	99	2.0	0.972	49
3	1.0	1.01	101	2.0	1.10	55
4	1.0	1.17	117	2.0	0.881	44
15	1.0	0.942	94	2.0	1.11	56
19	1.0	1.16	116	2.0	0.998	50
37	1.0	1.01	101	2.0	1.32	66
54	1.0	1.06	106	2.0	1.09	55
81	1.0	0.926	93	2.0	1.49	74
77	1.0	0.959	96	2.0	1.44	72
104	1.0	1.23	123	2.0	0.785	39
105	1.0	0.912	91	2.0	1.43	71
114	1.0	1.02	102	2.0	1.40	70
118	1.0	0.994	99	2.0	1.42	71
123	1.0	0.972	97	2.0	1.43	71
126	1.0	0.914	91	2.0	1.47	73
155	1.0	1.10	110	2.0	0.924	46
156/157	2.0	2.08	104	4.0	2.73	68
167	1.0	0.969	97	2.0	1.48	74
169	1.0	0.979	98	2.0	1.49	74
188	1.0	1.12	112	2.0	0.896	45
189	1.0	0.960	96	2.0	1.39	69
202	1.0	1.08	108	2.0	1.06	53
205	1.0	0.990	99	2.0	1.31	66
206	1.0	1.04	104	2.0	1.18	59
208	1.0	1.02	102	2.0	1.15	58
209	1.0	0.999	100	2.0	1.09	54

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client ALS Environmental

Spike 1 ID LCS-50577  
Spike 1 Filename P160614A\_12

Spike 2 ID LCSD-50578  
Spike 2 Filename P160614A\_13

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	96	99	3.1
4-MoCB	3	98	101	3.0
2,2'-DiCB	4	113	117	3.5
4,4'-DiCB	15	93	94	1.1
2,2',6-TrCB	19	116	116	0.0
3,4,4'-TrCB	37	100	101	1.0
2,2',6,6'-TeCB	54	110	106	3.7
3,3',4,4'-TeCB	77	96	96	0.0
3,4,4',5-TeCB	81	95	93	2.1
2,2',4,6,6'-PeCB	104	113	123	8.5
2,3,3',4,4'-PeCB	105	97	91	6.4
2,3,4,4',5-PeCB	114	96	102	6.1
2,3',4,4',5-PeCB	118	98	99	1.0
2,3',4,4',5'-PeCB	123	93	97	4.2
3,3',4,4',5-PeCB	126	96	91	5.3
2,2',4,4',6,6'-HxCB	155	110	110	0.0
(156/157)	156/157	103	104	1.0
2,3',4,4',5,5'-HxCB	167	102	97	5.0
3,3',4,4',5,5'-HxCB	169	96	98	2.1
2,2',3,4',5,6,6'-HpCB	188	118	112	5.2
2,3,3',4,4',5,5'-HpCB	189	102	96	6.1
2,2',3,3',5,5',6,6'-OxCB	202	107	108	0.9
2,3,3',4,4',5,5',6-OxCB	205	101	99	2.0
2,2',3,3',4,4',5,5',6-NoCB	206	103	104	1.0
2,2',3,3',4,5,5',6,6'-NoCB	208	105	102	2.9
Decachlorobiphenyl	209	100	100	0.0

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

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55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Composite Sampling City Outfall Basin 19

**To:** File  
**From:** Cindy Ryals, GSI Water Solutions, Inc.  
**Date:** November 4, 2016

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in September 2016. One stormwater composite sample (W16I160-01) was collected in Outfall Basin 19 on September 17, 2016, and submitted for analyses.

The laboratory analyses for these samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- Pace Analytical Services (Pace)
  - Polychlorinated Biphenyls (PCB) Congeners – EPA 1668A

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with these source control program samples.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method and field decontamination blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control and duplicate laboratory control (LC/DLC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for field duplicate and laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## **Analysis Holding Times**

The samples were extracted and analyzed within the acceptable holding times for all analyses.

## **Method Blanks**

Method blanks were analyzed during the subcontracted laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. No analytes were detected in the method blanks processed during any of the analyses.

## **Field Decontamination Blanks**

A field decontamination blank was not collected for this sampling event.

## **Surrogate Recoveries**

Surrogate recoveries were completed during the analyses of PAHs and phthalates. All surrogate recoveries for the field sample and associated QC samples were within control criteria.

## **Internal Standard Recoveries**

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. Labeled internal standard recoveries were within method-specified target ranges for the samples and the associated QC samples, with the following exception:

- The LCSD recovery was below acceptance criteria, and flagged by the laboratory for rejection. The lab narrative notes that the LCSD sample appears to have been partially

spilled. Because the data were automatically corrected for variation in recovery, and the LCSD were rejected, accurate values were obtained. No additional qualification of field sample results was required.

## **Matrix Spike/Matrix Spike Duplicates**

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates. MS recoveries were within acceptance limits, with the following exceptions:

- The matrix spike (B16I325-MS2) recovery for mercury was below acceptable limits. The WPCL notes that the inconsistent results for matrix QC indicate non-homogeneous sample matrix. Sample result is flagged as a low estimate.
- The matrix spike (B16I342-MS1) recovery was low for several analytes during PAH analysis. Results are flagged J- as low estimates. Non-detects of PAHs and phthalates are flagged UJ to indicate that the reported quantitation limit is approximate and may be inaccurate or imprecise.

## **Laboratory Control Sample / Duplicate Laboratory Control Samples**

LC samples were processed during the analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. DLC samples were processed during the analysis of PCB congeners. LC/DLC sample recoveries and RPDs were within laboratory control limits for all analyses, with the following exception:

- The RPD for congeners 19 and 77 in the laboratory spike samples were above the 20% limit used by Pace analytical. This could indicate an increased variability in the results for these congeners. Matrix spikes were not extracted with this sample batch. Results are flagged J as estimates.

## **Laboratory Duplicate**

WPCL processed duplicate samples during the TSS analysis, the total metals analysis, the analysis of mercury, and the analysis of PAHs and phthalates. RPDs were within laboratory acceptance limits for all analytes.

## **Field Duplicate**

A field duplicate was not collected during this sample event.

## **Other**

WPCL reports that the continuing calibration verification was high for several PAH compounds analyzed during the analysis of the field sample. Detected results for these compounds should be considered high estimates (“J+” flag).

WPCL also reports that the continuing calibration verification was low for several PAH compounds analyzed during the analysis of the field sample. Detected results for these compounds should be considered low estimates (“J-” flag). Non-detects of PAHs and phthalates

are flagged UJ to indicate that the reported quantitation limit is approximate and may be inaccurate or imprecise.

WPCL reports elevated reporting limits due to non-target matrix interference for sample results for anthracene, benzo(a)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene. No qualification is required.

No other anomalies were reported in by WPCL or the subcontracted laboratories. A list of additional data qualifications added during validation is provided in Table 1.

**Table 1. Qualifiers Added or Modified During Validation**

City of Portland  
 Outfall 19

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
19_SW3	Mercury	ug/L	0.0808	J-	MSR
19_SW3	1-Methylnaphthalene	ug/L	0.0400	UJ-	CCV
19_SW3	Bis(2-ethylhexyl) phthalate	ug/L	3.2000	J+	CCV
19_SW3	Di-n-octyl phthalate	ug/L	0.5100	J+	CCV
19_SW3	Benzo(a)anthracene	ug/L	0.0220	UJ-	MSR
19_SW3	Benzo(a)pyrene	ug/L	0.0270	J-	MSR
19_SW3	Benzo(b)fluoranthene	ug/L	0.0440	J-	MSR
19_SW3	Chrysene	ug/L	0.0300	J-	MSR
19_SW3	Dibenzo(a,h)anthracene	ug/L	0.0100	UJ-	MSR
19_SW3	Indeno(1,2,3-cd)pyrene	ug/L	0.0200	UJ-	MSR
19_SW3	PCB 19	ug/L	0.0017	J	RPD LCS
19_SW3	PCB 77	ug/L	0.0010	J	RPD LCS

**Notes**

µg/L = micrograms per liter

**Qualifier Definitions**

U = Analyte not detected above method detection limit.

J- = Detection of analyte is considered a low estimate

J+ = Detection of analyte is considered a high estimate

**Reason Code Definitions**

CCV = The continuing calibration verification was outside acceptable limits and the sample results are estimates.

MS = Matrix spike recovery was outside of acceptable limits and result is an estimate.

MSR = Due to low matrix spike recovery, sample results may be low estimates due to matrix interference.

RPD LCS = the RPD in the laboratory control spikes were above the acceptance criteria, indicating increased variability in results. Results are estimates.



City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



October 10, 2016

Linda Scheffler  
Director's Office

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Work Order  
**W161160**

Project  
**Portland Harbor**

Received  
09/19/16 10:41

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W161160</b>	Project Mgr: Linda Scheffler
Received: 9/19/16 10:41	
Submitted By: Field Operations	

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
19_SW3	W161160-01	Stormwater	Composite	09/17/16 06:42	09/17/16 13:37	

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**19\_SW3 : W161160-01**

**General Chemistry**

Total suspended solids	30 mg/L	2	2		B161318	09/20/16	09/20/16	SM 2540D	
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**Total Metals**

Total Metals by ICPMS									
Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Arsenic	2.28 ug/L	0.100	0.100	1	B161408	09/26/16	09/27/16	EPA 200.8	
Cadmium	0.324 ug/L	0.100	0.100	1	B161408	09/26/16	09/27/16	EPA 200.8	
Chromium	3.56 ug/L	0.200	0.200	1	B161408	09/26/16	09/27/16	EPA 200.8	
Copper	52.4 ug/L	0.200	0.200	1	B161408	09/26/16	09/27/16	EPA 200.8	
Lead	27.1 ug/L	0.100	0.100	1	B161408	09/26/16	09/27/16	EPA 200.8	
Mercury	0.0808 ug/L	0.00100	0.00100	1	B161325	09/20/16	09/21/16	WPCLSOP M-10	
Nickel	4.11 ug/L	0.200	0.200	1	B161408	09/26/16	09/27/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B161408	09/26/16	09/27/16	EPA 200.8	
Zinc	250 ug/L	0.500	0.500	1	B161408	09/26/16	09/27/16	EPA 200.8	

Reported: 10/10/16 14:41

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W161160**

**Client: Director's Office**  
**Received: 09/19/16 10:41**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

**Polynuclear Aromatics & Phthalates by GCMS-SIM**

Acenaphthene	ND ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Acenaphthylene	ND ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Anthracene	ND ug/L	0.033	0.033	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	D4
Benzo(a)anthracene	ND ug/L	0.022	0.022	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	D4
Benzo(a)pyrene	0.027 ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.044 ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.047 ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.012 ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Chrysene	0.030 ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Fluoranthene	0.063 ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Fluorene	ND ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	D4
1-Methylnaphthalene	ND ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	V3
2-Methylnaphthalene	ND ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Naphthalene	ND ug/L	0.060	0.060	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	D4
Phenanthrene	0.054 ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Pyrene	0.087 ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Diethyl phthalate	ND ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Di-n-octyl phthalate	0.51 ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	J, V1
Bis(2-ethylhexyl) phthalate	3.2 ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.16 ug/L	0.229	71%	31-164	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Fluoranthene-d10	0.24 ug/L	0.229	105%	65-145	B161342	09/22/16	09/28/16	EPA 8270-SIM	

**19\_SW3 : W161160-01RE1**

**Semivolatile Organics - SIM**

Dimethyl phthalate	12 ug/L	2.0	1.0	2	B161342	09/22/16	09/29/16	EPA 8270-SIM	
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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W161160**

Client: Director's Office  
Received: 09/19/16 10:41

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Total Suspended Solids - Batch B161318										
<b>Blank (B161318-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					09/20/16 :09/20/16	
<b>LCS (B161318-BS1)</b>										
Total suspended solids	96	mg/L			100		96% (90-110)		09/20/16 :09/20/16	
<b>Duplicate (B161318-DUP1) Source: W161165-02</b>										
Total suspended solids	89	mg/L	2	2		75		17 (20)	09/20/16 :09/20/16	
<b>Duplicate (B161318-DUP2) Source: W161160-01</b>										
Total suspended solids	32	mg/L	2	2		30		6 (20)	09/20/16 :09/20/16	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Total Metals by ICPMS - Batch B161325										
<b>Blank (B161325-BLK1)</b>										
Mercury	ND	ug/L	0.000900	0.000900					09/20/16 :09/21/16	
<b>LCS (B161325-BS1)</b>										
Mercury	0.00995	ug/L	0.000900	0.000900	0.0100		99% (85-125)		09/20/16 :09/21/16	
<b>Duplicate (B161325-DUP1) Source: W161149-01</b>										
Mercury	0.00386	ug/L	0.00100	0.00100		0.00377		2 (20)	09/20/16 :09/21/16	
<b>Duplicate (B161325-DUP2) Source: W161153-01</b>										
Mercury	0.0292	ug/L	0.00100	0.00100		0.0245		18 (20)	09/20/16 :09/21/16	
<b>Matrix Spike (B161325-MS1) Source: W161149-01</b>										
Mercury	0.0272	ug/L	0.00100	0.00100	0.0278	0.00377	84% (70-130)		09/20/16 :09/21/16	
<b>Matrix Spike (B161325-MS2) Source: W161153-01</b>										
Mercury	0.0743	ug/L	0.00100	0.00100	0.111	0.0245	45% (70-130)		09/20/16 :09/21/16	M3

Total Metals by ICPMS - Batch B161408

<b>Blank (B161408-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					09/26/16 :09/27/16	
Cadmium	ND	ug/L	0.100	0.100					09/26/16 :09/27/16	
Chromium	ND	ug/L	0.200	0.200					09/26/16 :09/27/16	
Copper	ND	ug/L	0.200	0.200					09/26/16 :09/27/16	

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**Project: Portland Harbor**  
**Work Order: W161160**

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**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B161408**

**Blank (B161408-BLK1)**

Lead	ND	ug/L	0.100	0.100					09/26/16 :09/27/16	
Nickel	ND	ug/L	0.200	0.200					09/26/16 :09/27/16	
Silver	ND	ug/L	0.100	0.100					09/26/16 :09/27/16	
Zinc	ND	ug/L	0.500	0.500					09/26/16 :09/27/16	

**LCS (B161408-BS1)**

Arsenic	5.09	ug/L	0.100	0.100	5.00		102% (85-115)		09/26/16 :09/27/16	
Cadmium	4.94	ug/L	0.100	0.100	5.00		99% (85-115)		09/26/16 :09/27/16	
Chromium	4.94	ug/L	0.200	0.200	5.00		99% (85-115)		09/26/16 :09/27/16	
Copper	5.22	ug/L	0.200	0.200	5.00		104% (85-115)		09/26/16 :09/27/16	
Lead	4.85	ug/L	0.100	0.100	5.00		97% (85-115)		09/26/16 :09/27/16	
Nickel	5.10	ug/L	0.200	0.200	5.00		102% (85-115)		09/26/16 :09/27/16	
Silver	4.99	ug/L	0.100	0.100	5.00		100% (85-115)		09/26/16 :09/27/16	
Zinc	25.5	ug/L	0.500	0.500	25.0		102% (85-115)		09/26/16 :09/27/16	

**Duplicate (B161408-DUP1)**

**Source: W161171-01**

Arsenic	0.426	ug/L	0.100	0.100		0.422		0.9 (20)	09/26/16 :09/27/16	
Cadmium	0.111	ug/L	0.100	0.100		0.110		0.7 (20)	09/26/16 :09/27/16	
Chromium	0.351	ug/L	0.200	0.200		0.342		3 (20)	09/26/16 :09/27/16	
Copper	12.3	ug/L	0.200	0.200		12.2		1 (20)	09/26/16 :09/27/16	
Lead	0.166	ug/L	0.100	0.100		0.172		3 (20)	09/26/16 :09/27/16	
Nickel	0.911	ug/L	0.200	0.200		0.908		0.4 (20)	09/26/16 :09/27/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	09/26/16 :09/27/16	
Zinc	156	ug/L	0.500	0.500		154		2 (20)	09/26/16 :09/27/16	

**Matrix Spike (B161408-MS1)**

**Source: W161171-01**

Arsenic	10.3	ug/L	0.100	0.100	10.0	0.422	99% (70-130)		09/26/16 :09/27/16	
Cadmium	9.91	ug/L	0.100	0.100	10.0	0.110	98% (70-130)		09/26/16 :09/27/16	
Chromium	9.96	ug/L	0.200	0.200	10.0	0.342	96% (70-130)		09/26/16 :09/27/16	
Copper	22.6	ug/L	0.200	0.200	10.0	12.2	104% (70-130)		09/26/16 :09/27/16	
Lead	9.87	ug/L	0.100	0.100	10.0	0.172	97% (70-130)		09/26/16 :09/27/16	
Nickel	11.2	ug/L	0.200	0.200	10.0	0.908	103% (70-130)		09/26/16 :09/27/16	
Silver	9.72	ug/L	0.100	0.100	10.0	ND	97% (70-130)		09/26/16 :09/27/16	
Zinc	204	ug/L	0.500	0.500	50.0	154	100% (70-130)		09/26/16 :09/27/16	

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**Project: Portland Harbor**  
**Work Order: W161160**

**Client: Director's Office**  
**Received: 09/19/16 10:41**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16I342**

**Blank (B16I342-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					09/22/16 :09/28/16	
Acenaphthylene	ND	ug/L	0.020	0.020					09/22/16 :09/28/16	
Anthracene	ND	ug/L	0.020	0.020					09/22/16 :09/28/16	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Chrysene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Fluoranthene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Fluorene	ND	ug/L	0.020	0.020					09/22/16 :09/28/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					09/22/16 :09/28/16	V3
2-Methylnaphthalene	ND	ug/L	0.040	0.040					09/22/16 :09/28/16	
Naphthalene	ND	ug/L	0.040	0.040					09/22/16 :09/28/16	
Phenanthrene	ND	ug/L	0.020	0.020					09/22/16 :09/28/16	
Pyrene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					09/22/16 :09/28/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					09/22/16 :09/28/16	
Diethyl phthalate	ND	ug/L	1.0	0.50					09/22/16 :09/28/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					09/22/16 :09/28/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					09/22/16 :09/28/16	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					09/22/16 :09/28/16	

**Surrogate**

2-Methylnaphthalene-d10	0.15	ug/L			0.229		67% (31-164)		09/22/16 :09/28/16	
Fluoranthene-d10	0.23	ug/L			0.229		99% (65-145)		09/22/16 :09/28/16	

**LCS (B16I342-BS1)**

Acenaphthene	0.231	ug/L	0.020	0.020	0.229		101% (67-125)		09/22/16 :09/28/16	
Acenaphthylene	0.261	ug/L	0.020	0.020	0.229		114% (64-138)		09/22/16 :09/28/16	
Anthracene	0.258	ug/L	0.020	0.020	0.229		113% (65-143)		09/22/16 :09/28/16	
Benzo(a)anthracene	0.237	ug/L	0.010	0.010	0.229		104% (80-130)		09/22/16 :09/28/16	
Benzo(a)pyrene	0.246	ug/L	0.010	0.010	0.229		108% (74-131)		09/22/16 :09/28/16	
Benzo(b)fluoranthene	0.226	ug/L	0.010	0.010	0.229		99% (67-128)		09/22/16 :09/28/16	
Benzo(g,h,i)perylene	0.223	ug/L	0.010	0.010	0.229		97% (57-137)		09/22/16 :09/28/16	
Benzo(k)fluoranthene	0.237	ug/L	0.010	0.010	0.229		104% (63-140)		09/22/16 :09/28/16	
Chrysene	0.247	ug/L	0.010	0.010	0.229		108% (80-134)		09/22/16 :09/28/16	
Dibenzo(a,h)anthracene	0.238	ug/L	0.010	0.010	0.229		104% (56-138)		09/22/16 :09/28/16	
Fluoranthene	0.253	ug/L	0.010	0.010	0.229		110% (70-150)		09/22/16 :09/28/16	
Fluorene	0.245	ug/L	0.020	0.020	0.229		107% (64-130)		09/22/16 :09/28/16	

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**Project: Portland Harbor**  
**Work Order: W161160**

**Client: Director's Office**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16I342**

**LCS (B16I342-BS1)**

Indeno(1,2,3-cd)pyrene	0.242	ug/L	0.010	0.010	0.229		106% (58-138)		09/22/16 :09/28/16	
Naphthalene	0.217	ug/L	0.040	0.040	0.229		95% (53-134)		09/22/16 :09/28/16	
Phenanthrene	0.232	ug/L	0.020	0.020	0.229		102% (73-132)		09/22/16 :09/28/16	
Pyrene	0.252	ug/L	0.010	0.010	0.229		110% (69-153)		09/22/16 :09/28/16	
Butyl benzyl phthalate	2.97	ug/L	1.0	0.50	2.29		130% (55-181)		09/22/16 :09/28/16	V1
Di-n-butyl phthalate	2.84	ug/L	1.0	0.50	2.29		124% (61-183)		09/22/16 :09/28/16	
Diethyl phthalate	2.96	ug/L	1.0	0.50	2.29		129% (65-177)		09/22/16 :09/28/16	
Dimethyl phthalate	2.81	ug/L	1.0	0.50	2.29		123% (77-151)		09/22/16 :09/28/16	
Di-n-octyl phthalate	3.01	ug/L	1.0	0.50	2.29		132% (12-185)		09/22/16 :09/28/16	V1
Bis(2-ethylhexyl) phthalate	2.76	ug/L	1.0	0.50	2.29		121% (39-170)		09/22/16 :09/28/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.16	ug/L			0.229		70% (31-164)		09/22/16 :09/28/16	
Fluoranthene-d10	0.24	ug/L			0.229		105% (65-145)		09/22/16 :09/28/16	

**Matrix Spike (B16I342-MS1)**

**Source: W16I149-01**

Acenaphthene	0.519	ug/L	0.020	0.020	0.457	ND	114% (67-125)		09/22/16 :09/28/16	
Acenaphthylene	0.557	ug/L	0.020	0.020	0.457	ND	122% (64-138)		09/22/16 :09/28/16	
Anthracene	0.517	ug/L	0.020	0.020	0.457	ND	113% (65-143)		09/22/16 :09/28/16	
Benzo(a)anthracene	0.470	ug/L	0.010	0.010	0.457	ND	103% (80-130)		09/22/16 :09/28/16	
Benzo(a)pyrene	0.419	ug/L	0.010	0.010	0.457	ND	92% (74-131)		09/22/16 :09/28/16	
Benzo(b)fluoranthene	0.401	ug/L	0.010	0.010	0.457	ND	88% (67-128)		09/22/16 :09/28/16	
Benzo(g,h,i)perylene	0.354	ug/L	0.010	0.010	0.457	0.0143	74% (57-137)		09/22/16 :09/28/16	
Benzo(k)fluoranthene	0.387	ug/L	0.010	0.010	0.457	ND	85% (63-140)		09/22/16 :09/28/16	
Chrysene	0.480	ug/L	0.010	0.010	0.457	ND	105% (80-134)		09/22/16 :09/28/16	
Dibenzo(a,h)anthracene	0.352	ug/L	0.010	0.010	0.457	ND	77% (56-138)		09/22/16 :09/28/16	
Fluoranthene	0.521	ug/L	0.010	0.010	0.457	0.0309	107% (70-150)		09/22/16 :09/28/16	
Fluorene	0.511	ug/L	0.020	0.020	0.457	ND	112% (64-130)		09/22/16 :09/28/16	
Indeno(1,2,3-cd)pyrene	0.360	ug/L	0.010	0.010	0.457	ND	79% (58-138)		09/22/16 :09/28/16	
Naphthalene	0.450	ug/L	0.040	0.040	0.457	ND	98% (53-134)		09/22/16 :09/28/16	
Phenanthrene	0.522	ug/L	0.020	0.020	0.457	0.0583	101% (73-132)		09/22/16 :09/28/16	
Pyrene	0.530	ug/L	0.010	0.010	0.457	0.0389	107% (69-153)		09/22/16 :09/28/16	
Butyl benzyl phthalate	6.16	ug/L	1.0	0.50	4.57	ND	135% (55-181)		09/22/16 :09/28/16	V1
Di-n-butyl phthalate	5.71	ug/L	1.0	0.50	4.57	ND	125% (61-183)		09/22/16 :09/28/16	
Diethyl phthalate	5.70	ug/L	1.0	0.50	4.57	ND	125% (65-177)		09/22/16 :09/28/16	
Dimethyl phthalate	5.95	ug/L	1.0	0.50	4.57	ND	130% (77-151)		09/22/16 :09/28/16	
Di-n-octyl phthalate	3.73	ug/L	1.0	0.50	4.57	ND	82% (12-185)		09/22/16 :09/28/16	V1
Bis(2-ethylhexyl) phthalate	4.19	ug/L	1.0	0.50	4.57	1.25	64% (39-170)		09/22/16 :09/28/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.17	ug/L			0.229		76% (31-164)		09/22/16 :09/28/16	
Fluoranthene-d10	0.25	ug/L			0.229		109% (65-145)		09/22/16 :09/28/16	

**Matrix Spike Dup (B16I342-MSD1)**

**Source: W16I149-01**

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W161160**

**Client: Director's Office**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B161342**

**Matrix Spike Dup (B161342-MSD1)**

**Source: W161149-01**

Acenaphthene	0.450	ug/L	0.020	0.020	0.457	ND	98% (67-125)	14 (30)	09/22/16 :09/28/16	
Acenaphthylene	0.503	ug/L	0.020	0.020	0.457	ND	110% (64-138)	10 (30)	09/22/16 :09/28/16	
Anthracene	0.456	ug/L	0.020	0.020	0.457	ND	100% (65-143)	13 (30)	09/22/16 :09/28/16	
Benzo(a)anthracene	0.347	ug/L	0.010	0.010	0.457	ND	76% (80-130)	30 (30)	09/22/16 :09/28/16	M6
Benzo(a)pyrene	0.289	ug/L	0.010	0.010	0.457	ND	63% (74-131)	37 (30)	09/22/16 :09/28/16	M6
Benzo(b)fluoranthene	0.273	ug/L	0.010	0.010	0.457	ND	60% (67-128)	38 (30)	09/22/16 :09/28/16	M6
Benzo(g,h,i)perylene	0.227	ug/L	0.010	0.010	0.457	0.0143	47% (57-137)	44 (30)	09/22/16 :09/28/16	M6
Benzo(k)fluoranthene	0.253	ug/L	0.010	0.010	0.457	ND	55% (63-140)	42 (30)	09/22/16 :09/28/16	M6
Chrysene	0.351	ug/L	0.010	0.010	0.457	ND	77% (80-134)	31 (30)	09/22/16 :09/28/16	M6
Dibenzo(a,h)anthracene	0.227	ug/L	0.010	0.010	0.457	ND	50% (56-138)	43 (30)	09/22/16 :09/28/16	M6
Fluoranthene	0.407	ug/L	0.010	0.010	0.457	0.0309	82% (70-150)	25 (30)	09/22/16 :09/28/16	
Fluorene	0.469	ug/L	0.020	0.020	0.457	ND	103% (64-130)	9 (30)	09/22/16 :09/28/16	
Indeno(1,2,3-cd)pyrene	0.229	ug/L	0.010	0.010	0.457	ND	50% (58-138)	45 (30)	09/22/16 :09/28/16	M6
Naphthalene	0.423	ug/L	0.040	0.040	0.457	ND	93% (53-134)	6 (30)	09/22/16 :09/28/16	
Phenanthrene	0.465	ug/L	0.020	0.020	0.457	0.0583	89% (73-132)	11 (30)	09/22/16 :09/28/16	
Pyrene	0.410	ug/L	0.010	0.010	0.457	0.0389	81% (69-153)	26 (30)	09/22/16 :09/28/16	
Butyl benzyl phthalate	4.56	ug/L	1.0	0.50	4.57	ND	100% (55-181)	30 (30)	09/22/16 :09/28/16	V1
Di-n-butyl phthalate	4.49	ug/L	1.0	0.50	4.57	ND	98% (61-183)	24 (30)	09/22/16 :09/28/16	
Diethyl phthalate	5.26	ug/L	1.0	0.50	4.57	ND	115% (65-177)	8 (30)	09/22/16 :09/28/16	
Dimethyl phthalate	5.48	ug/L	1.0	0.50	4.57	ND	120% (77-151)	8 (30)	09/22/16 :09/28/16	
Di-n-octyl phthalate	2.76	ug/L	1.0	0.50	4.57	ND	60% (12-185)	30 (30)	09/22/16 :09/28/16	V1
Bis(2-ethylhexyl) phthalate	3.26	ug/L	1.0	0.50	4.57	1.25	44% (39-170)	25 (30)	09/22/16 :09/28/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.16	ug/L			0.229		72% (31-164)		09/22/16 :09/28/16	
Fluoranthene-d10	0.19	ug/L			0.229		85% (65-145)		09/22/16 :09/28/16	

Reported: 10/10/16 14:41

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W161160**

**Client: Director's Office**  
**Received: 09/19/16 10:41**

**Qualifiers**

- D4 Reporting limit is raised for this analyte due to non-target matrix interference.
- J Analyte was detected but at a concentration below the reporting limit; the result is an estimate.
- M3 Inconsistent results for matrix QC (duplicates and/or matrix spikes) indicate non-homogeneous sample matrix. Sample results should be considered estimates.
- M6 Based on low matrix spike recovery, sample results may be low estimates due to matrix interference.
- V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.
- V3 Continuing calibration verification was low; sample results for this analyte may be low estimates.

**Definitions**

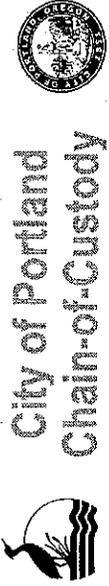
DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 10/10/16 14:41

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

Jennifer Shackelford, Laboratory Coordinator QA/QC

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5686  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody

Bureau of Environmental Services

Date: 9/19/16

Work Order #: W162160

Collected By: M35, JXL, ASA, KEB, ECP

Client Name: Directors Office  
 Matrix: Stormwater  
 Project Name: Portland Harbor

Requested Analyses

Lab Number	2016 Stormwater Outfall Monitoring Composite Sample COC		Sample Type	Composite End Date/Time	Composite Start Date/Time	TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs + phthalates (low-level)	# of Containers	Remarks
	Location ID	Location ID										
19_SW3	19_SW3	9/17/16 0642	C	9/17/16 1337		●	●	●	●	●	4	SW-19-AAP918 (OF19) 4900 NW Kirtledge Ave, DS of MH
4-35	4-35		C			●	●	●	●	●		Field Duplicate

Relinquished By: Signature: *[Signature]* Date: 9/19/16  
 Printed Name: Nicholas Semms 1041  
 Received By: Signature: *[Signature]* Date: 9/19/16  
 Printed Name: Nicholas Semms 1041

S:\EID\Director's Office\Portland Harbor\Sampling\2016 Stormwater Outfall Monitoring\Portland Harbor 2016 Stormwater Outfall Monitoring Composite COC\Page-16 of

### WPCL Cooler Receipt Form

Work Order Number: W16T160

Cooler Receipt Form Filled Out By: M

Project: Portland Harbor

Sample transport: Samples received on ice

Courier \_\_\_\_\_

Directly from field \_\_\_\_\_

Temperature (°C) 8

	Yes	No	NA
Is the COC present and signed?	✓		
Are sample bottles intact?	✓		
Do the COC and sample labels match?	✓		
Are the appropriate containers used?	✓		
Are samples appropriately preserved?	✓		
Do VOA vials have Headspace?			✓
Are samples received within holding times?	✓		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	1601146	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
9-19-16	1150	M	W16T160-01	D	1	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

October 10, 2016

**Analytical Report for Service Request No: K1611164**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W161160**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory September 20, 2016  
For your reference, these analyses have been assigned our service request number **K1611164**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

## Table of Contents

Acronyms

Qualifiers

State Certifications, Accreditations, And Licenses

Chain of Custody

Subcontract Lab Results

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

**SUBCONTRACT ORDER**  
**City of Portland Water Pollution Control Lab**  
**W161160**

*K116111164*

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

ALS Environmental  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

**WPCL Project Name**

**Portland Harbor**

**TURNAROUND REQUEST**

- Standard  
 Rush \_ day(s)

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W161160-01</b>	<b>Water</b>	<b>Sampled:09/17/16 13:37</b>		
Out-PCB Congeners 209	10/03/16 17:00	03/16/17 13:37		
<i>Containers Supplied:</i>				
G amber 1L (A)				

*ALS called 9-19-16 1340*

<i>[Signature]</i>	<i>12:40</i>	<i>12:40</i>	<i>[Signature]</i>	<i>ALS</i>	<i>9-20-16</i>	<i>12:40</i>
Released By	Date		Received By		Date	
			<i>[Signature]</i>		<i>9/20/16</i>	<i>1415</i>
Released By	Date		Received By		Date	



### Cooler Receipt and Preservation Form

Client city of Portland, WPCL Service Request K16 11164  
 Received: 9/20/16 Opened: 9/20/16 By: CG Unloaded: 9/20/16 By: CG

- Samples were received via?  USPS  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- Samples were received in: (circle)  Cooler  Box  Envelope  Other \_\_\_\_\_ NA
- Were custody seals on coolers? NA Y  N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
6.1	6.0			-0.1	323	NA		NA

- Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves \_\_\_\_\_
- Were custody papers properly filled out (ink, signed, etc.)? NA  Y N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA  Y N  
 If applicable, tissue samples were received:  Frozen  Partially Thawed  Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA  Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below*  NA Y N
- Were VOA vials received without headspace? *Indicate in the table below.*  NA Y N
- Was C12/Res negative? CG 9/20  NA  Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Report Prepared for:**

Howard Holmes  
ALS Environmental  
1317 S. 13th Avenue  
Kelso WA 98626

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Prepared Date:**

October 6, 2016

**Report Information:**

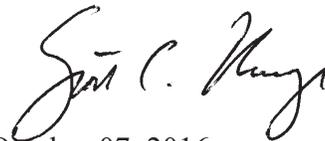
**Pace Project #: 10363363**  
**Sample Receipt Date: 09/22/2016**  
**Client Project #: K1611164**  
**Client Sub PO #: 51K1611164**  
**State Cert #: C755**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



October 07, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.



## **DISCUSSION**

This report presents the results from the analyses performed on one sample submitted by a representative of ALS Environmental. The sample was analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the amount of sample extracted.

The isotopically-labeled PCB internal standards in the sample extract were recovered at 48-109%. With the exception of the LCSD, which appears to have been partially spilled, the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1668A. All of the internal standard recoveries in the water LCSD were flagged "R" to indicate that they were outside the target range for this method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the sample material.

Laboratory spike samples were also prepared with the sample batch using reference material that had been fortified with native standards. The results show that the spiked native compounds were recovered at 84-119%, with relative percent differences of 0.0-22.7%. The relative percent differences for congeners 19 and 77 in the water spikes were above the 20% limit used by Pace analytical. This could indicate an increased variability in the results for these congeners. These values were within method limits. Matrix spikes were not extracted with this sample batch. If requested within 15 days of the date of this report, and if additional sample material is available, the sample can be re-tested to verify these results.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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# Appendix A

## Sample Management

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • T-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

Project Number: K1611164  
 Project Manager: Howard Holmes  
 QAP: LAB QAP

10363363

209651

Lab Code	Sample ID	# of Cont.	Matrix	Sample		Lab ID	CL Biphen Cong 1668A
				Date	Time		
K1611164-001	W161160-01	1	Water	9/17/16	1337	Pace MIN	X

**Folder Comments:**

Tier II

*City of Portland EDD*

*PH*

Special Instructions/Comments Please provide the electronic (PDF and EDD) report to the following e-mail address: ALKLS.Data@alsglobal.com.  <i>Report &amp; EDD to CofP</i> <i>Report, EDD &amp; Invoice to ALS-Kelso</i> <i>Howard Holmes</i>	Turnaround Requirements RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD	Report Requirements I. Results Only II. Results + QC Summaries III. Results + QC and Calibration Summaries IV. Data Validation Report with Raw Data PQL/MDL/J Y EDD Y	Invoice Information PO# 51K1611164
	Requested FAX Date: _____ Requested Report Date: 09/30/16	Received By: <i>Sham Yum Pace</i> 9/20/16 1000 Airbill Number: <i>TEMP: 0.8</i>	

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Keisno, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

Project Number: K1611164  
Project Manager: Howard Holmes  
QAP: LAB QAP

K1611164

Ship To: Pace MN  
Pace Analytical Services  
1700 Elm Street  
Suite 200  
Minneapolis, MN 55414

PC  
SMO

Date  
Date

*[Signature]* 9/21/2016  
*[Signature]* 9/21/16

### Instructions:

Ice   
Dry Ice   
No Ice

Bill to Client Account

### Shipping:

Overnight   
2nd Day   
Ground

Comments:



**ALS Environmental**

# PURCHASE ORDER

FOR SUBCONTRACTED ANALYSES

Service Request: K1611164

**Date:** 9/20/2016  
**Contact:** Howard Holmes  
**Email:** howard.holmes@alsglobal.com

**Company:** Pace Analytical Services  
**Address:** 1700 Elm Street, Suite 200  
Minneapolis MN, 55414  
**Phone:** 612.607.1700

**Bill To:** ALS Environmental  
1317 South 13th Avenue  
Kelso WA, 98626

**Ship To:** ALS Environmental  
ALKLS.Data@alsglobal.com

**Phone:** 1-360-577-7222

**Phone:** 360-501-3364

Item/Description	Quantity	Unit Price
1668A/CI Biphen Cong	1	<i>Adverse</i>

Comments:

ALS Group USA, Corp.  
www.alsglobal.com  
An ALS Limited Company

**Sample Condition Upon Receipt**

Client Name: ALS Environmental

Project #: **WO# : 10363363**

Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  Speedee  Other: \_\_\_\_\_  
 Tracking Number: 6447 9279 5391



Custody Seal on Cooler/Box Present?  Yes  No      Seals Intact?  Yes  No      **Optional:** Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_  
 Packing Material:  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_      Temp Blank?  Yes  No  
 Thermometer Used:  151401163  B88A912167504  151401164  B88A0143310098      Type of Ice:  Wet  Blue  None  Samples on ice, cooling process has begun  
 Cooler Temp Read (°C): 1.0      Cooler Temp Corrected (°C): 0.8      Biological Tissue Frozen?  Yes  No  N/A  
 Temp should be above freezing to 5°C      Correction Factor: -0.2      Date and Initials of Person Examining Contents: 9/22/16 SG

USDA Regulated Soil (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes  No  
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
**If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.**

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
(HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH >12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**

Field Data Required?  Yes  No

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Comments/Resolution: \_\_\_\_\_

Project Manager Review: Scott Unze Date: 09/22/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

## REPORT OF LABORATORY ANALYSIS

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# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1611164-001		
Lab Sample ID	10363363001		
Filename	P160930A_13		
Injected By	CVS		
Total Amount Extracted	938 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	09/17/2016 13:37
ICAL ID	P160930A02	Received	09/22/2016 10:00
CCal Filename(s)	P160930A_01	Extracted	09/27/2016 14:20
Method Blank ID	BLANK-52124	Analyzed	09/30/2016 23:07

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.884	2.82	2.0	1.16	58
13C-4-MoCB	3	11.520	2.76	2.0	1.26	63
13C-2,2'-DiCB	4	11.772	1.55	2.0	0.966	48
13C-4,4'-DiCB	15	18.598	1.57	2.0	1.48	74
13C-2,2',6-TrCB	19	15.388	1.04	2.0	1.10	55
13C-3,4,4'-TrCB	37	26.213	1.06	2.0	1.90	95
13C-2,2',6,6'-TeCB	54	18.853	0.81	2.0	1.21	61
13C-3,4,4',5'-TeCB	81	33.243	0.77	2.0	2.16	108
13C-3,3',4,4'-TeCB	77	33.847	0.78	2.0	2.19	109
13C-2,2',4,6,6'-PeCB	104	24.821	1.69	2.0	1.21	61
13C-2,3,3',4,4'-PeCB	105	37.389	1.61	2.0	1.94	97
13C-2,3,4,4',5'-PeCB	114	36.736	1.62	2.0	1.97	99
13C-2,3',4,4',5'-PeCB	118	36.182	1.54	2.0	2.03	102
13C-2,3',4,4',5'-PeCB	123	35.847	1.57	2.0	2.03	101
13C-3,3',4,4',5'-PeCB	126	40.575	1.63	2.0	1.96	98
13C-2,2',4,4',6,6'-HxCB	155	30.762	1.30	2.0	1.40	70
13C-HxCB (156/157)	156/157	43.598	1.29	4.0	3.45	86
13C-2,3',4,4',5,5'-HxCB	167	42.425	1.26	2.0	1.76	88
13C-3,3',4,4',5,5'-HxCB	169	46.918	1.30	2.0	1.58	79
13C-2,2',3,4',5,6,6'-HpCB	188	36.635	1.02	2.0	1.75	88
13C-2,3,3',4,4',5,5'-HpCB	189	49.417	1.00	2.0	1.72	86
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.106	0.89	2.0	1.94	97
13C-2,3,3',4,4',5,5',6-OxCB	205	52.003	0.86	2.0	1.66	83
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.727	0.78	2.0	1.44	72
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	48.878	0.74	2.0	1.56	78
13C--DeCB	209	55.300	0.71	2.0	1.71	86
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.887	1.03	2.0	1.94	97
13C-2,3,3',5,5'-PeCB	111	33.813	1.56	2.0	1.76	88
13C-2,2',3,3',5,5',6-HpCB	178	39.770	1.01	2.0	1.73	86
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.094	1.59	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.832	0.83	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.030	1.54	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.351	1.23	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.507	0.91	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1611164-001  
Lab Sample ID 10363363001  
Filename P160930A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.267
2		---	---	ND	---	0.267
3		---	---	ND	---	0.267
4		11.796	1.60	2.18	---	0.267
5		---	---	ND	---	0.267
6		14.585	1.79	0.376	---	0.267
7		---	---	ND	---	0.267
8		15.088	1.78	2.00	---	0.267
9		---	---	ND	---	0.267
10		---	---	ND	---	0.267
11		---	---	ND	---	2.61
12	12/13	---	---	ND	---	0.533
13	12/13	---	---	ND	---	0.533
14		---	---	ND	---	0.267
15		18.622	1.55	2.79	---	0.352
16		18.490	1.00	5.82	---	0.267
17		17.987	1.06	5.81	---	0.267
18	18/30	17.520	1.02	12.2	---	0.533
19		15.412	1.07	1.69	---	0.267
20	20/28	21.921	1.04	16.6	---	1.38
21	21/33	22.156	1.04	8.24	---	1.44
22		22.591	1.01	5.76	---	1.01
23		---	---	ND	---	0.267
24		---	---	ND	---	0.267
25		21.233	1.01	1.19	---	0.267
26	26/29	20.982	1.06	2.91	---	0.533
27		18.215	1.08	0.896	---	0.267
28	20/28	21.921	1.04	(16.6)	---	1.38
29	26/29	20.982	1.06	(2.91)	---	0.533
30	18/30	17.520	1.02	(12.2)	---	0.533
31		21.586	1.04	14.4	---	1.39
32		19.087	1.06	3.92	---	0.267
33	21/33	22.156	1.04	(8.24)	---	1.44
34		---	---	ND	---	0.267
35		---	---	ND	---	0.267
36		---	---	ND	---	0.267
37		26.230	1.03	4.76	---	0.565
38		---	---	ND	---	0.267
39		---	---	ND	---	0.267
40	40/41/71	25.995	0.76	7.51	---	1.60
41	40/41/71	25.995	0.76	(7.51)	---	1.60
42		25.475	0.80	3.77	---	0.533
43	43/73	---	---	ND	---	0.533
44	44/47/65	24.889	0.78	13.0	---	1.60
45	45/51	21.971	0.79	2.86	---	1.07
46		22.306	0.79	0.968	---	0.533
47	44/47/65	24.889	0.78	(13.0)	---	1.60
48		24.670	0.79	3.13	---	0.533

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
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RT = Retention Time  
I = Interference  
ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1611164-001  
Lab Sample ID 10363363001  
Filename P160930A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	24.369	0.77	7.22	---	1.07
50	50/53	21.233	0.75	1.92	---	1.07
51	45/51	21.971	0.79	(2.86)	---	1.07
52		23.849	0.78	14.7	---	1.64
53	50/53	21.233	0.75	(1.92)	---	1.07
54		---	---	ND	---	0.533
55		---	---	ND	---	0.533
56		29.974	0.77	4.59	---	0.533
57		---	---	ND	---	0.533
58		---	---	ND	---	0.533
59	59/62/75	---	---	ND	---	1.60
60		30.209	0.78	2.70	---	0.533
61	61/70/74/76	28.918	0.76	17.7	---	2.13
62	59/62/75	---	---	ND	---	1.60
63		---	---	ND	---	0.533
64		26.247	0.78	5.64	---	0.533
65	44/47/65	24.889	0.78	(13.0)	---	1.60
66		29.270	0.80	8.49	---	0.896
67		---	---	ND	---	0.533
68		---	---	ND	---	0.533
69	49/69	24.369	0.77	(7.22)	---	1.07
70	61/70/74/76	28.918	0.76	(17.7)	---	2.13
71	40/41/71	25.995	0.76	(7.51)	---	1.60
72		---	---	ND	---	0.533
73	43/73	---	---	ND	---	0.533
74	61/70/74/76	28.918	0.76	(17.7)	---	2.13
75	59/62/75	---	---	ND	---	1.60
76	61/70/74/76	28.918	0.76	(17.7)	---	2.13
77		33.863	0.84	0.952	---	0.533
78		---	---	ND	---	0.533
79		---	---	ND	---	0.533
80		---	---	ND	---	0.533
81		---	---	ND	---	0.533
82		33.428	1.58	1.41	---	0.533
83		31.533	1.52	0.601	---	0.533
84		29.119	1.57	3.04	---	0.533
85	85/116/117	32.942	1.54	1.97	---	1.60
86	86/87/97/108/119/125	32.287	1.60	7.51	---	3.20
87	86/87/97/108/119/125	32.287	1.60	(7.51)	---	3.20
88	88/91	28.884	1.50	1.47	---	1.07
89		---	---	ND	---	0.533
90	90/101/113	31.047	1.60	9.56	---	1.60
91	88/91	28.884	1.50	(1.47)	---	1.07
92		30.443	1.58	1.57	---	0.533
93	93/98/100/102	---	---	ND	---	2.13
94		---	---	ND	---	0.533
95		27.979	1.61	7.44	---	1.01
96		---	---	ND	---	0.533

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
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ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1611164-001  
Lab Sample ID 10363363001  
Filename P160930A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	32.287	1.60	(7.51)	---	3.20
98	93/98/100/102	---	---	ND	---	2.13
99		31.667	1.63	4.46	---	0.533
100	93/98/100/102	---	---	ND	---	2.13
101	90/101/113	31.047	1.60	(9.56)	---	1.60
102	93/98/100/102	---	---	ND	---	2.13
103		---	---	ND	---	0.533
104		---	---	ND	---	0.533
105		37.423	1.56	4.71	---	0.533
106		---	---	ND	---	0.533
107	107/124	---	---	ND	---	1.07
108	86/87/97/108/119/125	32.287	1.60	(7.51)	---	3.20
109		---	---	ND	---	0.533
110	110/115	33.109	1.56	12.1	---	1.07
111		---	---	ND	---	0.533
112		---	---	ND	---	0.533
113	90/101/113	31.047	1.60	(9.56)	---	1.60
114		---	---	ND	---	0.533
115	110/115	33.109	1.56	(12.1)	---	1.07
116	85/116/117	32.942	1.54	(1.97)	---	1.60
117	85/116/117	32.942	1.54	(1.97)	---	1.60
118		36.199	1.58	9.93	---	0.683
119	86/87/97/108/119/125	32.287	1.60	(7.51)	---	3.20
120		---	---	ND	---	0.533
121		---	---	ND	---	0.533
122		---	---	ND	---	0.533
123		---	---	ND	---	0.533
124	107/124	---	---	ND	---	1.07
125	86/87/97/108/119/125	32.287	1.60	(7.51)	---	3.20
126		---	---	ND	---	0.533
127		---	---	ND	---	0.533
128	128/166	40.659	1.25	1.43	---	1.07
129	129/138/163	39.368	1.25	8.83	---	1.60
130		---	---	ND	---	0.533
131		---	---	ND	---	0.533
132		36.283	1.20	3.02	---	0.533
133		---	---	ND	---	0.533
134	134/143	---	---	ND	---	1.07
135	135/151	34.031	1.27	1.83	---	1.07
136		31.550	1.31	0.802	---	0.533
137		---	---	ND	---	0.533
138	129/138/163	39.368	1.25	(8.83)	---	1.60
139	139/140	---	---	ND	---	1.07
140	139/140	---	---	ND	---	1.07
141		38.278	1.25	1.18	---	0.533
142		---	---	ND	---	0.533
143	134/143	---	---	ND	---	1.07
144		---	---	ND	---	0.533

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1611164-001  
Lab Sample ID 10363363001  
Filename P160930A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.533
146		37.457	1.32	0.862	---	0.533
147	147/149	34.975	1.25	5.34	---	1.07
148		---	---	ND	---	0.533
149	147/149	34.975	1.25	(5.34)	---	1.07
150		---	---	ND	---	0.533
151	135/151	34.031	1.27	(1.83)	---	1.07
152		---	---	ND	---	0.533
153	153/168	38.077	1.27	5.42	---	1.07
154		---	---	ND	---	0.533
155		---	---	ND	---	0.533
156	156/157	43.615	1.31	1.15	---	1.07
157	156/157	43.615	1.31	(1.15)	---	1.07
158		39.787	1.23	0.840	---	0.533
159		---	---	ND	---	0.533
160		---	---	ND	---	0.533
161		---	---	ND	---	0.533
162		---	---	ND	---	0.533
163	129/138/163	39.368	1.25	(8.83)	---	1.60
164		---	---	ND	---	0.533
165		---	---	ND	---	0.533
166	128/166	40.659	1.25	(1.43)	---	1.07
167		---	---	ND	---	0.533
168	153/168	38.077	1.27	(5.42)	---	1.07
169		---	---	ND	---	0.533
170		46.281	1.07	0.932	---	0.533
171	171/173	---	---	ND	---	1.07
172		---	---	ND	---	0.533
173	171/173	---	---	ND	---	1.07
174		41.586	0.96	0.857	---	0.533
175		---	---	ND	---	0.533
176		---	---	ND	---	0.533
177		---	---	ND	---	0.533
178		---	---	ND	---	0.533
179		---	---	ND	---	0.533
180	180/193	44.990	1.07	1.84	---	1.07
181		---	---	ND	---	0.533
182		---	---	ND	---	0.533
183	183/185	---	---	ND	---	1.07
184		---	---	ND	---	0.533
185	183/185	---	---	ND	---	1.07
186		---	---	ND	---	0.533
187		40.726	1.01	1.12	---	0.533
188		---	---	ND	---	0.533
189		---	---	ND	---	0.533
190		---	---	ND	---	0.533
191		---	---	ND	---	0.533
192		---	---	ND	---	0.533

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID           K1611164-001  
 Lab Sample ID             10363363001  
 Filename                    P160930A\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	44.990	1.07	(1.84)	---	1.07
194		---	---	ND	---	0.800
195		---	---	ND	---	0.800
196		---	---	ND	---	0.800
197	197/200	---	---	ND	---	1.60
198	198/199	---	---	ND	---	1.60
199	198/199	---	---	ND	---	1.60
200	197/200	---	---	ND	---	1.60
201		---	---	ND	---	0.800
202		---	---	ND	---	0.800
203		---	---	ND	---	0.800
204		---	---	ND	---	0.800
205		---	---	ND	---	0.800
206		---	---	ND	---	0.800
207		---	---	ND	---	0.800
208		---	---	ND	---	0.800
209		---	---	ND	---	0.800

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

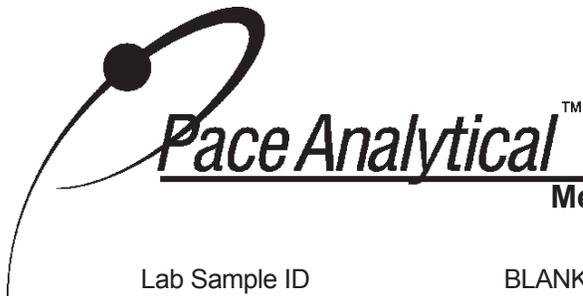
Client Sample ID           K1611164-001  
Lab Sample ID             10363363001  
Filename                    P160930A\_13

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	7.34
Total Trichloro Biphenyls	84.3
Total Tetrachloro Biphenyls	95.1
Total Pentachloro Biphenyls	65.8
Total Hexachloro Biphenyls	30.7
Total Heptachloro Biphenyls	4.74
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	288

ND = Not Detected

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-52124	Matrix	Water
Filename	P160929A_12	Extracted	09/27/2016 14:20
Injected By	CVS	Analyzed	09/29/2016 14:42
Total Amount Extracted	1050 mL	Dilution	5
ICAL ID	P160929A06		
CCal Filename(s)	P160929A_05		

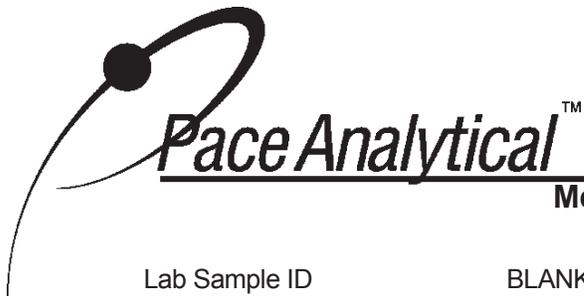
PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.849	3.22	2.0	0.981	49
13C-4-MoCB	3	11.484	3.26	2.0	1.08	54
13C-2,2'-DiCB	4	11.736	1.51	2.0	0.906	45
13C-4,4'-DiCB	15	18.574	1.59	2.0	1.11	56
13C-2,2',6-TrCB	19	15.352	1.07	2.0	1.05	52
13C-3,4,4'-TrCB	37	26.170	1.06	2.0	1.58	79
13C-2,2',6,6'-TeCB	54	18.810	0.78	2.0	1.17	59
13C-3,4,4',5-TeCB	81	33.217	0.84	2.0	1.87	93
13C-3,3',4,4'-TeCB	77	33.804	0.77	2.0	1.85	92
13C-2,2',4,6,6'-PeCB	104	24.762	1.66	2.0	1.09	54
13C-2,3,3',4,4'-PeCB	105	37.346	1.59	2.0	1.67	83
13C-2,3,4,4',5-PeCB	114	36.693	1.61	2.0	1.70	85
13C-2,3',4,4',5-PeCB	118	36.123	1.59	2.0	1.69	84
13C-2,3',4,4',5'-PeCB	123	35.787	1.47	2.0	1.68	84
13C-3,3',4,4',5-PeCB	126	40.532	1.72	2.0	1.60	80
13C-2,2',4,4',6,6'-HxCB	155	30.719	1.25	2.0	1.35	68
13C-HxCB (156/157)	156/157	43.555	1.27	4.0	3.19	80
13C-2,3',4,4',5,5'-HxCB	167	42.365	1.28	2.0	1.65	82
13C-3,3',4,4',5,5'-HxCB	169	46.858	1.20	2.0	1.45	73
13C-2,2',3,4',5,6,6'-HpCB	188	36.592	1.06	2.0	1.62	81
13C-2,3,3',4,4',5,5'-HpCB	189	49.364	1.02	2.0	1.78	89
13C-2,2',3,3',5,5',6,6'-OoCB	202	42.046	0.92	2.0	1.88	94
13C-2,3,3',4,4',5,5',6-OoCB	205	51.928	0.89	2.0	1.65	83
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.652	0.81	2.0	1.55	78
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	48.825	0.74	2.0	1.73	86
13C-DeCB	209	55.247	0.72	2.0	1.83	92
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.844	1.05	2.0	1.62	81
13C-2,3,3',5,5'-PeCB	111	33.753	1.57	2.0	1.50	75
13C-2,2',3,3',5,5',6-HpCB	178	39.710	1.07	2.0	1.65	82
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.058	1.62	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.772	0.79	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.970	1.66	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.291	1.38	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	51.454	0.90	2.0	NA	NA

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52124  
 Filename P160929A\_12

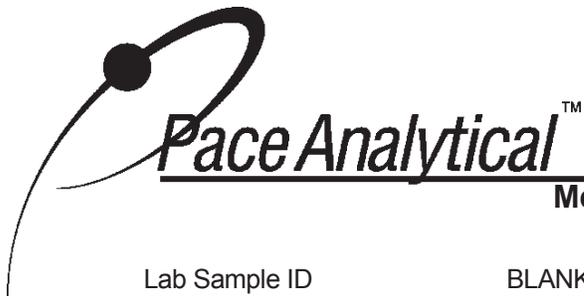
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		--	--	ND	--	0.238
2		--	--	ND	--	0.238
3		--	--	ND	--	0.238
4		--	--	ND	--	0.238
5		--	--	ND	--	0.238
6		--	--	ND	--	0.238
7		--	--	ND	--	0.238
8		--	--	ND	--	0.238
9		--	--	ND	--	0.238
10		--	--	ND	--	0.238
11		--	--	ND	--	2.33
12	12/13	--	--	ND	--	0.475
13	12/13	--	--	ND	--	0.475
14		--	--	ND	--	0.238
15		--	--	ND	--	0.238
16		--	--	ND	--	0.238
17		--	--	ND	--	0.238
18	18/30	--	--	ND	--	0.475
19		--	--	ND	--	0.238
20	20/28	--	--	ND	--	1.23
21	21/33	--	--	ND	--	1.28
22		--	--	ND	--	0.903
23		--	--	ND	--	0.238
24		--	--	ND	--	0.238
25		--	--	ND	--	0.238
26	26/29	--	--	ND	--	0.475
27		--	--	ND	--	0.238
28	20/28	--	--	ND	--	1.23
29	26/29	--	--	ND	--	0.475
30	18/30	--	--	ND	--	0.475
31		--	--	ND	--	1.24
32		--	--	ND	--	0.238
33	21/33	--	--	ND	--	1.28
34		--	--	ND	--	0.238
35		--	--	ND	--	0.238
36		--	--	ND	--	0.238
37		--	--	ND	--	0.504
38		--	--	ND	--	0.238
39		--	--	ND	--	0.238
40	40/41/71	--	--	ND	--	1.43
41	40/41/71	--	--	ND	--	1.43
42		--	--	ND	--	0.475
43	43/73	--	--	ND	--	0.475
44	44/47/65	--	--	ND	--	1.43
45	45/51	--	--	ND	--	0.950

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52124  
Filename P160929A\_12

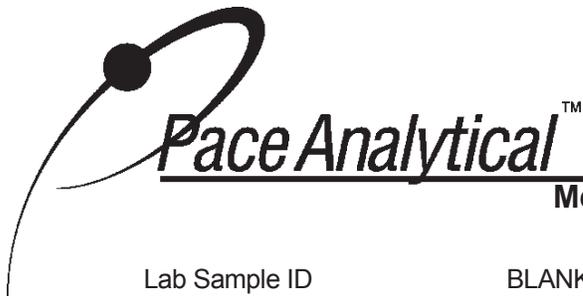
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		--	--	ND	--	0.475
47	44/47/65	--	--	ND	--	1.43
48		--	--	ND	--	0.475
49	49/69	--	--	ND	--	0.950
50	50/53	--	--	ND	--	0.950
51	45/51	--	--	ND	--	0.950
52		--	--	ND	--	1.46
53	50/53	--	--	ND	--	0.950
54		--	--	ND	--	0.475
55		--	--	ND	--	0.475
56		--	--	ND	--	0.475
57		--	--	ND	--	0.475
58		--	--	ND	--	0.475
59	59/62/75	--	--	ND	--	1.43
60		--	--	ND	--	0.475
61	61/70/74/76	--	--	ND	--	1.90
62	59/62/75	--	--	ND	--	1.43
63		--	--	ND	--	0.475
64		--	--	ND	--	0.475
65	44/47/65	--	--	ND	--	1.43
66		--	--	ND	--	0.798
67		--	--	ND	--	0.475
68		--	--	ND	--	0.475
69	49/69	--	--	ND	--	0.950
70	61/70/74/76	--	--	ND	--	1.90
71	40/41/71	--	--	ND	--	1.43
72		--	--	ND	--	0.475
73	43/73	--	--	ND	--	0.475
74	61/70/74/76	--	--	ND	--	1.90
75	59/62/75	--	--	ND	--	1.43
76	61/70/74/76	--	--	ND	--	1.90
77		--	--	ND	--	0.475
78		--	--	ND	--	0.475
79		--	--	ND	--	0.475
80		--	--	ND	--	0.475
81		--	--	ND	--	0.475
82		--	--	ND	--	0.475
83		--	--	ND	--	0.475
84		--	--	ND	--	0.475
85	85/116/117	--	--	ND	--	1.43
86	86/87/97/108/119/125	--	--	ND	--	2.85
87	86/87/97/108/119/125	--	--	ND	--	2.85
88	88/91	--	--	ND	--	0.950
89		--	--	ND	--	0.475
90	90/101/113	--	--	ND	--	1.43

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52124  
Filename P160929A\_12

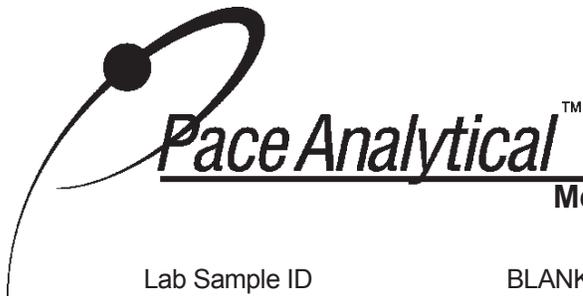
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	--	--	ND	--	0.950
92		--	--	ND	--	0.475
93	93/98/100/102	--	--	ND	--	1.90
94		--	--	ND	--	0.475
95		--	--	ND	--	0.903
96		--	--	ND	--	0.475
97	86/87/97/108/119/125	--	--	ND	--	2.85
98	93/98/100/102	--	--	ND	--	1.90
99		--	--	ND	--	0.475
100	93/98/100/102	--	--	ND	--	1.90
101	90/101/113	--	--	ND	--	1.43
102	93/98/100/102	--	--	ND	--	1.90
103		--	--	ND	--	0.475
104		--	--	ND	--	0.475
105		--	--	ND	--	0.475
106		--	--	ND	--	0.475
107	107/124	--	--	ND	--	0.950
108	86/87/97/108/119/125	--	--	ND	--	2.85
109		--	--	ND	--	0.475
110	110/115	--	--	ND	--	0.950
111		--	--	ND	--	0.475
112		--	--	ND	--	0.475
113	90/101/113	--	--	ND	--	1.43
114		--	--	ND	--	0.475
115	110/115	--	--	ND	--	0.950
116	85/116/117	--	--	ND	--	1.43
117	85/116/117	--	--	ND	--	1.43
118		--	--	ND	--	0.608
119	86/87/97/108/119/125	--	--	ND	--	2.85
120		--	--	ND	--	0.475
121		--	--	ND	--	0.475
122		--	--	ND	--	0.475
123		--	--	ND	--	0.475
124	107/124	--	--	ND	--	0.950
125	86/87/97/108/119/125	--	--	ND	--	2.85
126		--	--	ND	--	0.475
127		--	--	ND	--	0.475
128	128/166	--	--	ND	--	0.950
129	129/138/163	--	--	ND	--	1.43
130		--	--	ND	--	0.475
131		--	--	ND	--	0.475
132		--	--	ND	--	0.475
133		--	--	ND	--	0.475
134	134/143	--	--	ND	--	0.950
135	135/151	--	--	ND	--	0.950

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B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52124  
Filename P160929A\_12

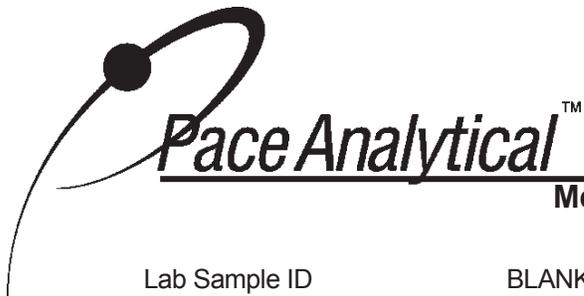
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		--	--	ND	--	0.475
137		--	--	ND	--	0.475
138	129/138/163	--	--	ND	--	1.43
139	139/140	--	--	ND	--	0.950
140	139/140	--	--	ND	--	0.950
141		--	--	ND	--	0.475
142		--	--	ND	--	0.475
143	134/143	--	--	ND	--	0.950
144		--	--	ND	--	0.475
145		--	--	ND	--	0.475
146		--	--	ND	--	0.475
147	147/149	--	--	ND	--	0.950
148		--	--	ND	--	0.475
149	147/149	--	--	ND	--	0.950
150		--	--	ND	--	0.475
151	135/151	--	--	ND	--	0.950
152		--	--	ND	--	0.475
153	153/168	--	--	ND	--	0.950
154		--	--	ND	--	0.475
155		--	--	ND	--	0.475
156	156/157	--	--	ND	--	0.950
157	156/157	--	--	ND	--	0.950
158		--	--	ND	--	0.475
159		--	--	ND	--	0.475
160		--	--	ND	--	0.475
161		--	--	ND	--	0.475
162		--	--	ND	--	0.475
163	129/138/163	--	--	ND	--	1.43
164		--	--	ND	--	0.475
165		--	--	ND	--	0.475
166	128/166	--	--	ND	--	0.950
167		--	--	ND	--	0.475
168	153/168	--	--	ND	--	0.950
169		--	--	ND	--	0.475
170		--	--	ND	--	0.475
171	171/173	--	--	ND	--	0.950
172		--	--	ND	--	0.475
173	171/173	--	--	ND	--	0.950
174		--	--	ND	--	0.475
175		--	--	ND	--	0.475
176		--	--	ND	--	0.475
177		--	--	ND	--	0.475
178		--	--	ND	--	0.475
179		--	--	ND	--	0.475
180	180/193	--	--	ND	--	0.950

Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52124  
 Filename P160929A\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		--	--	ND	--	0.475
182		--	--	ND	--	0.475
183	183/185	--	--	ND	--	0.950
184		--	--	ND	--	0.475
185	183/185	--	--	ND	--	0.950
186		--	--	ND	--	0.475
187		--	--	ND	--	0.475
188		--	--	ND	--	0.475
189		--	--	ND	--	0.475
190		--	--	ND	--	0.475
191		--	--	ND	--	0.475
192		--	--	ND	--	0.475
193	180/193	--	--	ND	--	0.950
194		--	--	ND	--	0.713
195		--	--	ND	--	0.713
196		--	--	ND	--	0.713
197	197/200	--	--	ND	--	1.43
198	198/199	--	--	ND	--	1.43
199	198/199	--	--	ND	--	1.43
200	197/200	--	--	ND	--	1.43
201		--	--	ND	--	0.713
202		--	--	ND	--	0.713
203		--	--	ND	--	0.713
204		--	--	ND	--	0.713
205		--	--	ND	--	0.713
206		--	--	ND	--	0.713
207		--	--	ND	--	0.713
208		--	--	ND	--	0.713
209		--	--	ND	--	0.713

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID            CBLKMX  
Lab Sample ID              BLANK-52124  
Filename                     P160929A\_12

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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**Method 1668A Polychlorobiphenyls  
 Laboratory Control Spike Analysis Results**

Lab Sample ID	LCS-52125	Matrix	Water
Filename	P161001A_05	Dilution	5
Total Amount Extracted	1030 mL	Extracted	09/27/2016 14:20
ICAL ID	P161001A02	Analyzed	10/01/2016 05:00
CCal Filename(s)	P161001A_01	Injected By	CVS
Method Blank ID	BLANK-52124		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.16	116	2.0	1.27	63
3	1.0	1.19	119	2.0	1.27	64
4	1.0	1.07	107	2.0	1.01	51
15	1.0	1.13	113	2.0	1.40	70
19	1.0	1.08	108	2.0	1.17	58
37	1.0	1.12	112	2.0	1.75	88
54	1.0	1.10	110	2.0	1.31	66
81	1.0	1.04	104	2.0	2.05	102
77	1.0	1.04	104	2.0	2.06	103
104	1.0	1.06	106	2.0	1.23	62
105	1.0	1.02	102	2.0	1.95	98
114	1.0	1.09	109	2.0	1.87	93
118	1.0	1.11	111	2.0	1.94	97
123	1.0	1.07	107	2.0	1.94	97
126	1.0	1.03	103	2.0	1.91	95
155	1.0	0.992	99	2.0	1.45	73
156/157	2.0	2.08	104	4.0	3.71	93
167	1.0	1.06	106	2.0	1.92	96
169	1.0	1.08	108	2.0	1.74	87
188	1.0	1.07	107	2.0	1.58	79
189	1.0	1.08	108	2.0	1.80	90
202	1.0	1.03	103	2.0	1.75	88
205	1.0	1.05	105	2.0	1.66	83
206	1.0	1.05	105	2.0	1.48	74
208	1.0	1.04	104	2.0	1.64	82
209	1.0	0.933	93	2.0	1.78	89

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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### Method 1668A Polychlorobiphenyls Laboratory Control Spike Analysis Results

Lab Sample ID	LCSD-52126	Matrix	Water
Filename	P161001B_11	Dilution	5
Total Amount Extracted	1050 mL	Extracted	09/27/2016 14:20
ICAL ID	P161001B08	Analyzed	10/01/2016 21:48
CCal Filename(s)	P161001B_07	Injected By	BAL
Method Blank ID	BLANK-52124		

PCB Isomer	Native Analytes			Labeled Analytes			
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery	
1	1.0	1.04	104	2.0	0.271	14	IR
3	1.0	1.18	118	2.0	0.267	13	R
4	1.0	1.14	114	2.0	0.260	13	R
15	1.0	1.09	109	2.0	0.260	13	R
19	1.0	0.864	86	2.0	0.337	17	R
37	1.0	1.05	105	2.0	0.377	19	R
54	1.0	0.950	95	2.0	0.294	15	R
81	1.0	0.989	99	2.0	0.456	23	R
77	1.0	0.843	84	2.0	0.460	23	R
104	1.0	1.13	113	2.0	0.279	14	R
105	1.0	0.979	98	2.0	0.465	23	R
114	1.0	0.999	100	2.0	0.454	23	R
118	1.0	1.04	104	2.0	0.462	23	R
123	1.0	1.08	108	2.0	0.440	22	R
126	1.0	0.912	91	2.0	0.460	23	R
155	1.0	0.984	98	2.0	0.351	18	R
156/157	2.0	2.07	103	4.0	0.886	22	R
167	1.0	1.09	109	2.0	0.449	22	R
169	1.0	1.07	107	2.0	0.405	20	R
188	1.0	1.11	111	2.0	0.399	20	R
189	1.0	1.01	101	2.0	0.455	23	R
202	1.0	1.03	103	2.0	0.459	23	R
205	1.0	0.989	99	2.0	0.489	24	R
206	1.0	1.01	101	2.0	0.451	23	R
208	1.0	0.996	100	2.0	0.456	23	R
209	1.0	1.03	103	2.0	0.476	24	R

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client ALS Environmental

Spike 1 ID LCS-52125  
Spike 1 Filename P161001A\_05

Spike 2 ID LCSD-52126  
Spike 2 Filename P161001B\_11

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	116	104	10.9
4-MoCB	3	119	118	0.8
2,2'-DiCB	4	107	114	6.3
4,4'-DiCB	15	113	109	3.6
2,2',6-TrCB	19	108	86	22.7
3,4,4'-TrCB	37	112	105	6.5
2,2',6,6'-TeCB	54	110	95	14.6
3,3',4,4'-TeCB	77	104	84	21.3
3,4,4',5-TeCB	81	104	99	4.9
2,2',4,6,6'-PeCB	104	106	113	6.4
2,3,3',4,4'-PeCB	105	102	98	4.0
2,3,4,4',5-PeCB	114	109	100	8.6
2,3',4,4',5-PeCB	118	111	104	6.5
2,3',4,4',5'-PeCB	123	107	108	0.9
3,3',4,4',5-PeCB	126	103	91	12.4
2,2',4,4',6,6'-HxCB	155	99	98	1.0
(156/157)	156/157	104	103	1.0
2,3',4,4',5,5'-HxCB	167	106	109	2.8
3,3',4,4',5,5'-HxCB	169	108	107	0.9
2,2',3,4',5,6,6'-HpCB	188	107	111	3.7
2,3,3',4,4',5,5'-HpCB	189	108	101	6.7
2,2',3,3',5,5',6,6'-OxCB	202	103	103	0.0
2,3,3',4,4',5,5',6-OxCB	205	105	99	5.9
2,2',3,3',4,4',5,5',6-NoCB	206	105	101	3.9
2,2',3,3',4,5,5',6,6'-NoCB	208	104	100	3.9
Decachlorobiphenyl	209	93	103	10.2

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

**REPORT OF LABORATORY ANALYSIS**

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**Water Solutions, Inc.**

55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# **Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Sampling in City Outfall Basins 16, 19, 52D, and M2**

**To:** File  
**From:** Cindy Ryals, GSI Water Solutions, Inc.  
**Date:** November 4, 2016

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in September 2016. Five stormwater grab samples (W16I149-01, W16I149-02, W16I149-03, W16I149-04, and W16I149-05) were collected in Outfall Basins 16, 19, 52D, and M2 on September 17, 2016, and submitted for analyses. Sample collection dates and laboratory identification numbers are presented in Table 1.

The laboratory analyses for these samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Conductivity – FO SOP 1.03a
  - pH – FO SOP 1.01a
  - Temp – FO SOP 1.05a
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- Pace Analytical Services (Pace)
  - Polychlorinated Biphenyls (PCB) Congeners – EPA 1668A

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with these source control program samples.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method and field decontamination blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control and duplicate laboratory control (LC/DLC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for field duplicate and laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## **Analysis Holding Times**

The samples were extracted and analyzed within the acceptable holding times for all analyses.

## **Method Blanks**

Method blanks were analyzed during the subcontracted laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. No analytes were detected in the method blanks processed during any of the analyses.

## **Field Decontamination Blanks**

Field decontamination blanks were not collected during this sampling event.

## **Surrogate Recoveries**

Surrogate recoveries were completed during the analyses of pesticides, PAHs and phthalates. All surrogate recoveries for the field samples, field decontamination blank and all associated QC samples were within control criteria.

## Internal Standard Recoveries

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. Labeled internal standard recoveries were within method-specified target ranges for the samples and the associated QC samples.

## Matrix Spike/Matrix Spike Duplicates

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates. All MS recoveries were within acceptance limits, with the following exceptions:

- The matrix spike duplicate recovery for W16I149-01 was below the acceptable range for a number of PAHs. The associated sample results are considered an estimate with potential low bias (“J-” flag). Non-detects of PAHs and phthalates are flagged “UJ” to indicate that the reported quantitation limit is approximate and may be inaccurate or imprecise.

## Laboratory Control Sample / Duplicate Laboratory Control Samples

LC samples were processed during the analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. DLC samples were processed during the analysis of PCB congeners. LC/DLC sample recoveries and RPDs were within laboratory control limits for all analyses.

## Laboratory Duplicate

WPCL processed two laboratory duplicate samples during the TSS analysis, three laboratory duplicates during the total metals analysis, two laboratory duplicates during the analysis of mercury, and one duplicate laboratory sample during the analysis of PAHs and phthalates. RPDs were within laboratory acceptance limits.

## Field Duplicate

A field duplicate was not collected during this sampling event.

## Other

WPCL reports that the continuing calibration verification was outside acceptance limits for several phthalate and PAH compounds in laboratory QC samples. However, the biases in the QC samples are not expected to impact field sample results, and no qualifications were made.

WPCL also reports that the continuing calibration verification during analysis of field samples was high for bis(2-ethylhexyl) phthalate and low for 1-methylnaphthalene. Detected results for these compounds for which the CCV was low should be considered low estimates (“J-” flag), and results for which the CCV was high should be considered high estimates (“J+” flag). Non-detects of PAHs and phthalates are flagged UJ to indicate that the reported quantitation limit is approximate and may be inaccurate or imprecise.

WPCL reports that the reporting limit was raised for phenanthrene and pyrene in sample W16I149-02, and for fluoranthene, fluorene, and pyrene in sample W16I149-05 due to non-target matrix interference. No further qualifications were made to this data.

No other anomalies were reported in by WPCL or the subcontracted laboratories. A list of additional data qualifications added during validation is provided in Table 2.

**Table 1. Field Samples Submitted with Corresponding Laboratory Identifications**

City of Portland

*Outfalls 16, 19, 52D & M2*

Field Sample ID	Sample Date	BES Sample ID	Analytes	Notes
M2_SW1	9/17/2016	W16I149-02	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	
52D_SW5	9/17/2016	W16I149-01	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	
16_SW1	9/17/2016	W16I149-04	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	
16_SW2	9/17/2016	W16I149-03	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	
19_SW2	9/17/2016	W16I149-05	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	

**Notes**

BES = City of Portland Bureau of Environmental Services

TSS = Total Suspended Solids

Tot Met = Total Metals

Tot Hg = Total Mercury

PCB Cong = PCB Congeners

PAHs = PAHs + phthalates

Cond = Conductivity

Temp = temperature

**Table 2. Qualifiers Added or Modified During Validation**

City of Portland

Outfalls 16, 19, 52D &amp; M2

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
W16I149-01	Benzo(a)anthracene	ug/L	0.010	UJ	MSR
W16I149-01	Benzo(a)pyrene	ug/L	0.010	UJ	MSR
W16I149-01	Benzo(b)fluoranthene	ug/L	0.010	UJ	MSR
W16I149-01	Benzo(g,h,i)perylene	ug/L	0.010	UJ	MSR
W16I149-01	Benzo(k)fluoranthene	ug/L	0.010	UJ	MSR
W16I149-01	Chrysene	ug/L	0.010	UJ	MSR
W16I149-01	Dibenzo(a,h)anthracene	ug/L	0.010	UJ	MSR
W16I149-01	Indeno(1,2,3-cd)pyrene	ug/L	0.010	UJ	MSR
W16I149-01	Bis(2-ethylhexyl) phthalate	ug/L	1.300	J+	CCV
W16I149-02	Bis(2-ethylhexyl) phthalate	ug/L	0.580	J+	CCV
W16I149-03	Bis(2-ethylhexyl) phthalate	ug/L	5.200	J+	CCV
W16I149-04	Bis(2-ethylhexyl) phthalate	ug/L	2.100	J+	CCV
W16I149-05	Bis(2-ethylhexyl) phthalate	ug/L	1.600	J+	CCV
W16I149-01	1-Methylnaphthalene	ug/L	0.040	UJ	CCV
W16I149-02	1-Methylnaphthalene	ug/L	0.040	UJ	CCV
W16I149-03	1-Methylnaphthalene	ug/L	0.040	UJ	CCV
W16I149-04	1-Methylnaphthalene	ug/L	0.040	UJ	CCV
W16I149-05	1-Methylnaphthalene	ug/L	0.040	UJ	CCV

**Notes**

µg/L = micrograms per liter

**Qualifier Definitions**

J = Detection of analyte is considered an estimate with unknown bias

J- = Detection of analyte is considered a low estimate

J+ = Detection of analyte is considered a high estimate

UJ = reported quantitation limit is approximate and may be inaccurate or imprecise

**Reason Code Definitions**

CCV = The continuing calibration verification was high and the sample results may be high estimates

MSR = The percent recovery of the MS or MSD was outside control limits. Result is estimated.



City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



October 03, 2016

Linda Scheffler  
Director's Office

---

Work Order  
**W161149**

Project  
**Portland Harbor**

Received  
09/17/16 14:37

---

Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project:	<b>Portland Harbor</b>	Client:	Director's Office
Work Order:	<b>W161149</b>	Project Mgr:	Linda Scheffler
Received:	9/17/16 14:37		
Submitted By:	Field Operations		

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
52D_SW5	W161149-01	Stormwater	Grab	09/17/16 11:07	09/17/16 11:07	
M2_SW1	W161149-02	Stormwater	Grab	09/17/16 11:58	09/17/16 11:58	
16_SW2	W161149-03	Stormwater	Grab	09/17/16 12:20	09/17/16 12:20	
16_SW1	W161149-04	Stormwater	Grab	09/17/16 13:03	09/17/16 13:03	
19_SW2	W161149-05	Stormwater	Grab	09/17/16 13:21	09/17/16 13:21	

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field conductivity

52D_SW5 : W161149-01	Conductivity*	57	umhos/cm			1	B16I304	09/17/16	09/17/16	FO SOP 1.03a
M2_SW1 : W161149-02	Conductivity*	74	umhos/cm			1	B16I304	09/17/16	09/17/16	FO SOP 1.03a
16_SW2 : W161149-03	Conductivity*	174	umhos/cm			1	B16I304	09/17/16	09/17/16	FO SOP 1.03a
16_SW1 : W161149-04	Conductivity*	33	umhos/cm			1	B16I304	09/17/16	09/17/16	FO SOP 1.03a
19_SW2 : W161149-05	Conductivity*	34	umhos/cm			1	B16I304	09/17/16	09/17/16	FO SOP 1.03a

Field pH

52D_SW5 : W161149-01	pH*	7.5	pH Units			1	B16I304	09/17/16 11:07	09/17/16	FO SOP 1.01a
M2_SW1 : W161149-02	pH*	7.0	pH Units			1	B16I304	09/17/16 11:58	09/17/16	FO SOP 1.01a
16_SW2 : W161149-03	pH*	6.9	pH Units			1	B16I304	09/17/16 12:20	09/17/16	FO SOP 1.01a
16_SW1 : W161149-04	pH*	7.3	pH Units			1	B16I304	09/17/16 13:03	09/17/16	FO SOP 1.01a
19_SW2 : W161149-05	pH*	7.3	pH Units			1	B16I304	09/17/16 13:21	09/17/16	FO SOP 1.01a

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W161149**

**Client: Director's Office**  
**Received: 09/17/16 14:37**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field temperature

52D_SW5 : W161149-01	Temperature*	17.0 °C			1	B16I304	09/17/16 11:07	09/17/16	FO SOP 1.05a	
M2_SW1 : W161149-02	Temperature*	16.2 °C			1	B16I304	09/17/16 11:58	09/17/16	FO SOP 1.05a	
16_SW2 : W161149-03	Temperature*	17.3 °C			1	B16I304	09/17/16 12:20	09/17/16	FO SOP 1.05a	
16_SW1 : W161149-04	Temperature*	17.5 °C			1	B16I304	09/17/16 13:03	09/17/16	FO SOP 1.05a	
19_SW2 : W161149-05	Temperature*	18.5 °C			1	B16I304	09/17/16 13:21	09/17/16	FO SOP 1.05a	

**General Chemistry**

Total Suspended Solids

52D_SW5 : W161149-01	Total suspended solids	41 mg/L	2	2		B16I288	09/19/16	09/19/16	SM 2540D	
M2_SW1 : W161149-02	Total suspended solids	3 mg/L	2	2		B16I288	09/19/16	09/19/16	SM 2540D	
16_SW2 : W161149-03	Total suspended solids	16 mg/L	2	2		B16I288	09/19/16	09/19/16	SM 2540D	
16_SW1 : W161149-04	Total suspended solids	29 mg/L	2	2		B16I288	09/19/16	09/19/16	SM 2540D	
19_SW2 : W161149-05	Total suspended solids	4 mg/L	2	2		B16I288	09/19/16	09/19/16	SM 2540D	

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**Total Metals**

Total Metals by ICPMS

52D\_SW5 : W161149-01

Arsenic	0.481	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Cadmium	0.159	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Chromium	3.18	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Copper	7.53	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Lead	1.91	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Mercury	0.00377	ug/L	0.00100	0.00100	1	B16I325	09/20/16	09/21/16	WPCLSOP M-10	
Nickel	2.70	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Zinc	92.7	ug/L	0.500	0.500	1	B16I295	09/19/16	09/20/16	EPA 200.8	

M2\_SW1 : W161149-02

Arsenic	0.857	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Cadmium	ND	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Chromium	0.626	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Copper	5.01	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Lead	0.706	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Mercury	0.00476	ug/L	0.00100	0.00100	1	B16I325	09/20/16	09/21/16	WPCLSOP M-10	
Nickel	0.740	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Zinc	45.5	ug/L	0.500	0.500	1	B16I295	09/19/16	09/20/16	EPA 200.8	

16\_SW2 : W161149-03

Arsenic	1.29	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Cadmium	3.63	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Chromium	10.1	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Copper	240	ug/L	0.800	0.800	4	B16I295	09/19/16	09/20/16	EPA 200.8	
Lead	41.1	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Mercury	0.128	ug/L	0.00100	0.00100	4	B16I325	09/20/16	09/21/16	WPCLSOP M-10	
Nickel	26.5	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Silver	0.215	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Zinc	384	ug/L	2.00	2.00	4	B16I295	09/19/16	09/20/16	EPA 200.8	

16\_SW1 : W161149-04

Arsenic	1.52	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Cadmium	0.300	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Chromium	3.92	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Copper	25.1	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Lead	5.64	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Mercury	0.00781	ug/L	0.00100	0.00100	1	B16I325	09/20/16	09/21/16	WPCLSOP M-10	
Nickel	3.76	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Zinc	127	ug/L	0.500	0.500	1	B16I295	09/19/16	09/20/16	EPA 200.8	

19\_SW2 : W161149-05

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Total Metals**

Total Metals by ICPMS

19\_SW2 : W161149-05

Arsenic	0.486	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Cadmium	0.183	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Chromium	0.871	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Copper	36.8	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Lead	3.99	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Mercury	0.0215	ug/L	0.00100	0.00100	1	B16I325	09/20/16	09/21/16	WPCLSOP M-10	
Nickel	2.88	ug/L	0.200	0.200	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16I295	09/19/16	09/20/16	EPA 200.8	
Zinc	159	ug/L	0.500	0.500	1	B16I295	09/19/16	09/20/16	EPA 200.8	

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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

52D\_SW5 : W161149-01

Acenaphthene	ND	ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	M6
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	M6
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	M6
Benzo(g,h,i)perylene	0.014	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	M6
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	M6
Chrysene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	M6
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	M6
Fluoranthene	0.031	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	M6
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	V3
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Phenanthrene	0.058	ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Pyrene	0.039	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.3	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.16	ug/L	0.229	71%	31-164	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Fluoranthene-d10	0.23	ug/L	0.229	100%	65-145	B161342	09/22/16	09/28/16	EPA 8270-SIM	

M2\_SW1 : W161149-02

Acenaphthene	ND	ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	V3

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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

M2\_SW1 : W161149-02

2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Phenanthrene	ND	ug/L	0.024	0.024	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	D4
Pyrene	ND	ug/L	0.013	0.013	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	D4
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	0.58	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	J, V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.14	ug/L	0.229	63%	31-164	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Fluoranthene-d10	0.22	ug/L	0.229	96%	65-145	B161342	09/22/16	09/28/16	EPA 8270-SIM	

16\_SW2 : W161149-03

Acenaphthene	ND	ug/L	0.032	0.032	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.10	0.10	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(a)anthracene	0.28	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(a)pyrene	0.082	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.40	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.12	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.11	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Chrysene	0.52	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.030	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Fluoranthene	1.3	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.10	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	V3
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Phenanthrene	0.29	ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Pyrene	1.1	ug/L	0.010	0.010	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Diethyl phthalate	1.9	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Dimethyl phthalate	1.4	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	5.2	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.12	ug/L	0.229	52%	31-164	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Fluoranthene-d10	0.20	ug/L	0.229	89%	65-145	B161342	09/22/16	09/28/16	EPA 8270-SIM	

16\_SW1 : W161149-04

Reported: 10/03/16 12:07

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W161149**

**Client: Director's Office**  
**Received: 09/17/16 14:37**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

16\_SW1 : W161149-04

Acenaphthene	ND	ug/L	0.020	0.020	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.024	0.024	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.020	0.020	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(a)pyrene	0.012	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.032	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.031	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Chrysene	0.027	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Fluoranthene	0.069	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.012	0.012	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	V3
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Phenanthrene	0.050	ug/L	0.020	0.020	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Pyrene	0.077	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.1	ug/L	1.0	0.50	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.15	ug/L	0.229	67%	31-164	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Fluoranthene-d10	0.22	ug/L	0.229	97%	65-145	B16I342	09/22/16	09/28/16	EPA 8270-SIM	

19\_SW2 : W161149-05

Acenaphthene	ND	ug/L	0.020	0.020	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.030	0.030	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	D4
Fluorene	ND	ug/L	0.024	0.024	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	D4
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16I342	09/22/16	09/28/16	EPA 8270-SIM	V3

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
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**Client: Director's Office**  
**Received: 09/17/16 14:37**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

19\_SW2 : W161149-05

2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Phenanthrene	<b>0.058</b>	ug/L	0.020	0.020	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Pyrene	ND	ug/L	0.030	0.030	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	D4
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Dimethyl phthalate	<b>10</b>	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	<b>1.6</b>	ug/L	1.0	0.50	1	B161342	09/22/16	09/28/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.15	ug/L	0.229	67%	31-164	B161342	09/22/16	09/28/16	EPA 8270-SIM	
Fluoranthene-d10	0.21	ug/L	0.229	93%	65-145	B161342	09/22/16	09/28/16	EPA 8270-SIM	

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Project: **Portland Harbor**  
Work Order: **W161149**

Client: Director's Office  
Received: 09/17/16 14:37

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B16I288</b>										
<b>Blank (B16I288-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					09/19/16 :09/19/16	
<b>LCS (B16I288-BS1)</b>										
Total suspended solids	100	mg/L	2	2	100		100% (90-110)		09/19/16 :09/19/16	
<b>Duplicate (B16I288-DUP1) Source: W16I149-04</b>										
Total suspended solids	33	mg/L	2	2		29		13 (20)	09/19/16 :09/19/16	
<b>Duplicate (B16I288-DUP2) Source: W16I152-04</b>										
Total suspended solids	4	mg/L	2	2		4		0 (20)	09/19/16 :09/19/16	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B16I295</b>										
<b>Blank (B16I295-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					09/19/16 :09/20/16	
Cadmium	ND	ug/L	0.100	0.100					09/19/16 :09/20/16	
Chromium	ND	ug/L	0.200	0.200					09/19/16 :09/20/16	
Copper	ND	ug/L	0.200	0.200					09/19/16 :09/20/16	
Lead	ND	ug/L	0.100	0.100					09/19/16 :09/20/16	
Nickel	ND	ug/L	0.200	0.200					09/19/16 :09/20/16	
Silver	ND	ug/L	0.100	0.100					09/19/16 :09/20/16	
Zinc	ND	ug/L	0.500	0.500					09/19/16 :09/20/16	
<b>LCS (B16I295-BS1)</b>										
Arsenic	2.52	ug/L	0.100	0.100	2.50		101% (85-115)		09/19/16 :09/20/16	
Cadmium	2.49	ug/L	0.100	0.100	2.50		100% (85-115)		09/19/16 :09/20/16	
Chromium	2.45	ug/L	0.200	0.200	2.50		98% (85-115)		09/19/16 :09/20/16	
Copper	2.52	ug/L	0.200	0.200	2.50		101% (85-115)		09/19/16 :09/20/16	
Lead	2.47	ug/L	0.100	0.100	2.50		99% (85-115)		09/19/16 :09/20/16	
Nickel	2.42	ug/L	0.200	0.200	2.50		97% (85-115)		09/19/16 :09/20/16	
Silver	2.31	ug/L	0.100	0.100	2.50		92% (85-115)		09/19/16 :09/20/16	
Zinc	12.7	ug/L	0.500	0.500	12.5		101% (85-115)		09/19/16 :09/20/16	
<b>Duplicate (B16I295-DUP1) Source: W16I149-01</b>										
Arsenic	0.488	ug/L	0.100	0.100		0.481		2 (20)	09/19/16 :09/20/16	
Cadmium	0.158	ug/L	0.100	0.100		0.159		0.4 (20)	09/19/16 :09/20/16	

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**Work Order: W161149**

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**Received: 09/17/16 14:37**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B161295**

<b>Duplicate (B161295-DUP1)</b>		<b>Source: W161149-01</b>								
Chromium	3.28	ug/L	0.200	0.200		3.18		3 (20)	09/19/16 :09/20/16	
Copper	7.68	ug/L	0.200	0.200		7.53		2 (20)	09/19/16 :09/20/16	
Lead	1.92	ug/L	0.100	0.100		1.91		0.8 (20)	09/19/16 :09/20/16	
Nickel	2.77	ug/L	0.200	0.200		2.70		3 (20)	09/19/16 :09/20/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	09/19/16 :09/20/16	
Zinc	92.6	ug/L	0.500	0.500		92.7		0.1 (20)	09/19/16 :09/20/16	

<b>Duplicate (B161295-DUP2)</b>		<b>Source: W161153-01</b>								
Copper	46.6	ug/L	0.200	0.200		52.7		12 (20)	09/19/16 :09/20/16	

<b>Duplicate (B161295-DUP3)</b>		<b>Source: W161153-01</b>								
Arsenic	1.67	ug/L	0.100	0.100		1.70		2 (20)	09/19/16 :09/20/16	
Cadmium	0.481	ug/L	0.100	0.100		0.416		15 (20)	09/19/16 :09/20/16	
Chromium	4.63	ug/L	0.200	0.200		5.17		11 (20)	09/19/16 :09/20/16	
Copper	42.4	ug/L	0.200	0.200		52.7		22 (20)	09/19/16 :09/20/16	
Lead	10.8	ug/L	0.100	0.100		11.2		4 (20)	09/19/16 :09/20/16	
Nickel	20.0	ug/L	0.200	0.200		20.0		0.1 (20)	09/19/16 :09/20/16	
Silver	0.573	ug/L	0.100	0.100		0.567		1 (20)	09/19/16 :09/20/16	
Zinc	227	ug/L	0.500	0.500		236		4 (20)	09/19/16 :09/20/16	

<b>Matrix Spike (B161295-MS1)</b>		<b>Source: W161149-01</b>								
Arsenic	5.37	ug/L	0.100	0.100	5.00	0.481	98% (70-130)		09/19/16 :09/20/16	
Cadmium	5.05	ug/L	0.100	0.100	5.00	0.159	98% (70-130)		09/19/16 :09/20/16	
Chromium	8.13	ug/L	0.200	0.200	5.00	3.18	99% (70-130)		09/19/16 :09/20/16	
Copper	12.6	ug/L	0.200	0.200	5.00	7.53	101% (70-130)		09/19/16 :09/20/16	
Lead	6.85	ug/L	0.100	0.100	5.00	1.91	99% (70-130)		09/19/16 :09/20/16	
Nickel	7.54	ug/L	0.200	0.200	5.00	2.70	97% (70-130)		09/19/16 :09/20/16	
Silver	5.00	ug/L	0.100	0.100	5.00	ND	100% (70-130)		09/19/16 :09/20/16	
Zinc	117	ug/L	0.500	0.500	25.0	92.7	97% (70-130)		09/19/16 :09/20/16	

<b>Matrix Spike (B161295-MS2)</b>		<b>Source: W161153-01</b>								
Arsenic	16.8	ug/L	0.100	0.100	15.0	1.70	101% (70-130)		09/19/16 :09/20/16	
Cadmium	14.8	ug/L	0.100	0.100	15.0	0.416	96% (70-130)		09/19/16 :09/20/16	
Chromium	19.5	ug/L	0.200	0.200	15.0	5.17	96% (70-130)		09/19/16 :09/20/16	
Copper	55.0	ug/L	0.200	0.200	15.0	52.7	15% (70-130)		09/19/16 :09/20/16	M3
Lead	23.8	ug/L	0.100	0.100	15.0	11.2	84% (70-130)		09/19/16 :09/20/16	
Nickel	36.0	ug/L	0.200	0.200	15.0	20.0	107% (70-130)		09/19/16 :09/20/16	
Silver	14.9	ug/L	0.100	0.100	15.0	0.567	96% (70-130)		09/19/16 :09/20/16	
Zinc	288	ug/L	0.500	0.500	75.0	236	70% (70-130)		09/19/16 :09/20/16	M3

**Total Metals by ICPMS - Batch B161325**

**Blank (B161325-BLK1)**

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**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B161325</b>										
<b>Blank (B161325-BLK1)</b>										
Mercury	ND	ug/L	0.000900	0.000900					09/20/16 :09/21/16	
<b>LCS (B161325-BS1)</b>										
Mercury	0.00995	ug/L	0.000900	0.000900	0.0100		99% (85-125)		09/20/16 :09/21/16	
<b>Duplicate (B161325-DUP1) Source: W161149-01</b>										
Mercury	0.00386	ug/L	0.00100	0.00100		0.00377		2 (20)	09/20/16 :09/21/16	
<b>Duplicate (B161325-DUP2) Source: W161153-01</b>										
Mercury	0.0292	ug/L	0.00100	0.00100		0.0245		18 (20)	09/20/16 :09/21/16	
<b>Matrix Spike (B161325-MS1) Source: W161149-01</b>										
Mercury	0.0272	ug/L	0.00100	0.00100	0.0278	0.00377	84% (70-130)		09/20/16 :09/21/16	
<b>Matrix Spike (B161325-MS2) Source: W161153-01</b>										
Mercury	0.0743	ug/L	0.00100	0.00100	0.111	0.0245	45% (70-130)		09/20/16 :09/21/16	M3

Reported: 10/03/16 12:07

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W161149**

**Client: Director's Office**  
**Received: 09/17/16 14:37**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16I342**

**Blank (B16I342-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					09/22/16 :09/28/16	
Acenaphthylene	ND	ug/L	0.020	0.020					09/22/16 :09/28/16	
Anthracene	ND	ug/L	0.020	0.020					09/22/16 :09/28/16	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Chrysene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Fluoranthene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Fluorene	ND	ug/L	0.020	0.020					09/22/16 :09/28/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					09/22/16 :09/28/16	V3
2-Methylnaphthalene	ND	ug/L	0.040	0.040					09/22/16 :09/28/16	
Naphthalene	ND	ug/L	0.040	0.040					09/22/16 :09/28/16	
Phenanthrene	ND	ug/L	0.020	0.020					09/22/16 :09/28/16	
Pyrene	ND	ug/L	0.010	0.010					09/22/16 :09/28/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					09/22/16 :09/28/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					09/22/16 :09/28/16	
Diethyl phthalate	ND	ug/L	1.0	0.50					09/22/16 :09/28/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					09/22/16 :09/28/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					09/22/16 :09/28/16	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					09/22/16 :09/28/16	

**Surrogate**

2-Methylnaphthalene-d10	0.15	ug/L			0.229		67% (31-164)		09/22/16 :09/28/16	
Fluoranthene-d10	0.23	ug/L			0.229		99% (65-145)		09/22/16 :09/28/16	

**LCS (B16I342-BS1)**

Acenaphthene	0.231	ug/L	0.020	0.020	0.229		101% (67-125)		09/22/16 :09/28/16	
Acenaphthylene	0.261	ug/L	0.020	0.020	0.229		114% (64-138)		09/22/16 :09/28/16	
Anthracene	0.258	ug/L	0.020	0.020	0.229		113% (65-143)		09/22/16 :09/28/16	
Benzo(a)anthracene	0.237	ug/L	0.010	0.010	0.229		104% (80-130)		09/22/16 :09/28/16	
Benzo(a)pyrene	0.246	ug/L	0.010	0.010	0.229		108% (74-131)		09/22/16 :09/28/16	
Benzo(b)fluoranthene	0.226	ug/L	0.010	0.010	0.229		99% (67-128)		09/22/16 :09/28/16	
Benzo(g,h,i)perylene	0.223	ug/L	0.010	0.010	0.229		97% (57-137)		09/22/16 :09/28/16	
Benzo(k)fluoranthene	0.237	ug/L	0.010	0.010	0.229		104% (63-140)		09/22/16 :09/28/16	
Chrysene	0.247	ug/L	0.010	0.010	0.229		108% (80-134)		09/22/16 :09/28/16	
Dibenzo(a,h)anthracene	0.238	ug/L	0.010	0.010	0.229		104% (56-138)		09/22/16 :09/28/16	
Fluoranthene	0.253	ug/L	0.010	0.010	0.229		110% (70-150)		09/22/16 :09/28/16	
Fluorene	0.245	ug/L	0.020	0.020	0.229		107% (64-130)		09/22/16 :09/28/16	

Reported: 10/03/16 12:07

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W161149**

**Client: Director's Office**  
**Received: 09/17/16 14:37**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16I342**

**LCS (B16I342-BS1)**

Indeno(1,2,3-cd)pyrene	0.242	ug/L	0.010	0.010	0.229		106% (58-138)		09/22/16 :09/28/16	
Naphthalene	0.217	ug/L	0.040	0.040	0.229		95% (53-134)		09/22/16 :09/28/16	
Phenanthrene	0.232	ug/L	0.020	0.020	0.229		102% (73-132)		09/22/16 :09/28/16	
Pyrene	0.252	ug/L	0.010	0.010	0.229		110% (69-153)		09/22/16 :09/28/16	
Butyl benzyl phthalate	2.97	ug/L	1.0	0.50	2.29		130% (55-181)		09/22/16 :09/28/16	V1
Di-n-butyl phthalate	2.84	ug/L	1.0	0.50	2.29		124% (61-183)		09/22/16 :09/28/16	
Diethyl phthalate	2.96	ug/L	1.0	0.50	2.29		129% (65-177)		09/22/16 :09/28/16	
Dimethyl phthalate	2.81	ug/L	1.0	0.50	2.29		123% (77-151)		09/22/16 :09/28/16	
Di-n-octyl phthalate	3.01	ug/L	1.0	0.50	2.29		132% (12-185)		09/22/16 :09/28/16	V1
Bis(2-ethylhexyl) phthalate	2.76	ug/L	1.0	0.50	2.29		121% (39-170)		09/22/16 :09/28/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.16	ug/L			0.229		70% (31-164)		09/22/16 :09/28/16	
Fluoranthene-d10	0.24	ug/L			0.229		105% (65-145)		09/22/16 :09/28/16	

**Matrix Spike (B16I342-MS1)**

**Source: W16I149-01**

Acenaphthene	0.519	ug/L	0.020	0.020	0.457	ND	114% (67-125)		09/22/16 :09/28/16	
Acenaphthylene	0.557	ug/L	0.020	0.020	0.457	ND	122% (64-138)		09/22/16 :09/28/16	
Anthracene	0.517	ug/L	0.020	0.020	0.457	ND	113% (65-143)		09/22/16 :09/28/16	
Benzo(a)anthracene	0.470	ug/L	0.010	0.010	0.457	ND	103% (80-130)		09/22/16 :09/28/16	
Benzo(a)pyrene	0.419	ug/L	0.010	0.010	0.457	ND	92% (74-131)		09/22/16 :09/28/16	
Benzo(b)fluoranthene	0.401	ug/L	0.010	0.010	0.457	ND	88% (67-128)		09/22/16 :09/28/16	
Benzo(g,h,i)perylene	0.354	ug/L	0.010	0.010	0.457	0.0143	74% (57-137)		09/22/16 :09/28/16	
Benzo(k)fluoranthene	0.387	ug/L	0.010	0.010	0.457	ND	85% (63-140)		09/22/16 :09/28/16	
Chrysene	0.480	ug/L	0.010	0.010	0.457	ND	105% (80-134)		09/22/16 :09/28/16	
Dibenzo(a,h)anthracene	0.352	ug/L	0.010	0.010	0.457	ND	77% (56-138)		09/22/16 :09/28/16	
Fluoranthene	0.521	ug/L	0.010	0.010	0.457	0.0309	107% (70-150)		09/22/16 :09/28/16	
Fluorene	0.511	ug/L	0.020	0.020	0.457	ND	112% (64-130)		09/22/16 :09/28/16	
Indeno(1,2,3-cd)pyrene	0.360	ug/L	0.010	0.010	0.457	ND	79% (58-138)		09/22/16 :09/28/16	
Naphthalene	0.450	ug/L	0.040	0.040	0.457	ND	98% (53-134)		09/22/16 :09/28/16	
Phenanthrene	0.522	ug/L	0.020	0.020	0.457	0.0583	101% (73-132)		09/22/16 :09/28/16	
Pyrene	0.530	ug/L	0.010	0.010	0.457	0.0389	107% (69-153)		09/22/16 :09/28/16	
Butyl benzyl phthalate	6.16	ug/L	1.0	0.50	4.57	ND	135% (55-181)		09/22/16 :09/28/16	V1
Di-n-butyl phthalate	5.71	ug/L	1.0	0.50	4.57	ND	125% (61-183)		09/22/16 :09/28/16	
Diethyl phthalate	5.70	ug/L	1.0	0.50	4.57	ND	125% (65-177)		09/22/16 :09/28/16	
Dimethyl phthalate	5.95	ug/L	1.0	0.50	4.57	ND	130% (77-151)		09/22/16 :09/28/16	
Di-n-octyl phthalate	3.73	ug/L	1.0	0.50	4.57	ND	82% (12-185)		09/22/16 :09/28/16	V1
Bis(2-ethylhexyl) phthalate	4.19	ug/L	1.0	0.50	4.57	1.25	64% (39-170)		09/22/16 :09/28/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.17	ug/L			0.229		76% (31-164)		09/22/16 :09/28/16	
Fluoranthene-d10	0.25	ug/L			0.229		109% (65-145)		09/22/16 :09/28/16	

**Matrix Spike Dup (B16I342-MSD1)**

**Source: W16I149-01**

Reported: 10/03/16 12:07

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W161149**

**Client: Director's Office**  
**Received: 09/17/16 14:37**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B161342**

**Matrix Spike Dup (B161342-MSD1)**

**Source: W161149-01**

Acenaphthene	0.450	ug/L	0.020	0.020	0.457	ND	98% (67-125)	14 (30)	09/22/16 :09/28/16	
Acenaphthylene	0.503	ug/L	0.020	0.020	0.457	ND	110% (64-138)	10 (30)	09/22/16 :09/28/16	
Anthracene	0.456	ug/L	0.020	0.020	0.457	ND	100% (65-143)	13 (30)	09/22/16 :09/28/16	
Benzo(a)anthracene	0.347	ug/L	0.010	0.010	0.457	ND	76% (80-130)	30 (30)	09/22/16 :09/28/16	M6
Benzo(a)pyrene	0.289	ug/L	0.010	0.010	0.457	ND	63% (74-131)	37 (30)	09/22/16 :09/28/16	M6
Benzo(b)fluoranthene	0.273	ug/L	0.010	0.010	0.457	ND	60% (67-128)	38 (30)	09/22/16 :09/28/16	M6
Benzo(g,h,i)perylene	0.227	ug/L	0.010	0.010	0.457	0.0143	47% (57-137)	44 (30)	09/22/16 :09/28/16	M6
Benzo(k)fluoranthene	0.253	ug/L	0.010	0.010	0.457	ND	55% (63-140)	42 (30)	09/22/16 :09/28/16	M6
Chrysene	0.351	ug/L	0.010	0.010	0.457	ND	77% (80-134)	31 (30)	09/22/16 :09/28/16	M6
Dibenzo(a,h)anthracene	0.227	ug/L	0.010	0.010	0.457	ND	50% (56-138)	43 (30)	09/22/16 :09/28/16	M6
Fluoranthene	0.407	ug/L	0.010	0.010	0.457	0.0309	82% (70-150)	25 (30)	09/22/16 :09/28/16	
Fluorene	0.469	ug/L	0.020	0.020	0.457	ND	103% (64-130)	9 (30)	09/22/16 :09/28/16	
Indeno(1,2,3-cd)pyrene	0.229	ug/L	0.010	0.010	0.457	ND	50% (58-138)	45 (30)	09/22/16 :09/28/16	M6
Naphthalene	0.423	ug/L	0.040	0.040	0.457	ND	93% (53-134)	6 (30)	09/22/16 :09/28/16	
Phenanthrene	0.465	ug/L	0.020	0.020	0.457	0.0583	89% (73-132)	11 (30)	09/22/16 :09/28/16	
Pyrene	0.410	ug/L	0.010	0.010	0.457	0.0389	81% (69-153)	26 (30)	09/22/16 :09/28/16	
Butyl benzyl phthalate	4.56	ug/L	1.0	0.50	4.57	ND	100% (55-181)	30 (30)	09/22/16 :09/28/16	V1
Di-n-butyl phthalate	4.49	ug/L	1.0	0.50	4.57	ND	98% (61-183)	24 (30)	09/22/16 :09/28/16	
Diethyl phthalate	5.26	ug/L	1.0	0.50	4.57	ND	115% (65-177)	8 (30)	09/22/16 :09/28/16	
Dimethyl phthalate	5.48	ug/L	1.0	0.50	4.57	ND	120% (77-151)	8 (30)	09/22/16 :09/28/16	
Di-n-octyl phthalate	2.76	ug/L	1.0	0.50	4.57	ND	60% (12-185)	30 (30)	09/22/16 :09/28/16	V1
Bis(2-ethylhexyl) phthalate	3.26	ug/L	1.0	0.50	4.57	1.25	44% (39-170)	25 (30)	09/22/16 :09/28/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.16	ug/L			0.229		72% (31-164)		09/22/16 :09/28/16	
Fluoranthene-d10	0.19	ug/L			0.229		85% (65-145)		09/22/16 :09/28/16	

Reported: 10/03/16 12:07

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



City of Portland  
Water Pollution Control Laboratory

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ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W161149**

Client: Director's Office  
Received: 09/17/16 14:37

**Qualifiers**

- D4 Reporting limit is raised for this analyte due to non-target matrix interference.
- J Analyte was detected but at a concentration below the reporting limit; the result is an estimate.
- M3 Inconsistent results for matrix QC (duplicates and/or matrix spikes) indicate non-homogeneous sample matrix. Sample results should be considered estimates.
- M6 Based on low matrix spike recovery, sample results may be low estimates due to matrix interference.
- V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.
- V3 Continuing calibration verification was low; sample results for this analyte may be low estimates.

**Definitions**

- |        |   |     |  |
|--------|---|-----|--|
| DET    | Analyte Detected                          | ND  | Analyte Not Detected at or above the reporting limit |
| MRL    | Method Reporting Limit                    | MDL | Method Detection Limit                               |
| NR     | Not Reportable                            | dry | Sample results reported on a dry weight basis        |
| % Rec. | Percent Recovery                          | RPD | Relative Percent Difference                          |
| *      | This analyte is not certified under NELAP |     |  |

Reported: 10/03/16 12:07

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Jennifer Shackelford, Laboratory Coordinator QA/QC

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody



Bureau of Environmental Services

Date: 9-17-16

Work Order #: W161149

Collected By: KEB / MJS / EY

Client Name: Director's Office Matrix: Stormwater  
 Project Name: Portland Harbor

Requested Analyses SMARTROLL # 34

Lab Number	2016 Stormwater Outfall Monitoring COC		Sample Date	Sample Time	Sample Type	TSS	Total Metals (As, Cd, Cr, Cu, Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs + phthalates (low-level)	Pesticides (Low-level)	Conductivity (umhos/cm)	pH (pH units)	Temperature (Deg C)	# of Containers	Remarks
	Location ID	Sample Date														
01	52D-SW5	9-17-16	1107	G								57	7.50	17.0	4	
02	M35W1	9-17-16	1158	G								74	7.0	16.2	4	
03	16-SW2	9-17-16	1220	G								174	6.9	17.3	4	
04	16-SW1	9-17-16	1303	G								33	7.3	17.5	4	
05	19-SW2	9-17-16	1321	G								34	7.3	18.5	4	

Inquired By: *Emma* Date: 9-17-16  
 Signature: *Emma* Time: 1437  
 Relinquished By: *Emma* Date: 9-17-16  
 Signature: *Emma* Time: 1437  
 Received By: *Emma* Date: 9-17-16  
 Signature: *Emma* Time: 1437  
 Printed Name: EMMA RICHARD  
 Printed Name: EMMA RICHARD  
 Printed Name: EMMA RICHARD  
 Printed Name: EMMA RICHARD

### WPCL Cooler Receipt Form

Work Order Number: W16I149

Cooler Receipt Form Filled Out By: RK

Project: Portland Harbor

Sample transport: Samples received on ice  Courier \_\_\_\_\_

Directly from field

Temperature (°C) 15

	Yes	No	NA
Is the COC present and signed?	✓		
Are sample bottles intact?	✓		
Do the COC and sample labels match?	✓		
Are the appropriate containers used?	✓		
Are samples appropriately preserved?	✓		
Do VOA vials have Headspace?			✓
Are samples received within holding times?	✓		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	1601146	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
9-17-16	1455	RK	W16I149-01+th <sub>2</sub> 05	D	1	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

September 30, 2016

**Analytical Report for Service Request No: K1611069**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W161149**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory September 19, 2016  
For your reference, these analyses have been assigned our service request number **K1611069**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

## Table of Contents

Acronyms

Qualifiers

State Certifications, Accreditations, And Licenses

Chain of Custody

Subcontract Lab Results

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

**SUBCONTRACT ORDER**

**City of Portland Water Pollution Control Lab  
W16I149**

*W16I149*

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
6543 N. Burlington Ave  
Portland, OR 97203  
Phone: 503-823-5600  
Fax: 503-823-5656  
Invoice To: Charles Lytle

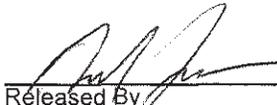
**RECEIVING LABORATORY:**

ALS Environmental  
1317 S. 13th Avenue  
Kelso, WA 98626  
Phone :(360) 577-7222  
Fax: (360) 636-1068

**WPCL Project Name**  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>	
<input checked="" type="checkbox"/> Standard	
<input type="checkbox"/> Rush _ day(s)	

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W16I149-01</b>	<b>Water</b>	<b>Sampled:09/17/16 11:07</b>		
Out-PCB Congeners 209	10/03/16 17:00	03/16/17 11:07		
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16I149-02</b>	<b>Water</b>	<b>Sampled:09/17/16 11:58</b>		
Out-PCB Congeners 209	10/03/16 17:00	03/16/17 11:58		
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16I149-03</b>	<b>Water</b>	<b>Sampled:09/17/16 12:20</b>		
Out-PCB Congeners 209	10/03/16 17:00	03/16/17 12:20		
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16I149-04</b>	<b>Water</b>	<b>Sampled:09/17/16 13:03</b>		
Out-PCB Congeners 209	10/03/16 17:00	03/16/17 13:03		
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16I149-05</b>	<b>Water</b>	<b>Sampled:09/17/16 13:21</b>		
Out-PCB Congeners 209	10/03/16 17:00	03/16/17 13:21		
<i>Containers Supplied:</i> G amber 1L (A)				

	<i>9-19-16 11:00</i>	<i>W16I149 ALS</i>	<i>9-19-16 11:00</i>
Released By	Date	Received By	Date
			<i>9/19/16 1300</i>
Released By	Date	Received By	Date



### Cooler Receipt and Preservation Form

Client City of Portland Service Request K16 11069  
 Received: 9/19/16 Opened: 9/19/16 By: [Signature] Unloaded: 9/19/16 By: [Signature]

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered  
 2. Samples were received in: (circle) Cooler Box Envelope Other NA  
 3. Were custody seals on coolers? NA Y N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
<u>5.9</u>	<u>6.0</u>	<u>—</u>	<u>—</u>	<u>+1</u>	<u>327</u>	<u>NA</u>		<u>NA</u>	
<u>6.7</u>	<u>6.6</u>			<u>-1</u>	<u>362</u>				

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves  
 5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N  
 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N  
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed  
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N  
 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N  
 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N  
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N  
 11. Were VOA vials received without headspace? Indicate in the table below. NA Y N  
 12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Report Prepared for:**

Howard Holmes  
ALS Environmental  
1317 S. 13th Avenue  
Kelso WA 98626

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Prepared Date:**

September 29, 2016

**Report Information:**

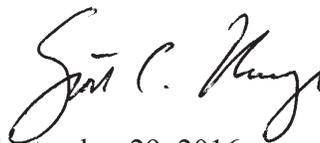
**Pace Project #: 10363209**  
**Sample Receipt Date: 09/21/2016**  
**Client Project #: K1611069**  
**Client Sub PO #: 51K1611069**  
**State Cert #: MN200001-005**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



September 29, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.

## **DISCUSSION**

This report presents the results from the analyses performed on five samples submitted by a representative of ALS Environmental. The samples were analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the amount of sample extracted.

The isotopically-labeled PCB internal standards in the sample extracts were recovered at 47-111%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the sample material.

Laboratory spike samples were also prepared with the sample batch using reference material that had been fortified with native standards. The results show that the spiked native compounds were recovered at 98-117%, with relative percent differences of 0.0-10.9%. These results were within the target ranges for this method. Matrix spikes were not prepared with the sample batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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Report No.....10363209

# Appendix A

## Sample Management

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

Project Number: K1611069  
 Project Manager: Howard Holmes  
 QAP: LAB QAP

10363209

209 list

Lab Code	Sample ID	# of Cont.	Matrix	Sample Time			Lab ID	CI Biphen Cong 1668A
				Date	Time	Pace		
K1611069-001	W161149-01		Water	9/17/16	1107	Pace MN	X	
K1611069-002	W161149-02		Water	9/17/16	1158	Pace MN	X	
K1611069-003	W161149-03		Water	9/17/16	1220	Pace MN	X	
K1611069-004	W161149-04		Water	9/17/16	1303	Pace MN	X	
K1611069-005	W161149-05		Water	9/17/16	1321	Pace MN	X	

Test Comments: CI Biphen Cong - 1668A K1611069-001,2,3,4,5 209 list

Folder Comments: Tier II 1668 PCB Congeners 209 list to Pace

City of Portland EDD

HC

Special Instructions/Comments Please provide the electronic (PDF and EDD) report to the following e-mail address: ALKLS.Data@alsglobal.com.  <i>Report to EDD to City</i> <i>Report, EDD &amp; Invoice to Als/Kelso</i> <i>Heavenly/Ally</i>	Turnaround Requirements RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD	Report Requirements I. Results Only II. Results + QC Summaries III. Results + QC and Calibration Summaries IV. Data Validation Report with Raw Data PQL/MDL/J Y EDD Y	Invoice Information PO# 51K1611069 Bill to
	Requested Report Date: 09/30/16	Requested FAX Date:	Requested Report Date: 09/30/16

Inquired By: HC 9/20/16  
 Received By: Ni Ci/PACE 9/21/16  
 Airbill Number:

<b>Sample Condition Upon Receipt</b>	<b>Client Name:</b> <u>ALS Environmental</u>	<b>Project #:</b> <b>WO# : 10363209</b>
<b>Courier:</b> <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Fed Ex <input type="checkbox"/> UPS <input type="checkbox"/> USPS <input type="checkbox"/> Client	<input type="checkbox"/> Pace <input type="checkbox"/> Speedee <input type="checkbox"/> Other:	 10363209
<b>Tracking Number:</b> <u>6447 9279 4649</u>		

**Custody Seal on Cooler/Box Present?**  Yes  No      **Seals Intact?**  Yes  No      **Optional:** Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_

**Packing Material:**  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_      **Temp Blank?**  Yes  No

**Thermometer**  151401163  B88A912167504      **Type of Ice:**  Wet  Blue  None  Samples on ice, cooling process has begun  
**Used:**  151401164  B88A0143310098

**Cooler Temp Read (°C):** 2.9      **Cooler Temp Corrected (°C):** 2.7      **Biological Tissue Frozen?**  Yes  No  N/A  
 Temp should be above freezing to 6°C      **Correction Factor:** -0.2      **Date and Initials of Person Examining Contents:** BC 9/21/16

**USDA Regulated Soil** (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes  No      Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
 If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A -Pace Containers Used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	9.
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A -Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	12.
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH >12 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl Sample # Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Pace Trip Blank Lot # (if purchased): _____	15.

**CLIENT NOTIFICATION/RESOLUTION**      **Field Data Required?**  Yes  No

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/Resolution: \_\_\_\_\_

**Project Manager Review:** Scott Unze      **Date:** 09/21/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office ( i.e out of hold, incorrect preservative, out of temp, incorrect containers).



## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

### REPORT OF LABORATORY ANALYSIS

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# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1611069-001		
Lab Sample ID	10363209001		
Filename	P160927B_09		
Injected By	CVS		
Total Amount Extracted	1020 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	09/17/2016 11:07
ICAL ID	P160927B02	Received	09/21/2016 10:00
CCal Filename(s)	P160927B_01	Extracted	09/22/2016 14:45
Method Blank ID	BLANK-52083	Analyzed	09/28/2016 05:32

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.896	2.87	2.0	1.24	62
13C-4-MoCB	3	11.532	3.23	2.0	1.21	60
13C-2,2'-DiCB	4	11.784	1.63	2.0	0.976	49
13C-4,4'-DiCB	15	18.611	1.53	2.0	1.44	72
13C-2,2',6-TrCB	19	15.388	1.04	2.0	1.13	57
13C-3,4,4'-TrCB	37	26.228	1.03	2.0	1.55	78
13C-2,2',6,6'-TeCB	54	18.868	0.81	2.0	1.17	59
13C-3,4,4',5'-TeCB	81	33.276	0.80	2.0	1.86	93
13C-3,3',4,4'-TeCB	77	33.863	0.85	2.0	1.83	92
13C-2,2',4,6,6'-PeCB	104	24.820	1.63	2.0	1.15	58
13C-2,3,3',4,4'-PeCB	105	37.407	1.62	2.0	1.73	87
13C-2,3,4,4',5'-PeCB	114	36.736	1.63	2.0	1.78	89
13C-2,3',4,4',5'-PeCB	118	36.199	1.60	2.0	1.82	91
13C-2,3',4,4',5'-PeCB	123	35.864	1.66	2.0	1.81	91
13C-3,3',4,4',5'-PeCB	126	40.592	1.56	2.0	1.70	85
13C-2,2',4,4',6,6'-HxCB	155	30.778	1.24	2.0	1.24	62
13C-HxCB (156/157)	156/157	43.633	1.29	4.0	3.11	78
13C-2,3',4,4',5,5'-HxCB	167	42.425	1.27	2.0	1.65	83
13C-3,3',4,4',5,5'-HxCB	169	46.936	1.24	2.0	1.46	73
13C-2,2',3,4',5,6,6'-HpCB	188	36.652	0.99	2.0	1.39	70
13C-2,3,3',4,4',5,5'-HpCB	189	49.447	0.96	2.0	1.55	78
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.124	0.83	2.0	1.66	83
13C-2,3,3',4,4',5,5',6-OxCB	205	52.012	0.86	2.0	1.53	76
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.736	0.80	2.0	1.30	65
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.887	0.80	2.0	1.58	79
13C--DeCB	209	55.331	0.75	2.0	1.57	79
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.903	1.07	2.0	1.90	95
13C-2,3,3',5,5'-PeCB	111	33.829	1.61	2.0	1.64	82
13C-2,2',3,3',5,5',6-HpCB	178	39.788	1.13	2.0	1.55	77
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.106	1.54	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.831	0.81	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.046	1.54	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.352	1.30	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.538	0.94	2.0	NA	NA

Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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 \* = See Discussion  
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 RT = Retention Time  
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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1611069-001  
 Lab Sample ID 10363209001  
 Filename P160927B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.245
2		---	---	ND	---	0.245
3		---	---	ND	---	0.245
4		---	---	ND	---	0.245
5		---	---	ND	---	0.245
6		---	---	ND	---	0.245
7		---	---	ND	---	0.245
8		---	---	ND	---	0.245
9		---	---	ND	---	0.245
10		---	---	ND	---	0.245
11		---	---	ND	---	2.40
12	12/13	---	---	ND	---	0.490
13	12/13	---	---	ND	---	0.490
14		---	---	ND	---	0.245
15		---	---	ND	---	0.324
16		---	---	ND	---	0.245
17		---	---	ND	---	0.245
18	18/30	---	---	ND	---	0.490
19		---	---	ND	---	0.245
20	20/28	---	---	ND	---	1.26
21	21/33	---	---	ND	---	1.32
22		---	---	ND	---	0.931
23		---	---	ND	---	0.245
24		---	---	ND	---	0.245
25		---	---	ND	---	0.245
26	26/29	---	---	ND	---	0.490
27		---	---	ND	---	0.245
28	20/28	---	---	ND	---	1.26
29	26/29	---	---	ND	---	0.490
30	18/30	---	---	ND	---	0.490
31		---	---	ND	---	1.27
32		---	---	ND	---	0.245
33	21/33	---	---	ND	---	1.32
34		---	---	ND	---	0.245
35		---	---	ND	---	0.245
36		---	---	ND	---	0.245
37		---	---	ND	---	0.520
38		---	---	ND	---	0.245
39		---	---	ND	---	0.245
40	40/41/71	---	---	ND	---	1.47
41	40/41/71	---	---	ND	---	1.47
42		---	---	ND	---	0.490
43	43/73	---	---	ND	---	0.490
44	44/47/65	---	---	ND	---	1.47
45	45/51	---	---	ND	---	0.980
46		---	---	ND	---	0.490
47	44/47/65	---	---	ND	---	1.47
48		---	---	ND	---	0.490

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID           K1611069-001  
 Lab Sample ID             10363209001  
 Filename                    P160927B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.980
50	50/53	---	---	ND	---	0.980
51	45/51	---	---	ND	---	0.980
52		---	---	ND	---	1.51
53	50/53	---	---	ND	---	0.980
54		---	---	ND	---	0.490
55		---	---	ND	---	0.490
56		---	---	ND	---	0.490
57		---	---	ND	---	0.490
58		---	---	ND	---	0.490
59	59/62/75	---	---	ND	---	1.47
60		---	---	ND	---	0.490
61	61/70/74/76	---	---	ND	---	1.96
62	59/62/75	---	---	ND	---	1.47
63		---	---	ND	---	0.490
64		---	---	ND	---	0.490
65	44/47/65	---	---	ND	---	1.47
66		---	---	ND	---	0.824
67		---	---	ND	---	0.490
68		---	---	ND	---	0.490
69	49/69	---	---	ND	---	0.980
70	61/70/74/76	---	---	ND	---	1.96
71	40/41/71	---	---	ND	---	1.47
72		---	---	ND	---	0.490
73	43/73	---	---	ND	---	0.490
74	61/70/74/76	---	---	ND	---	1.96
75	59/62/75	---	---	ND	---	1.47
76	61/70/74/76	---	---	ND	---	1.96
77		---	---	ND	---	0.490
78		---	---	ND	---	0.490
79		---	---	ND	---	0.490
80		---	---	ND	---	0.490
81		---	---	ND	---	0.490
82		---	---	ND	---	0.490
83		---	---	ND	---	0.490
84		---	---	ND	---	0.490
85	85/116/117	---	---	ND	---	1.47
86	86/87/97/108/119/125	---	---	ND	---	2.94
87	86/87/97/108/119/125	---	---	ND	---	2.94
88	88/91	---	---	ND	---	0.980
89		---	---	ND	---	0.490
90	90/101/113	---	---	ND	---	1.47
91	88/91	---	---	ND	---	0.980
92		---	---	ND	---	0.490
93	93/98/100/102	---	---	ND	---	1.96
94		---	---	ND	---	0.490
95		---	---	ND	---	0.931
96		---	---	ND	---	0.490

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1611069-001  
 Lab Sample ID 10363209001  
 Filename P160927B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.94
98	93/98/100/102	---	---	ND	---	1.96
99		---	---	ND	---	0.490
100	93/98/100/102	---	---	ND	---	1.96
101	90/101/113	---	---	ND	---	1.47
102	93/98/100/102	---	---	ND	---	1.96
103		---	---	ND	---	0.490
104		---	---	ND	---	0.490
105		---	---	ND	---	0.490
106		---	---	ND	---	0.490
107	107/124	---	---	ND	---	0.980
108	86/87/97/108/119/125	---	---	ND	---	2.94
109		---	---	ND	---	0.490
110	110/115	---	---	ND	---	0.980
111		---	---	ND	---	0.490
112		---	---	ND	---	0.490
113	90/101/113	---	---	ND	---	1.47
114		---	---	ND	---	0.490
115	110/115	---	---	ND	---	0.980
116	85/116/117	---	---	ND	---	1.47
117	85/116/117	---	---	ND	---	1.47
118		---	---	ND	---	0.628
119	86/87/97/108/119/125	---	---	ND	---	2.94
120		---	---	ND	---	0.490
121		---	---	ND	---	0.490
122		---	---	ND	---	0.490
123		---	---	ND	---	0.490
124	107/124	---	---	ND	---	0.980
125	86/87/97/108/119/125	---	---	ND	---	2.94
126		---	---	ND	---	0.490
127		---	---	ND	---	0.490
128	128/166	---	---	ND	---	0.980
129	129/138/163	---	---	ND	---	1.47
130		---	---	ND	---	0.490
131		---	---	ND	---	0.490
132		---	---	ND	---	0.490
133		---	---	ND	---	0.490
134	134/143	---	---	ND	---	0.980
135	135/151	---	---	ND	---	0.980
136		---	---	ND	---	0.490
137		---	---	ND	---	0.490
138	129/138/163	---	---	ND	---	1.47
139	139/140	---	---	ND	---	0.980
140	139/140	---	---	ND	---	0.980
141		---	---	ND	---	0.490
142		---	---	ND	---	0.490
143	134/143	---	---	ND	---	0.980
144		---	---	ND	---	0.490

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1611069-001  
 Lab Sample ID 10363209001  
 Filename P160927B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.490
146		---	---	ND	---	0.490
147	147/149	---	---	ND	---	0.980
148		---	---	ND	---	0.490
149	147/149	---	---	ND	---	0.980
150		---	---	ND	---	0.490
151	135/151	---	---	ND	---	0.980
152		---	---	ND	---	0.490
153	153/168	---	---	ND	---	0.980
154		---	---	ND	---	0.490
155		---	---	ND	---	0.490
156	156/157	---	---	ND	---	0.980
157	156/157	---	---	ND	---	0.980
158		---	---	ND	---	0.490
159		---	---	ND	---	0.490
160		---	---	ND	---	0.490
161		---	---	ND	---	0.490
162		---	---	ND	---	0.490
163	129/138/163	---	---	ND	---	1.47
164		---	---	ND	---	0.490
165		---	---	ND	---	0.490
166	128/166	---	---	ND	---	0.980
167		---	---	ND	---	0.490
168	153/168	---	---	ND	---	0.980
169		---	---	ND	---	0.490
170		---	---	ND	---	0.490
171	171/173	---	---	ND	---	0.980
172		---	---	ND	---	0.490
173	171/173	---	---	ND	---	0.980
174		---	---	ND	---	0.490
175		---	---	ND	---	0.490
176		---	---	ND	---	0.490
177		---	---	ND	---	0.490
178		---	---	ND	---	0.490
179		---	---	ND	---	0.490
180	180/193	---	---	ND	---	0.980
181		---	---	ND	---	0.490
182		---	---	ND	---	0.490
183	183/185	---	---	ND	---	0.980
184		---	---	ND	---	0.490
185	183/185	---	---	ND	---	0.980
186		---	---	ND	---	0.490
187		---	---	ND	---	0.490
188		---	---	ND	---	0.490
189		---	---	ND	---	0.490
190		---	---	ND	---	0.490
191		---	---	ND	---	0.490
192		---	---	ND	---	0.490

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1611069-001  
 Lab Sample ID        10363209001  
 Filename                P160927B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.980
194		---	---	ND	---	0.735
195		---	---	ND	---	0.735
196		---	---	ND	---	0.735
197	197/200	---	---	ND	---	1.47
198	198/199	---	---	ND	---	1.47
199	198/199	---	---	ND	---	1.47
200	197/200	---	---	ND	---	1.47
201		---	---	ND	---	0.735
202		---	---	ND	---	0.735
203		---	---	ND	---	0.735
204		---	---	ND	---	0.735
205		---	---	ND	---	0.735
206		---	---	ND	---	0.735
207		---	---	ND	---	0.735
208		---	---	ND	---	0.735
209		---	---	ND	---	0.735

Conc = Concentration  
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 EMPC = Estimated Maximum Possible Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1611069-001  
Lab Sample ID             10363209001  
Filename                    P160927B\_09

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1611069-002		
Lab Sample ID	10363209002		
Filename	P160927B_10		
Injected By	CVS		
Total Amount Extracted	850 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	09/17/2016 11:58
ICAL ID	P160927B02	Received	09/21/2016 10:00
CCal Filename(s)	P160927B_01	Extracted	09/22/2016 14:45
Method Blank ID	BLANK-52083	Analyzed	09/28/2016 06:31

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.896	3.01	2.0	1.25	62
13C-4-MoCB	3	11.532	3.37	2.0	1.19	59
13C-2,2'-DiCB	4	11.784	1.48	2.0	1.04	52
13C-4,4'-DiCB	15	18.611	1.50	2.0	1.37	69
13C-2,2',6-TrCB	19	15.388	1.02	2.0	1.27	64
13C-3,4,4'-TrCB	37	26.230	1.11	2.0	1.79	89
13C-2,2',6,6'-TeCB	54	18.868	0.80	2.0	1.26	63
13C-3,4,4',5'-TeCB	81	33.278	0.80	2.0	1.97	99
13C-3,3',4,4'-TeCB	77	33.865	0.84	2.0	2.01	101
13C-2,2',4,6,6'-PeCB	104	24.821	1.60	2.0	1.15	58
13C-2,3,3',4,4'-PeCB	105	37.426	1.57	2.0	1.86	93
13C-2,3,4,4',5'-PeCB	114	36.755	1.51	2.0	1.73	87
13C-2,3',4,4',5'-PeCB	118	36.201	1.56	2.0	1.81	90
13C-2,3',4,4',5'-PeCB	123	35.849	1.63	2.0	1.91	96
13C-3,3',4,4',5'-PeCB	126	40.595	1.62	2.0	1.83	91
13C-2,2',4,4',6,6'-HxCB	155	30.780	1.35	2.0	1.33	67
13C-HxCB (156/157)	156/157	43.602	1.25	4.0	3.46	86
13C-2,3',4,4',5,5'-HxCB	167	42.429	1.24	2.0	1.85	92
13C-3,3',4,4',5,5'-HxCB	169	46.923	1.32	2.0	1.55	77
13C-2,2',3,4',5,6,6'-HpCB	188	36.654	1.03	2.0	1.39	69
13C-2,3,3',4,4',5,5'-HpCB	189	49.433	1.11	2.0	1.55	78
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.126	0.90	2.0	1.64	82
13C-2,3,3',4,4',5,5',6-OxCB	205	52.020	0.90	2.0	1.56	78
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.745	0.68	2.0	1.45	73
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.873	0.85	2.0	1.58	79
13C--DeCB	209	55.340	0.68	2.0	1.61	80
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.903	1.06	2.0	1.86	93
13C-2,3,3',5,5'-PeCB	111	33.815	1.46	2.0	1.65	83
13C-2,2',3,3',5,5',6-HpCB	178	39.790	1.10	2.0	1.70	85
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.106	1.54	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.832	0.79	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.031	1.69	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.354	1.21	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.525	0.82	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
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 \* = See Discussion  
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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1611069-002  
 Lab Sample ID 10363209002  
 Filename P160927B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.294
2		---	---	ND	---	0.294
3		---	---	ND	---	0.294
4		---	---	ND	---	0.294
5		---	---	ND	---	0.294
6		---	---	ND	---	0.294
7		---	---	ND	---	0.294
8		---	---	ND	---	0.294
9		---	---	ND	---	0.294
10		---	---	ND	---	0.294
11		---	---	ND	---	2.88
12	12/13	---	---	ND	---	0.588
13	12/13	---	---	ND	---	0.588
14		---	---	ND	---	0.294
15		---	---	ND	---	0.388
16		---	---	ND	---	0.294
17		---	---	ND	---	0.294
18	18/30	---	---	ND	---	0.588
19		---	---	ND	---	0.294
20	20/28	---	---	ND	---	1.52
21	21/33	---	---	ND	---	1.59
22		---	---	ND	---	1.12
23		---	---	ND	---	0.294
24		---	---	ND	---	0.294
25		---	---	ND	---	0.294
26	26/29	---	---	ND	---	0.588
27		---	---	ND	---	0.294
28	20/28	---	---	ND	---	1.52
29	26/29	---	---	ND	---	0.588
30	18/30	---	---	ND	---	0.588
31		---	---	ND	---	1.53
32		---	---	ND	---	0.294
33	21/33	---	---	ND	---	1.59
34		---	---	ND	---	0.294
35		---	---	ND	---	0.294
36		---	---	ND	---	0.294
37		---	---	ND	---	0.623
38		---	---	ND	---	0.294
39		---	---	ND	---	0.294
40	40/41/71	---	---	ND	---	1.76
41	40/41/71	---	---	ND	---	1.76
42		---	---	ND	---	0.588
43	43/73	---	---	ND	---	0.588
44	44/47/65	---	---	ND	---	1.76
45	45/51	---	---	ND	---	1.18
46		---	---	ND	---	0.588
47	44/47/65	---	---	ND	---	1.76
48		---	---	ND	---	0.588

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1611069-002  
Lab Sample ID             10363209002  
Filename                    P160927B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.18
50	50/53	---	---	ND	---	1.18
51	45/51	---	---	ND	---	1.18
52		---	---	ND	---	1.81
53	50/53	---	---	ND	---	1.18
54		---	---	ND	---	0.588
55		---	---	ND	---	0.588
56		---	---	ND	---	0.588
57		---	---	ND	---	0.588
58		---	---	ND	---	0.588
59	59/62/75	---	---	ND	---	1.76
60		---	---	ND	---	0.588
61	61/70/74/76	---	---	ND	---	2.35
62	59/62/75	---	---	ND	---	1.76
63		---	---	ND	---	0.588
64		---	---	ND	---	0.588
65	44/47/65	---	---	ND	---	1.76
66		---	---	ND	---	0.988
67		---	---	ND	---	0.588
68		---	---	ND	---	0.588
69	49/69	---	---	ND	---	1.18
70	61/70/74/76	---	---	ND	---	2.35
71	40/41/71	---	---	ND	---	1.76
72		---	---	ND	---	0.588
73	43/73	---	---	ND	---	0.588
74	61/70/74/76	---	---	ND	---	2.35
75	59/62/75	---	---	ND	---	1.76
76	61/70/74/76	---	---	ND	---	2.35
77		---	---	ND	---	0.588
78		---	---	ND	---	0.588
79		---	---	ND	---	0.588
80		---	---	ND	---	0.588
81		---	---	ND	---	0.588
82		---	---	ND	---	0.588
83		---	---	ND	---	0.588
84		---	---	ND	---	0.588
85	85/116/117	---	---	ND	---	1.76
86	86/87/97/108/119/125	---	---	ND	---	3.53
87	86/87/97/108/119/125	---	---	ND	---	3.53
88	88/91	---	---	ND	---	1.18
89		---	---	ND	---	0.588
90	90/101/113	---	---	ND	---	1.76
91	88/91	---	---	ND	---	1.18
92		---	---	ND	---	0.588
93	93/98/100/102	---	---	ND	---	2.35
94		---	---	ND	---	0.588
95		---	---	ND	---	1.12
96		---	---	ND	---	0.588

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1611069-002  
 Lab Sample ID 10363209002  
 Filename P160927B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.53
98	93/98/100/102	---	---	ND	---	2.35
99		---	---	ND	---	0.588
100	93/98/100/102	---	---	ND	---	2.35
101	90/101/113	---	---	ND	---	1.76
102	93/98/100/102	---	---	ND	---	2.35
103		---	---	ND	---	0.588
104		---	---	ND	---	0.588
105		---	---	ND	---	0.588
106		---	---	ND	---	0.588
107	107/124	---	---	ND	---	1.18
108	86/87/97/108/119/125	---	---	ND	---	3.53
109		---	---	ND	---	0.588
110	110/115	---	---	ND	---	1.18
111		---	---	ND	---	0.588
112		---	---	ND	---	0.588
113	90/101/113	---	---	ND	---	1.76
114		---	---	ND	---	0.588
115	110/115	---	---	ND	---	1.18
116	85/116/117	---	---	ND	---	1.76
117	85/116/117	---	---	ND	---	1.76
118		---	---	ND	---	0.753
119	86/87/97/108/119/125	---	---	ND	---	3.53
120		---	---	ND	---	0.588
121		---	---	ND	---	0.588
122		---	---	ND	---	0.588
123		---	---	ND	---	0.588
124	107/124	---	---	ND	---	1.18
125	86/87/97/108/119/125	---	---	ND	---	3.53
126		---	---	ND	---	0.588
127		---	---	ND	---	0.588
128	128/166	---	---	ND	---	1.18
129	129/138/163	---	---	ND	---	1.76
130		---	---	ND	---	0.588
131		---	---	ND	---	0.588
132		---	---	ND	---	0.588
133		---	---	ND	---	0.588
134	134/143	---	---	ND	---	1.18
135	135/151	---	---	ND	---	1.18
136		---	---	ND	---	0.588
137		---	---	ND	---	0.588
138	129/138/163	---	---	ND	---	1.76
139	139/140	---	---	ND	---	1.18
140	139/140	---	---	ND	---	1.18
141		---	---	ND	---	0.588
142		---	---	ND	---	0.588
143	134/143	---	---	ND	---	1.18
144		---	---	ND	---	0.588

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1611069-002  
 Lab Sample ID 10363209002  
 Filename P160927B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.588
146		---	---	ND	---	0.588
147	147/149	---	---	ND	---	1.18
148		---	---	ND	---	0.588
149	147/149	---	---	ND	---	1.18
150		---	---	ND	---	0.588
151	135/151	---	---	ND	---	1.18
152		---	---	ND	---	0.588
153	153/168	---	---	ND	---	1.18
154		---	---	ND	---	0.588
155		---	---	ND	---	0.588
156	156/157	---	---	ND	---	1.18
157	156/157	---	---	ND	---	1.18
158		---	---	ND	---	0.588
159		---	---	ND	---	0.588
160		---	---	ND	---	0.588
161		---	---	ND	---	0.588
162		---	---	ND	---	0.588
163	129/138/163	---	---	ND	---	1.76
164		---	---	ND	---	0.588
165		---	---	ND	---	0.588
166	128/166	---	---	ND	---	1.18
167		---	---	ND	---	0.588
168	153/168	---	---	ND	---	1.18
169		---	---	ND	---	0.588
170		---	---	ND	---	0.588
171	171/173	---	---	ND	---	1.18
172		---	---	ND	---	0.588
173	171/173	---	---	ND	---	1.18
174		---	---	ND	---	0.588
175		---	---	ND	---	0.588
176		---	---	ND	---	0.588
177		---	---	ND	---	0.588
178		---	---	ND	---	0.588
179		---	---	ND	---	0.588
180	180/193	---	---	ND	---	1.18
181		---	---	ND	---	0.588
182		---	---	ND	---	0.588
183	183/185	---	---	ND	---	1.18
184		---	---	ND	---	0.588
185	183/185	---	---	ND	---	1.18
186		---	---	ND	---	0.588
187		---	---	ND	---	0.588
188		---	---	ND	---	0.588
189		---	---	ND	---	0.588
190		---	---	ND	---	0.588
191		---	---	ND	---	0.588
192		---	---	ND	---	0.588

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1611069-002  
 Lab Sample ID        10363209002  
 Filename                P160927B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.18
194		---	---	ND	---	0.882
195		---	---	ND	---	0.882
196		---	---	ND	---	0.882
197	197/200	---	---	ND	---	1.76
198	198/199	---	---	ND	---	1.76
199	198/199	---	---	ND	---	1.76
200	197/200	---	---	ND	---	1.76
201		---	---	ND	---	0.882
202		---	---	ND	---	0.882
203		---	---	ND	---	0.882
204		---	---	ND	---	0.882
205		---	---	ND	---	0.882
206		---	---	ND	---	0.882
207		---	---	ND	---	0.882
208		---	---	ND	---	0.882
209		---	---	ND	---	0.882

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1611069-002  
Lab Sample ID             10363209002  
Filename                    P160927B\_10

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1611069-003		
Lab Sample ID	10363209003		
Filename	P160928A_11		
Injected By	CVS		
Total Amount Extracted	960 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	09/17/2016 12:20
ICAL ID	P160928A02	Received	09/21/2016 10:00
CCal Filename(s)	P160928A_01	Extracted	09/22/2016 14:45
Method Blank ID	BLANK-52083	Analyzed	09/28/2016 22:24

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.861	2.99	2.0	1.16	58
13C-4-MoCB	3	11.496	2.88	2.0	1.19	60
13C-2,2'-DiCB	4	11.748	1.47	2.0	0.983	49
13C-4,4'-DiCB	15	18.563	1.65	2.0	1.37	69
13C-2,2',6-TrCB	19	15.364	1.00	2.0	1.06	53
13C-3,4,4'-TrCB	37	26.188	1.00	2.0	1.58	79
13C-2,2',6,6'-TeCB	54	18.827	0.80	2.0	0.971	49
13C-3,4,4',5'-TeCB	81	33.236	0.77	2.0	1.72	86
13C-3,3',4,4'-TeCB	77	33.822	0.77	2.0	1.67	84
13C-2,2',4,6,6'-PeCB	104	24.796	1.61	2.0	1.16	58
13C-2,3,3',4,4'-PeCB	105	37.382	1.61	2.0	1.62	81
13C-2,3,4,4',5'-PeCB	114	36.711	1.61	2.0	1.67	83
13C-2,3',4,4',5'-PeCB	118	36.158	1.50	2.0	1.61	80
13C-2,3',4,4',5'-PeCB	123	35.823	1.52	2.0	1.67	83
13C-3,3',4,4',5'-PeCB	126	40.568	1.59	2.0	1.67	84
13C-2,2',4,4',6,6'-HxCB	155	30.754	1.26	2.0	1.29	64
13C-HxCB (156/157)	156/157	43.608	1.28	4.0	3.06	77
13C-2,3',4,4',5,5'-HxCB	167	42.401	1.22	2.0	1.56	78
13C-3,3',4,4',5,5'-HxCB	169	46.911	1.23	2.0	1.51	76
13C-2,2',3,4',5,6,6'-HpCB	188	36.628	1.08	2.0	1.41	70
13C-2,3,3',4,4',5,5'-HpCB	189	49.417	1.01	2.0	1.61	81
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.099	0.92	2.0	1.57	78
13C-2,3,3',4,4',5,5',6-OxCB	205	51.982	0.89	2.0	1.48	74
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.706	0.83	2.0	1.39	69
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	48.857	0.79	2.0	1.46	73
13C--DeCB	209	55.301	0.67	2.0	1.68	84
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.862	1.03	2.0	1.70	85
13C-2,3,3',5,5'-PeCB	111	33.789	1.56	2.0	1.49	75
13C-2,2',3,3',5,5',6-HpCB	178	39.746	1.10	2.0	1.60	80
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.070	1.60	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.790	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.005	1.54	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.327	1.23	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.508	0.92	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1611069-003  
Lab Sample ID 10363209003  
Filename P160928A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.260
2		---	---	ND	---	0.260
3		---	---	ND	---	0.260
4		11.772	1.58	0.875	---	0.260
5		---	---	ND	---	0.260
6		14.550	1.46	0.808	---	0.260
7		---	---	ND	---	0.260
8		15.065	1.50	1.20	---	0.260
9		---	---	ND	---	0.260
10		---	---	ND	---	0.260
11		---	---	ND	---	2.55
12	12/13	---	---	ND	---	0.521
13	12/13	---	---	ND	---	0.521
14		---	---	ND	---	0.260
15		18.587	1.72	1.03	---	0.344
16		18.467	1.02	0.941	---	0.260
17		17.964	1.04	0.780	---	0.260
18	18/30	17.497	1.03	1.74	---	0.521
19		---	---	ND	---	0.260
20	20/28	21.879	1.03	3.15	---	1.34
21	21/33	22.130	1.06	2.14	---	1.41
22		22.566	1.05	1.49	---	0.989
23		---	---	ND	---	0.260
24		---	---	ND	---	0.260
25		---	---	ND	---	0.260
26	26/29	---	---	ND	---	0.521
27		---	---	ND	---	0.260
28	20/28	21.879	1.03	(3.15)	---	1.34
29	26/29	---	---	ND	---	0.521
30	18/30	17.497	1.03	(1.74)	---	0.521
31		21.560	1.04	2.69	---	1.35
32		19.062	1.07	0.588	---	0.260
33	21/33	22.130	1.06	(2.14)	---	1.41
34		---	---	ND	---	0.260
35		---	---	ND	---	0.260
36		---	---	ND	---	0.260
37		26.205	1.01	1.67	---	0.552
38		---	---	ND	---	0.260
39		---	---	ND	---	0.260
40	40/41/71	25.953	0.80	2.01	---	1.56
41	40/41/71	25.953	0.80	(2.01)	---	1.56
42		25.433	0.77	0.884	---	0.521
43	43/73	---	---	ND	---	0.521
44	44/47/65	24.863	0.77	2.82	---	1.56
45	45/51	---	---	ND	---	1.04
46		---	---	ND	---	0.521
47	44/47/65	24.863	0.77	(2.82)	---	1.56
48		24.645	0.79	0.679	---	0.521

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

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NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1611069-003  
Lab Sample ID 10363209003  
Filename P160928A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	24.344	0.77	1.48	---	1.04
50	50/53	---	---	ND	---	1.04
51	45/51	---	---	ND	---	1.04
52		23.807	0.80	2.63	---	1.60
53	50/53	---	---	ND	---	1.04
54		---	---	ND	---	0.521
55		---	---	ND	---	0.521
56		29.949	0.81	1.12	---	0.521
57		---	---	ND	---	0.521
58		---	---	ND	---	0.521
59	59/62/75	---	---	ND	---	1.56
60		30.201	0.78	0.656	---	0.521
61	61/70/74/76	28.893	0.77	4.41	---	2.08
62	59/62/75	---	---	ND	---	1.56
63		---	---	ND	---	0.521
64		26.205	0.76	1.46	---	0.521
65	44/47/65	24.863	0.77	(2.82)	---	1.56
66		29.245	0.78	2.02	---	0.875
67		---	---	ND	---	0.521
68		---	---	ND	---	0.521
69	49/69	24.344	0.77	(1.48)	---	1.04
70	61/70/74/76	28.893	0.77	(4.41)	---	2.08
71	40/41/71	25.953	0.80	(2.01)	---	1.56
72		---	---	ND	---	0.521
73	43/73	---	---	ND	---	0.521
74	61/70/74/76	28.893	0.77	(4.41)	---	2.08
75	59/62/75	---	---	ND	---	1.56
76	61/70/74/76	28.893	0.77	(4.41)	---	2.08
77		---	---	ND	---	0.521
78		---	---	ND	---	0.521
79		---	---	ND	---	0.521
80		---	---	ND	---	0.521
81		---	---	ND	---	0.521
82		---	---	ND	---	0.521
83		---	---	ND	---	0.521
84		29.094	1.56	0.778	---	0.521
85	85/116/117	---	---	ND	---	1.56
86	86/87/97/108/119/125	---	---	ND	---	3.12
87	86/87/97/108/119/125	---	---	ND	---	3.12
88	88/91	---	---	ND	---	1.04
89		---	---	ND	---	0.521
90	90/101/113	31.039	1.52	2.88	---	1.56
91	88/91	---	---	ND	---	1.04
92		---	---	ND	---	0.521
93	93/98/100/102	---	---	ND	---	2.08
94		---	---	ND	---	0.521
95		27.954	1.56	1.93	---	0.989
96		---	---	ND	---	0.521

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1611069-003  
Lab Sample ID 10363209003  
Filename P160928A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.12
98	93/98/100/102	---	---	ND	---	2.08
99		31.642	1.48	1.24	---	0.521
100	93/98/100/102	---	---	ND	---	2.08
101	90/101/113	31.039	1.52	(2.88)	---	1.56
102	93/98/100/102	---	---	ND	---	2.08
103		---	---	ND	---	0.521
104		---	---	ND	---	0.521
105		37.416	1.52	1.84	---	0.521
106		---	---	ND	---	0.521
107	107/124	---	---	ND	---	1.04
108	86/87/97/108/119/125	---	---	ND	---	3.12
109		---	---	ND	---	0.521
110	110/115	33.084	1.57	4.18	---	1.04
111		---	---	ND	---	0.521
112		---	---	ND	---	0.521
113	90/101/113	31.039	1.52	(2.88)	---	1.56
114		---	---	ND	---	0.521
115	110/115	33.084	1.57	(4.18)	---	1.04
116	85/116/117	---	---	ND	---	1.56
117	85/116/117	---	---	ND	---	1.56
118		36.192	1.59	4.08	---	0.667
119	86/87/97/108/119/125	---	---	ND	---	3.12
120		---	---	ND	---	0.521
121		---	---	ND	---	0.521
122		---	---	ND	---	0.521
123		---	---	ND	---	0.521
124	107/124	---	---	ND	---	1.04
125	86/87/97/108/119/125	---	---	ND	---	3.12
126		---	---	ND	---	0.521
127		---	---	ND	---	0.521
128	128/166	---	---	ND	---	1.04
129	129/138/163	39.361	1.24	4.48	---	1.56
130		---	---	ND	---	0.521
131		---	---	ND	---	0.521
132		36.259	1.26	1.42	---	0.521
133		---	---	ND	---	0.521
134	134/143	---	---	ND	---	1.04
135	135/151	---	---	ND	---	1.04
136		---	---	ND	---	0.521
137		---	---	ND	---	0.521
138	129/138/163	39.361	1.24	(4.48)	---	1.56
139	139/140	---	---	ND	---	1.04
140	139/140	---	---	ND	---	1.04
141		38.271	1.20	0.722	---	0.521
142		---	---	ND	---	0.521
143	134/143	---	---	ND	---	1.04
144		---	---	ND	---	0.521

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1611069-003  
Lab Sample ID 10363209003  
Filename P160928A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.521
146		---	---	ND	---	0.521
147	147/149	34.968	1.25	1.67	---	1.04
148		---	---	ND	---	0.521
149	147/149	34.968	1.25	(1.67)	---	1.04
150		---	---	ND	---	0.521
151	135/151	---	---	ND	---	1.04
152		---	---	ND	---	0.521
153	153/168	38.070	1.24	2.73	---	1.04
154		---	---	ND	---	0.521
155		---	---	ND	---	0.521
156	156/157	---	---	ND	---	1.04
157	156/157	---	---	ND	---	1.04
158		---	---	ND	---	0.521
159		---	---	ND	---	0.521
160		---	---	ND	---	0.521
161		---	---	ND	---	0.521
162		---	---	ND	---	0.521
163	129/138/163	39.361	1.24	(4.48)	---	1.56
164		---	---	ND	---	0.521
165		---	---	ND	---	0.521
166	128/166	---	---	ND	---	1.04
167		---	---	ND	---	0.521
168	153/168	38.070	1.24	(2.73)	---	1.04
169		---	---	ND	---	0.521
170		46.274	1.01	0.821	---	0.521
171	171/173	---	---	ND	---	1.04
172		---	---	ND	---	0.521
173	171/173	---	---	ND	---	1.04
174		41.563	1.03	0.823	---	0.521
175		---	---	ND	---	0.521
176		---	---	ND	---	0.521
177		---	---	ND	---	0.521
178		---	---	ND	---	0.521
179		---	---	ND	---	0.521
180	180/193	44.983	1.10	1.85	---	1.04
181		---	---	ND	---	0.521
182		---	---	ND	---	0.521
183	183/185	---	---	ND	---	1.04
184		---	---	ND	---	0.521
185	183/185	---	---	ND	---	1.04
186		---	---	ND	---	0.521
187		40.702	1.05	0.971	---	0.521
188		---	---	ND	---	0.521
189		---	---	ND	---	0.521
190		---	---	ND	---	0.521
191		---	---	ND	---	0.521
192		---	---	ND	---	0.521

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1611069-003  
 Lab Sample ID        10363209003  
 Filename                P160928A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	44.983	1.10	(1.85)	---	1.04
194		---	---	ND	---	0.781
195		---	---	ND	---	0.781
196		---	---	ND	---	0.781
197	197/200	---	---	ND	---	1.56
198	198/199	---	---	ND	---	1.56
199	198/199	---	---	ND	---	1.56
200	197/200	---	---	ND	---	1.56
201		---	---	ND	---	0.781
202		---	---	ND	---	0.781
203		---	---	ND	---	0.781
204		---	---	ND	---	0.781
205		---	---	ND	---	0.781
206		---	---	ND	---	0.781
207		---	---	ND	---	0.781
208		---	---	ND	---	0.781
209		---	---	ND	---	0.781

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1611069-003  
Lab Sample ID             10363209003  
Filename                    P160928A\_11

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	3.91
Total Trichloro Biphenyls	15.2
Total Tetrachloro Biphenyls	20.2
Total Pentachloro Biphenyls	16.9
Total Hexachloro Biphenyls	11.0
Total Heptachloro Biphenyls	4.46
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	71.7

ND = Not Detected

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1611069-004		
Lab Sample ID	10363209004		
Filename	P160927B_12		
Injected By	CVS		
Total Amount Extracted	975 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	09/17/2016 13:03
ICAL ID	P160927B02	Received	09/21/2016 10:00
CCal Filename(s)	P160927B_01	Extracted	09/22/2016 14:45
Method Blank ID	BLANK-52083	Analyzed	09/28/2016 08:29

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.897	3.03	2.0	1.15	57
13C-4-MoCB	3	11.521	2.82	2.0	1.15	58
13C-2,2'-DiCB	4	11.784	1.61	2.0	0.943	47
13C-4,4'-DiCB	15	18.600	1.59	2.0	1.39	69
13C-2,2',6-TrCB	19	15.389	1.05	2.0	1.07	54
13C-3,4,4'-TrCB	37	26.213	1.04	2.0	1.72	86
13C-2,2',6,6'-TeCB	54	18.852	0.87	2.0	1.16	58
13C-3,4,4',5'-TeCB	81	33.278	0.76	2.0	2.03	101
13C-3,3',4,4'-TeCB	77	33.848	0.76	2.0	1.94	97
13C-2,2',4,6,6'-PeCB	104	24.805	1.60	2.0	1.17	59
13C-2,3,3',4,4'-PeCB	105	37.425	1.57	2.0	1.82	91
13C-2,3,4,4',5'-PeCB	114	36.737	1.61	2.0	1.84	92
13C-2,3',4,4',5'-PeCB	118	36.184	1.63	2.0	1.88	94
13C-2,3',4,4',5'-PeCB	123	35.849	1.61	2.0	1.89	95
13C-3,3',4,4',5'-PeCB	126	40.594	1.64	2.0	1.98	99
13C-2,2',4,4',6,6'-HxCB	155	30.763	1.22	2.0	1.28	64
13C-HxCB (156/157)	156/157	43.618	1.24	4.0	3.29	82
13C-2,3',4,4',5,5'-HxCB	167	42.427	1.22	2.0	1.76	88
13C-3,3',4,4',5,5'-HxCB	169	46.921	1.29	2.0	1.59	79
13C-2,2',3,4',5,6,6'-HpCB	188	36.654	1.00	2.0	1.40	70
13C-2,3,3',4,4',5,5'-HpCB	189	49.449	1.08	2.0	1.57	79
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.109	0.91	2.0	1.62	81
13C-2,3,3',4,4',5,5',6-OxCB	205	52.013	0.92	2.0	1.52	76
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.738	0.76	2.0	1.43	72
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	48.867	0.82	2.0	1.59	80
13C--DeCB	209	55.333	0.71	2.0	1.71	86
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.887	1.02	2.0	1.88	94
13C-2,3,3',5,5'-PeCB	111	33.814	1.65	2.0	1.64	82
13C-2,2',3,3',5,5',6-HpCB	178	39.790	1.01	2.0	1.63	81
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.107	1.61	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.832	0.77	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.031	1.56	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.354	1.30	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.539	0.85	2.0	NA	NA

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1611069-004  
 Lab Sample ID 10363209004  
 Filename P160927B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.256
2		---	---	ND	---	0.256
3		---	---	ND	---	0.256
4		---	---	ND	---	0.256
5		---	---	ND	---	0.256
6		---	---	ND	---	0.256
7		---	---	ND	---	0.256
8		---	---	ND	---	0.256
9		---	---	ND	---	0.256
10		---	---	ND	---	0.256
11		---	---	ND	---	2.51
12	12/13	---	---	ND	---	0.513
13	12/13	---	---	ND	---	0.513
14		---	---	ND	---	0.256
15		---	---	ND	---	0.338
16		---	---	ND	---	0.256
17		---	---	ND	---	0.256
18	18/30	---	---	ND	---	0.513
19		---	---	ND	---	0.256
20	20/28	---	---	ND	---	1.32
21	21/33	---	---	ND	---	1.38
22		---	---	ND	---	0.974
23		---	---	ND	---	0.256
24		---	---	ND	---	0.256
25		---	---	ND	---	0.256
26	26/29	---	---	ND	---	0.513
27		---	---	ND	---	0.256
28	20/28	---	---	ND	---	1.32
29	26/29	---	---	ND	---	0.513
30	18/30	---	---	ND	---	0.513
31		---	---	ND	---	1.33
32		---	---	ND	---	0.256
33	21/33	---	---	ND	---	1.38
34		---	---	ND	---	0.256
35		---	---	ND	---	0.256
36		---	---	ND	---	0.256
37		---	---	ND	---	0.544
38		---	---	ND	---	0.256
39		---	---	ND	---	0.256
40	40/41/71	---	---	ND	---	1.54
41	40/41/71	---	---	ND	---	1.54
42		---	---	ND	---	0.513
43	43/73	---	---	ND	---	0.513
44	44/47/65	---	---	ND	---	1.54
45	45/51	---	---	ND	---	1.03
46		---	---	ND	---	0.513
47	44/47/65	---	---	ND	---	1.54
48		---	---	ND	---	0.513

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1611069-004  
Lab Sample ID             10363209004  
Filename                    P160927B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.03
50	50/53	---	---	ND	---	1.03
51	45/51	---	---	ND	---	1.03
52		---	---	ND	---	1.58
53	50/53	---	---	ND	---	1.03
54		---	---	ND	---	0.513
55		---	---	ND	---	0.513
56		---	---	ND	---	0.513
57		---	---	ND	---	0.513
58		---	---	ND	---	0.513
59	59/62/75	---	---	ND	---	1.54
60		---	---	ND	---	0.513
61	61/70/74/76	---	---	ND	---	2.05
62	59/62/75	---	---	ND	---	1.54
63		---	---	ND	---	0.513
64		---	---	ND	---	0.513
65	44/47/65	---	---	ND	---	1.54
66		---	---	ND	---	0.862
67		---	---	ND	---	0.513
68		---	---	ND	---	0.513
69	49/69	---	---	ND	---	1.03
70	61/70/74/76	---	---	ND	---	2.05
71	40/41/71	---	---	ND	---	1.54
72		---	---	ND	---	0.513
73	43/73	---	---	ND	---	0.513
74	61/70/74/76	---	---	ND	---	2.05
75	59/62/75	---	---	ND	---	1.54
76	61/70/74/76	---	---	ND	---	2.05
77		---	---	ND	---	0.513
78		---	---	ND	---	0.513
79		---	---	ND	---	0.513
80		---	---	ND	---	0.513
81		---	---	ND	---	0.513
82		---	---	ND	---	0.513
83		---	---	ND	---	0.513
84		---	---	ND	---	0.513
85	85/116/117	---	---	ND	---	1.54
86	86/87/97/108/119/125	---	---	ND	---	3.08
87	86/87/97/108/119/125	---	---	ND	---	3.08
88	88/91	---	---	ND	---	1.03
89		---	---	ND	---	0.513
90	90/101/113	---	---	ND	---	1.54
91	88/91	---	---	ND	---	1.03
92		---	---	ND	---	0.513
93	93/98/100/102	---	---	ND	---	2.05
94		---	---	ND	---	0.513
95		---	---	ND	---	0.974
96		---	---	ND	---	0.513

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
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NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1611069-004  
 Lab Sample ID 10363209004  
 Filename P160927B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.08
98	93/98/100/102	---	---	ND	---	2.05
99		---	---	ND	---	0.513
100	93/98/100/102	---	---	ND	---	2.05
101	90/101/113	---	---	ND	---	1.54
102	93/98/100/102	---	---	ND	---	2.05
103		---	---	ND	---	0.513
104		---	---	ND	---	0.513
105		---	---	ND	---	0.513
106		---	---	ND	---	0.513
107	107/124	---	---	ND	---	1.03
108	86/87/97/108/119/125	---	---	ND	---	3.08
109		---	---	ND	---	0.513
110	110/115	---	---	ND	---	1.03
111		---	---	ND	---	0.513
112		---	---	ND	---	0.513
113	90/101/113	---	---	ND	---	1.54
114		---	---	ND	---	0.513
115	110/115	---	---	ND	---	1.03
116	85/116/117	---	---	ND	---	1.54
117	85/116/117	---	---	ND	---	1.54
118		---	---	ND	---	0.656
119	86/87/97/108/119/125	---	---	ND	---	3.08
120		---	---	ND	---	0.513
121		---	---	ND	---	0.513
122		---	---	ND	---	0.513
123		---	---	ND	---	0.513
124	107/124	---	---	ND	---	1.03
125	86/87/97/108/119/125	---	---	ND	---	3.08
126		---	---	ND	---	0.513
127		---	---	ND	---	0.513
128	128/166	---	---	ND	---	1.03
129	129/138/163	---	---	ND	---	1.54
130		---	---	ND	---	0.513
131		---	---	ND	---	0.513
132		---	---	ND	---	0.513
133		---	---	ND	---	0.513
134	134/143	---	---	ND	---	1.03
135	135/151	---	---	ND	---	1.03
136		---	---	ND	---	0.513
137		---	---	ND	---	0.513
138	129/138/163	---	---	ND	---	1.54
139	139/140	---	---	ND	---	1.03
140	139/140	---	---	ND	---	1.03
141		---	---	ND	---	0.513
142		---	---	ND	---	0.513
143	134/143	---	---	ND	---	1.03
144		---	---	ND	---	0.513

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1611069-004  
 Lab Sample ID 10363209004  
 Filename P160927B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.513
146		---	---	ND	---	0.513
147	147/149	---	---	ND	---	1.03
148		---	---	ND	---	0.513
149	147/149	---	---	ND	---	1.03
150		---	---	ND	---	0.513
151	135/151	---	---	ND	---	1.03
152		---	---	ND	---	0.513
153	153/168	---	---	ND	---	1.03
154		---	---	ND	---	0.513
155		---	---	ND	---	0.513
156	156/157	---	---	ND	---	1.03
157	156/157	---	---	ND	---	1.03
158		---	---	ND	---	0.513
159		---	---	ND	---	0.513
160		---	---	ND	---	0.513
161		---	---	ND	---	0.513
162		---	---	ND	---	0.513
163	129/138/163	---	---	ND	---	1.54
164		---	---	ND	---	0.513
165		---	---	ND	---	0.513
166	128/166	---	---	ND	---	1.03
167		---	---	ND	---	0.513
168	153/168	---	---	ND	---	1.03
169		---	---	ND	---	0.513
170		---	---	ND	---	0.513
171	171/173	---	---	ND	---	1.03
172		---	---	ND	---	0.513
173	171/173	---	---	ND	---	1.03
174		---	---	ND	---	0.513
175		---	---	ND	---	0.513
176		---	---	ND	---	0.513
177		---	---	ND	---	0.513
178		---	---	ND	---	0.513
179		---	---	ND	---	0.513
180	180/193	---	---	ND	---	1.03
181		---	---	ND	---	0.513
182		---	---	ND	---	0.513
183	183/185	---	---	ND	---	1.03
184		---	---	ND	---	0.513
185	183/185	---	---	ND	---	1.03
186		---	---	ND	---	0.513
187		---	---	ND	---	0.513
188		---	---	ND	---	0.513
189		---	---	ND	---	0.513
190		---	---	ND	---	0.513
191		---	---	ND	---	0.513
192		---	---	ND	---	0.513

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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 A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID           K1611069-004  
 Lab Sample ID             10363209004  
 Filename                    P160927B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.03
194		---	---	ND	---	0.769
195		---	---	ND	---	0.769
196		---	---	ND	---	0.769
197	197/200	---	---	ND	---	1.54
198	198/199	---	---	ND	---	1.54
199	198/199	---	---	ND	---	1.54
200	197/200	---	---	ND	---	1.54
201		---	---	ND	---	0.769
202		---	---	ND	---	0.769
203		---	---	ND	---	0.769
204		---	---	ND	---	0.769
205		---	---	ND	---	0.769
206		---	---	ND	---	0.769
207		---	---	ND	---	0.769
208		---	---	ND	---	0.769
209		---	---	ND	---	0.769

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1611069-004  
Lab Sample ID             10363209004  
Filename                    P160927B\_12

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1611069-005		
Lab Sample ID	10363209005		
Filename	P160927B_13		
Injected By	CVS		
Total Amount Extracted	1020 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	09/17/2016 13:21
ICAL ID	P160927B02	Received	09/21/2016 10:00
CCal Filename(s)	P160927B_01	Extracted	09/22/2016 14:45
Method Blank ID	BLANK-52083	Analyzed	09/28/2016 09:27

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.896	2.87	2.0	1.35	68
13C-4-MoCB	3	11.520	2.75	2.0	1.29	65
13C-2,2'-DiCB	4	11.784	1.56	2.0	1.05	52
13C-4,4'-DiCB	15	18.611	1.65	2.0	1.52	76
13C-2,2',6-TrCB	19	15.400	1.05	2.0	1.28	64
13C-3,4,4'-TrCB	37	26.229	1.10	2.0	1.86	93
13C-2,2',6,6'-TeCB	54	18.868	0.84	2.0	1.27	64
13C-3,4,4',5'-TeCB	81	33.277	0.73	2.0	2.22	111
13C-3,3',4,4'-TeCB	77	33.847	0.77	2.0	2.08	104
13C-2,2',4,6,6'-PeCB	104	24.820	1.66	2.0	1.32	66
13C-2,3,3',4,4'-PeCB	105	37.407	1.58	2.0	2.09	104
13C-2,3,4,4',5'-PeCB	114	36.737	1.64	2.0	1.99	99
13C-2,3',4,4',5'-PeCB	118	36.200	1.61	2.0	2.15	108
13C-2,3',4,4',5'-PeCB	123	35.848	1.47	2.0	2.07	103
13C-3,3',4,4',5'-PeCB	126	40.593	1.60	2.0	2.01	101
13C-2,2',4,4',6,6'-HxCB	155	30.778	1.24	2.0	1.39	69
13C-HxCB (156/157)	156/157	43.634	1.27	4.0	3.51	88
13C-2,3',4,4',5,5'-HxCB	167	42.443	1.22	2.0	1.84	92
13C-3,3',4,4',5,5'-HxCB	169	46.920	1.24	2.0	1.68	84
13C-2,2',3,4',5,6,6'-HpCB	188	36.669	1.08	2.0	1.52	76
13C-2,3,3',4,4',5,5'-HpCB	189	49.448	1.09	2.0	1.66	83
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.125	0.89	2.0	1.73	86
13C-2,3,3',4,4',5,5',6-OxCB	205	52.013	0.92	2.0	1.55	77
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.737	0.79	2.0	1.48	74
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.887	0.79	2.0	1.60	80
13C--DeCB	209	55.332	0.67	2.0	1.70	85
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.903	1.07	2.0	2.04	102
13C-2,3,3',5,5'-PeCB	111	33.814	1.61	2.0	1.74	87
13C-2,2',3,3',5,5',6-HpCB	178	39.772	1.09	2.0	1.66	83
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.106	1.62	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.814	0.79	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.030	1.62	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.353	1.27	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.538	0.83	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1611069-005  
Lab Sample ID 10363209005  
Filename P160927B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.246
2		---	---	ND	---	0.246
3		---	---	ND	---	0.246
4		11.808	1.59	0.847	---	0.246
5		---	---	ND	---	0.246
6		---	---	ND	---	0.246
7		---	---	ND	---	0.246
8		15.113	1.34	0.464	---	0.246
9		---	---	ND	---	0.246
10		---	---	ND	---	0.246
11		---	---	ND	---	2.41
12	12/13	---	---	ND	---	0.491
13	12/13	---	---	ND	---	0.491
14		---	---	ND	---	0.246
15		18.635	1.67	0.543	---	0.324
16		18.503	1.01	1.07	---	0.246
17		18.000	1.07	0.896	---	0.246
18	18/30	17.533	1.05	2.16	---	0.491
19		15.424	1.14	0.387	---	0.246
20	20/28	21.920	1.08	1.74	---	1.27
21	21/33	---	---	ND	---	1.33
22		---	---	ND	---	0.934
23		---	---	ND	---	0.246
24		---	---	ND	---	0.246
25		---	---	ND	---	0.246
26	26/29	---	---	ND	---	0.491
27		---	---	ND	---	0.246
28	20/28	21.920	1.08	(1.74)	---	1.27
29	26/29	---	---	ND	---	0.491
30	18/30	17.533	1.05	(2.16)	---	0.491
31		21.584	1.00	1.54	---	1.28
32		19.103	1.06	0.634	---	0.246
33	21/33	---	---	ND	---	1.33
34		---	---	ND	---	0.246
35		---	---	ND	---	0.246
36		---	---	ND	---	0.246
37		---	---	ND	---	0.521
38		---	---	ND	---	0.246
39		---	---	ND	---	0.246
40	40/41/71	---	---	ND	---	1.47
41	40/41/71	---	---	ND	---	1.47
42		---	---	ND	---	0.491
43	43/73	---	---	ND	---	0.491
44	44/47/65	---	---	ND	---	1.47
45	45/51	---	---	ND	---	0.983
46		---	---	ND	---	0.491
47	44/47/65	---	---	ND	---	1.47
48		---	---	ND	---	0.491

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1611069-005  
 Lab Sample ID 10363209005  
 Filename P160927B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.983
50	50/53	---	---	ND	---	0.983
51	45/51	---	---	ND	---	0.983
52		---	---	ND	---	1.51
53	50/53	---	---	ND	---	0.983
54		---	---	ND	---	0.491
55		---	---	ND	---	0.491
56		---	---	ND	---	0.491
57		---	---	ND	---	0.491
58		---	---	ND	---	0.491
59	59/62/75	---	---	ND	---	1.47
60		---	---	ND	---	0.491
61	61/70/74/76	---	---	ND	---	1.97
62	59/62/75	---	---	ND	---	1.47
63		---	---	ND	---	0.491
64		26.246	0.84	0.499	---	0.491
65	44/47/65	---	---	ND	---	1.47
66		---	---	ND	---	0.825
67		---	---	ND	---	0.491
68		---	---	ND	---	0.491
69	49/69	---	---	ND	---	0.983
70	61/70/74/76	---	---	ND	---	1.97
71	40/41/71	---	---	ND	---	1.47
72		---	---	ND	---	0.491
73	43/73	---	---	ND	---	0.491
74	61/70/74/76	---	---	ND	---	1.97
75	59/62/75	---	---	ND	---	1.47
76	61/70/74/76	---	---	ND	---	1.97
77		---	---	ND	---	0.491
78		---	---	ND	---	0.491
79		---	---	ND	---	0.491
80		---	---	ND	---	0.491
81		---	---	ND	---	0.491
82		---	---	ND	---	0.491
83		---	---	ND	---	0.491
84		---	---	ND	---	0.491
85	85/116/117	---	---	ND	---	1.47
86	86/87/97/108/119/125	---	---	ND	---	2.95
87	86/87/97/108/119/125	---	---	ND	---	2.95
88	88/91	---	---	ND	---	0.983
89		---	---	ND	---	0.491
90	90/101/113	---	---	ND	---	1.47
91	88/91	---	---	ND	---	0.983
92		---	---	ND	---	0.491
93	93/98/100/102	---	---	ND	---	1.97
94		---	---	ND	---	0.491
95		---	---	ND	---	0.934
96		---	---	ND	---	0.491

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1611069-005  
Lab Sample ID 10363209005  
Filename P160927B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.95
98	93/98/100/102	---	---	ND	---	1.97
99		---	---	ND	---	0.491
100	93/98/100/102	---	---	ND	---	1.97
101	90/101/113	---	---	ND	---	1.47
102	93/98/100/102	---	---	ND	---	1.97
103		---	---	ND	---	0.491
104		---	---	ND	---	0.491
105		---	---	ND	---	0.491
106		---	---	ND	---	0.491
107	107/124	---	---	ND	---	0.983
108	86/87/97/108/119/125	---	---	ND	---	2.95
109		---	---	ND	---	0.491
110	110/115	33.109	1.53	1.23	---	0.983
111		---	---	ND	---	0.491
112		---	---	ND	---	0.491
113	90/101/113	---	---	ND	---	1.47
114		---	---	ND	---	0.491
115	110/115	33.109	1.53	(1.23)	---	0.983
116	85/116/117	---	---	ND	---	1.47
117	85/116/117	---	---	ND	---	1.47
118		36.217	1.75	0.886	---	0.629
119	86/87/97/108/119/125	---	---	ND	---	2.95
120		---	---	ND	---	0.491
121		---	---	ND	---	0.491
122		---	---	ND	---	0.491
123		---	---	ND	---	0.491
124	107/124	---	---	ND	---	0.983
125	86/87/97/108/119/125	---	---	ND	---	2.95
126		---	---	ND	---	0.491
127		---	---	ND	---	0.491
128	128/166	---	---	ND	---	0.983
129	129/138/163	---	---	ND	---	1.47
130		---	---	ND	---	0.491
131		---	---	ND	---	0.491
132		---	---	ND	---	0.491
133		---	---	ND	---	0.491
134	134/143	---	---	ND	---	0.983
135	135/151	---	---	ND	---	0.983
136		---	---	ND	---	0.491
137		---	---	ND	---	0.491
138	129/138/163	---	---	ND	---	1.47
139	139/140	---	---	ND	---	0.983
140	139/140	---	---	ND	---	0.983
141		---	---	ND	---	0.491
142		---	---	ND	---	0.491
143	134/143	---	---	ND	---	0.983
144		---	---	ND	---	0.491

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
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R = Recovery outside of Method 1668A control limits  
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RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1611069-005  
 Lab Sample ID 10363209005  
 Filename P160927B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.491
146		---	---	ND	---	0.491
147	147/149	---	---	ND	---	0.983
148		---	---	ND	---	0.491
149	147/149	---	---	ND	---	0.983
150		---	---	ND	---	0.491
151	135/151	---	---	ND	---	0.983
152		---	---	ND	---	0.491
153	153/168	---	---	ND	---	0.983
154		---	---	ND	---	0.491
155		---	---	ND	---	0.491
156	156/157	---	---	ND	---	0.983
157	156/157	---	---	ND	---	0.983
158		---	---	ND	---	0.491
159		---	---	ND	---	0.491
160		---	---	ND	---	0.491
161		---	---	ND	---	0.491
162		---	---	ND	---	0.491
163	129/138/163	---	---	ND	---	1.47
164		---	---	ND	---	0.491
165		---	---	ND	---	0.491
166	128/166	---	---	ND	---	0.983
167		---	---	ND	---	0.491
168	153/168	---	---	ND	---	0.983
169		---	---	ND	---	0.491
170		---	---	ND	---	0.491
171	171/173	---	---	ND	---	0.983
172		---	---	ND	---	0.491
173	171/173	---	---	ND	---	0.983
174		---	---	ND	---	0.491
175		---	---	ND	---	0.491
176		---	---	ND	---	0.491
177		---	---	ND	---	0.491
178		---	---	ND	---	0.491
179		---	---	ND	---	0.491
180	180/193	---	---	ND	---	0.983
181		---	---	ND	---	0.491
182		---	---	ND	---	0.491
183	183/185	---	---	ND	---	0.983
184		---	---	ND	---	0.491
185	183/185	---	---	ND	---	0.983
186		---	---	ND	---	0.491
187		---	---	ND	---	0.491
188		---	---	ND	---	0.491
189		---	---	ND	---	0.491
190		---	---	ND	---	0.491
191		---	---	ND	---	0.491
192		---	---	ND	---	0.491

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
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 Nn = Value obtained from additional analyses

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1611069-005  
 Lab Sample ID        10363209005  
 Filename                P160927B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.983
194		---	---	ND	---	0.737
195		---	---	ND	---	0.737
196		---	---	ND	---	0.737
197	197/200	---	---	ND	---	1.47
198	198/199	---	---	ND	---	1.47
199	198/199	---	---	ND	---	1.47
200	197/200	---	---	ND	---	1.47
201		---	---	ND	---	0.737
202		---	---	ND	---	0.737
203		---	---	ND	---	0.737
204		---	---	ND	---	0.737
205		---	---	ND	---	0.737
206		---	---	ND	---	0.737
207		---	---	ND	---	0.737
208		---	---	ND	---	0.737
209		---	---	ND	---	0.737

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

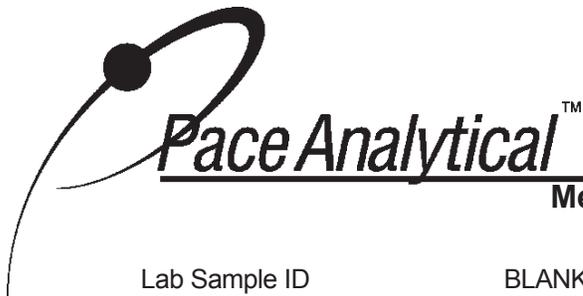
Client Sample ID           K1611069-005  
Lab Sample ID             10363209005  
Filename                    P160927B\_13

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	1.85
Total Trichloro Biphenyls	8.43
Total Tetrachloro Biphenyls	0.499
Total Pentachloro Biphenyls	2.11
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	12.9

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-52083	Matrix	Water
Filename	P160927B_04	Extracted	09/22/2016 14:45
Injected By	CVS	Analyzed	09/28/2016 00:38
Total Amount Extracted	991 mL	Dilution	5
ICAL ID	P160927B02		
CCal Filename(s)	P160927B_01		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
------------	-------	----	-------	------------	------------	------------

Labeled Analytes

13C-2-MoCB	1	8.896	2.74	2.0	1.45	72
13C-4-MoCB	3	11.544	3.45	2.0	1.32	66
13C-2,2'-DiCB	4	11.796	1.65	2.0	1.11	55
13C-4,4'-DiCB	15	18.647	1.60	2.0	1.46	73
13C-2,2',6-TrCB	19	15.424	1.07	2.0	1.36	68
13C-3,4,4'-TrCB	37	26.245	1.08	2.0	1.86	93
13C-2,2',6,6'-TeCB	54	18.901	0.83	2.0	1.49	74
13C-3,4,4',5-TeCB	81	33.293	0.82	2.0	2.03	101
13C-3,3',4,4'-TeCB	77	33.897	0.71	2.0	2.09	105
13C-2,2',4,6,6'-PeCB	104	24.854	1.56	2.0	1.28	64
13C-2,3,3',4,4'-PeCB	105	37.457	1.53	2.0	1.90	95
13C-2,3,4,4',5-PeCB	114	36.770	1.55	2.0	1.84	92
13C-2,3',4,4',5-PeCB	118	36.216	1.60	2.0	1.93	97
13C-2,3',4,4',5'-PeCB	123	35.898	1.60	2.0	1.93	97
13C-3,3',4,4',5-PeCB	126	40.626	1.64	2.0	1.84	92
13C-2,2',4,4',6,6'-HxCB	155	30.795	1.26	2.0	1.54	77
13C-HxCB (156/157)	156/157	43.667	1.20	4.0	3.62	90
13C-2,3',4,4',5,5'-HxCB	167	42.443	1.25	2.0	1.89	95
13C-3,3',4,4',5,5'-HxCB	169	46.953	1.23	2.0	1.62	81
13C-2,2',3,4',5,6,6'-HpCB	188	36.686	1.07	2.0	1.61	80
13C-2,3,3',4,4',5,5'-HpCB	189	49.469	0.98	2.0	1.76	88
13C-2,2',3,3',5,5',6,6'-OoCB	202	42.141	0.92	2.0	1.79	89
13C-2,3,3',4,4',5,5',6-OoCB	205	52.033	0.88	2.0	1.69	85
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.758	0.83	2.0	1.56	78
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	48.887	0.83	2.0	1.63	82
13C-DeCB	209	55.353	0.69	2.0	1.77	89

Cleanup Standards

13C-2,4,4'-TrCB	28	21.919	0.96	2.0	1.96	98
13C-2,3,3',5,5'-PeCB	111	33.847	1.59	2.0	1.62	81
13C-2,2',3,3',5,5',6-HpCB	178	39.805	1.13	2.0	1.68	84

Recovery Standards

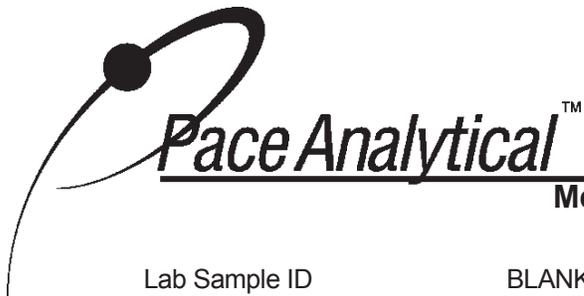
13C-2,5-DiCB	9	14.130	1.52	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.848	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.046	1.60	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.386	1.26	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	51.559	0.86	2.0	NA	NA

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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52083  
 Filename P160927B\_04

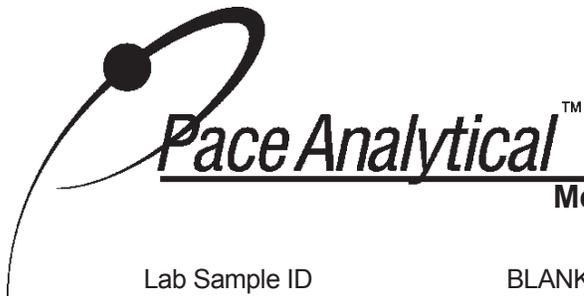
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		--	--	ND	--	0.252
2		--	--	ND	--	0.252
3		--	--	ND	--	0.252
4		--	--	ND	--	0.252
5		--	--	ND	--	0.252
6		--	--	ND	--	0.252
7		--	--	ND	--	0.252
8		--	--	ND	--	0.252
9		--	--	ND	--	0.252
10		--	--	ND	--	0.252
11		--	--	ND	--	2.47
12	12/13	--	--	ND	--	0.504
13	12/13	--	--	ND	--	0.504
14		--	--	ND	--	0.252
15		--	--	ND	--	0.252
16		--	--	ND	--	0.252
17		--	--	ND	--	0.252
18	18/30	--	--	ND	--	0.504
19		--	--	ND	--	0.252
20	20/28	--	--	ND	--	1.30
21	21/33	--	--	ND	--	1.36
22		--	--	ND	--	0.958
23		--	--	ND	--	0.252
24		--	--	ND	--	0.252
25		--	--	ND	--	0.252
26	26/29	--	--	ND	--	0.504
27		--	--	ND	--	0.252
28	20/28	--	--	ND	--	1.30
29	26/29	--	--	ND	--	0.504
30	18/30	--	--	ND	--	0.504
31		--	--	ND	--	1.31
32		--	--	ND	--	0.252
33	21/33	--	--	ND	--	1.36
34		--	--	ND	--	0.252
35		--	--	ND	--	0.252
36		--	--	ND	--	0.252
37		--	--	ND	--	0.535
38		--	--	ND	--	0.252
39		--	--	ND	--	0.252
40	40/41/71	--	--	ND	--	1.51
41	40/41/71	--	--	ND	--	1.51
42		--	--	ND	--	0.504
43	43/73	--	--	ND	--	0.504
44	44/47/65	--	--	ND	--	1.51
45	45/51	--	--	ND	--	1.01

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52083  
 Filename P160927B\_04

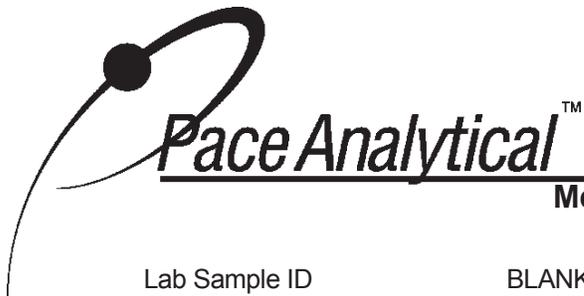
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		--	--	ND	--	0.504
47	44/47/65	--	--	ND	--	1.51
48		--	--	ND	--	0.504
49	49/69	--	--	ND	--	1.01
50	50/53	--	--	ND	--	1.01
51	45/51	--	--	ND	--	1.01
52		--	--	ND	--	1.55
53	50/53	--	--	ND	--	1.01
54		--	--	ND	--	0.504
55		--	--	ND	--	0.504
56		--	--	ND	--	0.504
57		--	--	ND	--	0.504
58		--	--	ND	--	0.504
59	59/62/75	--	--	ND	--	1.51
60		--	--	ND	--	0.504
61	61/70/74/76	--	--	ND	--	2.02
62	59/62/75	--	--	ND	--	1.51
63		--	--	ND	--	0.504
64		--	--	ND	--	0.504
65	44/47/65	--	--	ND	--	1.51
66		--	--	ND	--	0.847
67		--	--	ND	--	0.504
68		--	--	ND	--	0.504
69	49/69	--	--	ND	--	1.01
70	61/70/74/76	--	--	ND	--	2.02
71	40/41/71	--	--	ND	--	1.51
72		--	--	ND	--	0.504
73	43/73	--	--	ND	--	0.504
74	61/70/74/76	--	--	ND	--	2.02
75	59/62/75	--	--	ND	--	1.51
76	61/70/74/76	--	--	ND	--	2.02
77		--	--	ND	--	0.504
78		--	--	ND	--	0.504
79		--	--	ND	--	0.504
80		--	--	ND	--	0.504
81		--	--	ND	--	0.504
82		--	--	ND	--	0.504
83		--	--	ND	--	0.504
84		--	--	ND	--	0.504
85	85/116/117	--	--	ND	--	1.51
86	86/87/97/108/119/125	--	--	ND	--	3.03
87	86/87/97/108/119/125	--	--	ND	--	3.03
88	88/91	--	--	ND	--	1.01
89		--	--	ND	--	0.504
90	90/101/113	--	--	ND	--	1.51

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
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ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52083  
Filename P160927B\_04

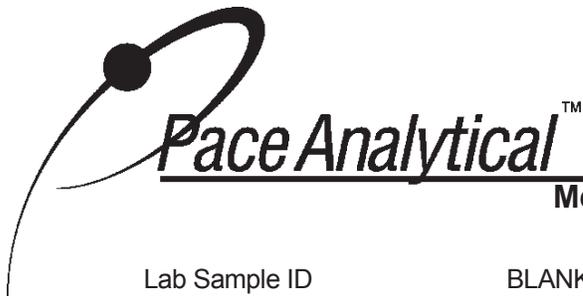
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	--	--	ND	--	1.01
92		--	--	ND	--	0.504
93	93/98/100/102	--	--	ND	--	2.02
94		--	--	ND	--	0.504
95		--	--	ND	--	0.958
96		--	--	ND	--	0.504
97	86/87/97/108/119/125	--	--	ND	--	3.03
98	93/98/100/102	--	--	ND	--	2.02
99		--	--	ND	--	0.504
100	93/98/100/102	--	--	ND	--	2.02
101	90/101/113	--	--	ND	--	1.51
102	93/98/100/102	--	--	ND	--	2.02
103		--	--	ND	--	0.504
104		--	--	ND	--	0.504
105		--	--	ND	--	0.504
106		--	--	ND	--	0.504
107	107/124	--	--	ND	--	1.01
108	86/87/97/108/119/125	--	--	ND	--	3.03
109		--	--	ND	--	0.504
110	110/115	--	--	ND	--	1.01
111		--	--	ND	--	0.504
112		--	--	ND	--	0.504
113	90/101/113	--	--	ND	--	1.51
114		--	--	ND	--	0.504
115	110/115	--	--	ND	--	1.01
116	85/116/117	--	--	ND	--	1.51
117	85/116/117	--	--	ND	--	1.51
118		--	--	ND	--	0.646
119	86/87/97/108/119/125	--	--	ND	--	3.03
120		--	--	ND	--	0.504
121		--	--	ND	--	0.504
122		--	--	ND	--	0.504
123		--	--	ND	--	0.504
124	107/124	--	--	ND	--	1.01
125	86/87/97/108/119/125	--	--	ND	--	3.03
126		--	--	ND	--	0.504
127		--	--	ND	--	0.504
128	128/166	--	--	ND	--	1.01
129	129/138/163	--	--	ND	--	1.51
130		--	--	ND	--	0.504
131		--	--	ND	--	0.504
132		--	--	ND	--	0.504
133		--	--	ND	--	0.504
134	134/143	--	--	ND	--	1.01
135	135/151	--	--	ND	--	1.01

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52083  
 Filename P160927B\_04

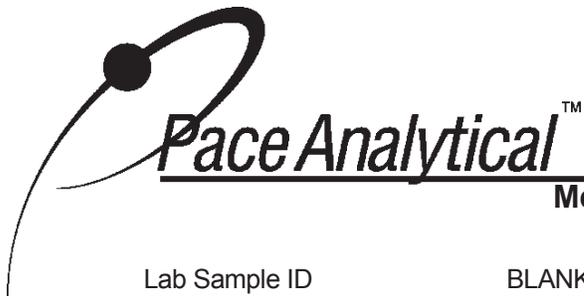
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		--	--	ND	--	0.504
137		--	--	ND	--	0.504
138	129/138/163	--	--	ND	--	1.51
139	139/140	--	--	ND	--	1.01
140	139/140	--	--	ND	--	1.01
141		--	--	ND	--	0.504
142		--	--	ND	--	0.504
143	134/143	--	--	ND	--	1.01
144		--	--	ND	--	0.504
145		--	--	ND	--	0.504
146		--	--	ND	--	0.504
147	147/149	--	--	ND	--	1.01
148		--	--	ND	--	0.504
149	147/149	--	--	ND	--	1.01
150		--	--	ND	--	0.504
151	135/151	--	--	ND	--	1.01
152		--	--	ND	--	0.504
153	153/168	--	--	ND	--	1.01
154		--	--	ND	--	0.504
155		--	--	ND	--	0.504
156	156/157	--	--	ND	--	1.01
157	156/157	--	--	ND	--	1.01
158		--	--	ND	--	0.504
159		--	--	ND	--	0.504
160		--	--	ND	--	0.504
161		--	--	ND	--	0.504
162		--	--	ND	--	0.504
163	129/138/163	--	--	ND	--	1.51
164		--	--	ND	--	0.504
165		--	--	ND	--	0.504
166	128/166	--	--	ND	--	1.01
167		--	--	ND	--	0.504
168	153/168	--	--	ND	--	1.01
169		--	--	ND	--	0.504
170		--	--	ND	--	0.504
171	171/173	--	--	ND	--	1.01
172		--	--	ND	--	0.504
173	171/173	--	--	ND	--	1.01
174		--	--	ND	--	0.504
175		--	--	ND	--	0.504
176		--	--	ND	--	0.504
177		--	--	ND	--	0.504
178		--	--	ND	--	0.504
179		--	--	ND	--	0.504
180	180/193	--	--	ND	--	1.01

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52083  
 Filename P160927B\_04

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		--	--	ND	--	0.504
182		--	--	ND	--	0.504
183	183/185	--	--	ND	--	1.01
184		--	--	ND	--	0.504
185	183/185	--	--	ND	--	1.01
186		--	--	ND	--	0.504
187		--	--	ND	--	0.504
188		--	--	ND	--	0.504
189		--	--	ND	--	0.504
190		--	--	ND	--	0.504
191		--	--	ND	--	0.504
192		--	--	ND	--	0.504
193	180/193	--	--	ND	--	1.01
194		--	--	ND	--	0.757
195		--	--	ND	--	0.757
196		--	--	ND	--	0.757
197	197/200	--	--	ND	--	1.51
198	198/199	--	--	ND	--	1.51
199	198/199	--	--	ND	--	1.51
200	197/200	--	--	ND	--	1.51
201		--	--	ND	--	0.757
202		--	--	ND	--	0.757
203		--	--	ND	--	0.757
204		--	--	ND	--	0.757
205		--	--	ND	--	0.757
206		--	--	ND	--	0.757
207		--	--	ND	--	0.757
208		--	--	ND	--	0.757
209		--	--	ND	--	0.757

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID           CBLKMJ  
Lab Sample ID             BLANK-52083  
Filename                    P160927B\_04

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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### Method 1668A Polychlorobiphenyls Laboratory Control Spike Analysis Results

Lab Sample ID	LCS-52084	Matrix	Water
Filename	P160926A_03	Dilution	5
Total Amount Extracted	1040 mL	Extracted	09/22/2016 14:45
ICAL ID	P160926A02	Analyzed	09/26/2016 15:45
CCal Filename(s)	P160926A_01	Injected By	BAL
Method Blank ID	BLANK-52083		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.04	104	2.0	1.13	57
3	1.0	1.11	111	2.0	1.08	54
4	1.0	1.14	114	2.0	0.872	44
15	1.0	1.12	112	2.0	1.07	54
19	1.0	1.03	103	2.0	1.06	53
37	1.0	1.07	107	2.0	1.36	68
54	1.0	1.11	111	2.0	1.04	52
81	1.0	1.01	101	2.0	1.53	77
77	1.0	0.978	98	2.0	1.53	76
104	1.0	1.11	111	2.0	1.07	54
105	1.0	1.03	103	2.0	1.58	79
114	1.0	1.03	103	2.0	1.49	75
118	1.0	1.08	108	2.0	1.52	76
123	1.0	1.09	109	2.0	1.55	78
126	1.0	1.07	107	2.0	1.44	72
155	1.0	1.06	106	2.0	1.25	63
156/157	2.0	2.08	104	4.0	2.71	68
167	1.0	1.07	107	2.0	1.43	72
169	1.0	1.09	109	2.0	1.21	60
188	1.0	1.13	113	2.0	1.60	80
189	1.0	0.991	99	2.0	1.52	76
202	1.0	1.02	102	2.0	1.73	87
205	1.0	1.03	103	2.0	1.51	76
206	1.0	1.10	110	2.0	1.33	67
208	1.0	0.960	104	2.0	1.53	77
209	1.0	1.04	104	2.0	1.49	75

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCSD-52085	Matrix	Water
Filename	P160926A_04	Dilution	5
Total Amount Extracted	1030 mL	Extracted	09/22/2016 14:45
ICAL ID	P160926A02	Analyzed	09/26/2016 16:44
CCal Filename(s)	P160926A_01	Injected By	BAL
Method Blank ID	BLANK-52083		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.16	116	2.0	1.22	61
3	1.0	1.17	117	2.0	1.27	64
4	1.0	1.13	113	2.0	1.02	51
15	1.0	1.12	112	2.0	1.39	70
19	1.0	1.01	101	2.0	1.28	64
37	1.0	1.06	106	2.0	1.67	83
54	1.0	1.08	108	2.0	1.30	65
81	1.0	1.06	106	2.0	1.73	86
77	1.0	1.04	104	2.0	1.72	86
104	1.0	1.04	104	2.0	1.37	69
105	1.0	1.05	105	2.0	1.73	87
114	1.0	1.09	109	2.0	1.68	84
118	1.0	1.07	107	2.0	1.77	88
123	1.0	1.08	108	2.0	1.72	86
126	1.0	1.05	105	2.0	1.59	79
155	1.0	1.04	104	2.0	1.74	87
156/157	2.0	2.05	102	4.0	3.30	83
167	1.0	1.03	103	2.0	1.71	85
169	1.0	1.01	101	2.0	1.48	74
188	1.0	1.11	111	2.0	2.17	108
189	1.0	1.05	105	2.0	1.80	90
202	1.0	1.05	105	2.0	2.22	111
205	1.0	1.06	106	2.0	1.71	86
206	1.0	1.02	102	2.0	1.53	76
208	1.0	1.07	107	2.0	1.83	91
209	1.0	1.01	101	2.0	1.79	89

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client ALS Environmental

Spike 1 ID LCS-52084  
Spike 1 Filename P160926A\_03

Spike 2 ID LCSD-52085  
Spike 2 Filename P160926A\_04

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	104	116	10.9
4-MoCB	3	111	117	5.3
2,2'-DiCB	4	114	113	0.9
4,4'-DiCB	15	112	112	0.0
2,2',6-TrCB	19	103	101	2.0
3,4,4'-TrCB	37	107	106	0.9
2,2',6,6'-TeCB	54	111	108	2.7
3,3',4,4'-TeCB	77	98	104	5.9
3,4,4',5-TeCB	81	101	106	4.8
2,2',4,6,6'-PeCB	104	111	104	6.5
2,3,3',4,4'-PeCB	105	103	105	1.9
2,3,4,4',5-PeCB	114	103	109	5.7
2,3',4,4',5-PeCB	118	108	107	0.9
2,3',4,4',5'-PeCB	123	109	108	0.9
3,3',4,4',5-PeCB	126	107	105	1.9
2,2',4,4',6,6'-HxCB	155	106	104	1.9
(156/157)	156/157	104	102	1.9
2,3',4,4',5,5'-HxCB	167	107	103	3.8
3,3',4,4',5,5'-HxCB	169	109	101	7.6
2,2',3,4',5,6,6'-HpCB	188	113	111	1.8
2,3,3',4,4',5,5'-HpCB	189	99	105	5.9
2,2',3,3',5,5',6,6'-OxCB	202	102	105	2.9
2,3,3',4,4',5,5',6-OxCB	205	103	106	2.9
2,2',3,3',4,4',5,5',6-NoCB	206	110	102	7.5
2,2',3,3',4,5,5',6,6'-NoCB	208	104	107	2.8
Decachlorobiphenyl	209	104	101	2.9

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

**REPORT OF LABORATORY ANALYSIS**

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55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Sampling in City Outfall Basin 19

**To:** File  
**From:** Brian Anderson, GSI Water Solutions, Inc.  
**Date:** January 16, 2017

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in October 2016. One stormwater composite sample (W16J118-01) was collected in Outfall Basin 19 on October 13 – 14, 2016, and submitted for analysis.

The laboratory analyses for this sample were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Conductivity – FO SOP 1.03a
  - pH – FO SOP 1.01a
  - Temp – FO SOP 1.05a
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- Pace Analytical Services (Pace)
  - Polychlorinated Biphenyls (PCB) Congeners – EPA 1668A

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with this source control program sample.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control (LC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the sample. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## **Analysis Holding Times**

The sample was extracted and analyzed within acceptable holding times.

## **Method Blanks**

Method blanks were analyzed during the laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, and subcontracted analysis of PCB congeners. No analytes were detected in the method blanks processed during any of the analyses.

## **Surrogate Recoveries**

Surrogate recoveries were completed during the analyses of PAHs and phthalates. Surrogate recoveries for the field sample and all associated QC samples were within control criteria.

## **Internal Standard Recoveries**

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. The laboratory reported that internal standards in the sample extracts were recovered at 60-107%. Internal standard recoveries were within the target ranges specified in the method. Because the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery, which allowed accurate values to be obtained.

## **Matrix Spike/Matrix Spike Duplicates**

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates. MS and MSD recoveries were within acceptance limits, and MSD values were within RPD limits.

## **Laboratory Control Samples**

LC samples were processed during the analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. LC sample recoveries were within laboratory control limits for all analyses.

## **Laboratory Duplicate**

WPCL processed two laboratory duplicate samples during TSS analysis, total metals analysis, and mercury analysis. RPDs were within laboratory acceptance limits with the exception of a high RPD for chromium. Affected data are qualified as estimated values (J).

## **Other**

The sample was delivered to WPCL with a cooler temperature of 15 degrees C, which is above the required holding temperature, but may not largely affect data quality due to the short time between sample collection and delivery to the laboratory. Similarly, samples were delivered to ASL Environmental with a cooler temperature of 8.2 degrees C.

WPCL reports that the continuing calibration verification was outside acceptance limits for several phthalate compounds in laboratory QC and field samples. The biases in the QC samples are not expected to impact field sample results, thus data were qualified as a high estimate (J+) only where the field sample was affected.

No other anomalies were reported in by WPCL or the subcontracted laboratories. A list of additional data qualifications added during validation is provided in Table 1.

**Table 1. Qualifiers Added or Modified During Validation**

City of Portland

*Outfall 19*

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
W16J118-01	Chromium	ug/L	2.23	J+	MS
W16J118-01	Bis(2-ethylhexyl) phthalate	ug/L	2.3	J+	CCV

**Notes**

µg/L = micrograms per liter

**Qualifier Definitions**

J+ = Detection of analyte is considered a high estimate

**Reason Code Definitions**

CCV = The continuing calibration verification was high and the sample results may be high estimates

MS = Inconsistent results for matrix QC indicate non-homogeneous sample matrix; sample results should be considered estimates



City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



November 08, 2016

Linda Scheffler  
Director's Office

---

Work Order  
**W16J118**

Project  
**Portland Harbor**

Received  
10/14/16 12:34

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W16J118</b>	Project Mgr: Linda Scheffler
Received: 10/14/16 12:34	
Submitted By: Field Operations	

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
19_SW3	W16J118-01	Stormwater	Composite	10/13/16 02:25	10/14/16 01:55	

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**19\_SW3 : W16J118-01**

**General Chemistry**

Total suspended solids	28 mg/L	2	2		B16J266	10/18/16	10/18/16	SM 2540D	
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**Total Metals**

Total Metals by ICPMS									
Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Arsenic	0.824 ug/L	0.100	0.100	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Cadmium	0.111 ug/L	0.100	0.100	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Chromium	2.23 ug/L	0.200	0.200	1	B16J246	10/17/16	10/17/16	EPA 200.8	M3
Copper	8.64 ug/L	0.200	0.200	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Lead	8.18 ug/L	0.100	0.100	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Mercury	0.0151 ug/L	0.00100	0.00100	1	B16J280	10/18/16	10/19/16	WPCLSOP M-10	
Nickel	1.55 ug/L	0.200	0.200	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Zinc	126 ug/L	0.500	0.500	1	B16J246	10/17/16	10/17/16	EPA 200.8	

Reported: 11/08/16 14:52

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16J118**

**Client: Director's Office**  
**Received: 10/14/16 12:34**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

Acenaphthene	ND ug/L	0.020	0.020	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Acenaphthylene	0.038 ug/L	0.020	0.020	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Anthracene	0.086 ug/L	0.020	0.020	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Benzo(a)anthracene	0.044 ug/L	0.010	0.010	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Benzo(a)pyrene	0.051 ug/L	0.010	0.010	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.089 ug/L	0.010	0.010	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.065 ug/L	0.010	0.010	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.026 ug/L	0.010	0.010	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Chrysene	0.059 ug/L	0.010	0.010	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND ug/L	0.010	0.010	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Fluoranthene	0.10 ug/L	0.010	0.010	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Fluorene	0.022 ug/L	0.020	0.020	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.042 ug/L	0.010	0.010	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
1-Methylnaphthalene	ND ug/L	0.040	0.040	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
2-Methylnaphthalene	ND ug/L	0.040	0.040	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Naphthalene	ND ug/L	0.040	0.040	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Phenanthrene	0.054 ug/L	0.020	0.020	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Pyrene	0.13 ug/L	0.010	0.010	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND ug/L	1.0	0.50	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND ug/L	1.0	0.50	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Diethyl phthalate	ND ug/L	1.0	0.50	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Dimethyl phthalate	1.6 ug/L	1.0	0.50	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND ug/L	1.0	0.50	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.3 ug/L	1.0	0.50	1	B16J263	10/18/16	10/18/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.18 ug/L	0.229	78%	31-164	B16J263	10/18/16	10/18/16	EPA 8270-SIM	
Fluoranthene-d10	0.23 ug/L	0.229	99%	65-145	B16J263	10/18/16	10/18/16	EPA 8270-SIM	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
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Project: **Portland Harbor**  
Work Order: **W16J118**

Client: Director's Office  
Received: 10/14/16 12:34

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B16J266</b>										
<b>Blank (B16J266-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					10/18/16 : 10/18/16	
<b>LCS (B16J266-BS1)</b>										
Total suspended solids	100	mg/L			100		100% (90-110)		10/18/16 : 10/18/16	
<b>Duplicate (B16J266-DUP1) Source: W16J115-01</b>										
Total suspended solids	9	mg/L	2	2		9		4 (20)	10/18/16 : 10/18/16	
<b>Duplicate (B16J266-DUP2) Source: W16J147-02</b>										
Total suspended solids	50	mg/L	2	2		48		4 (20)	10/18/16 : 10/18/16	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B16J246</b>										
<b>Blank (B16J246-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					10/17/16 : 10/17/16	
Cadmium	ND	ug/L	0.100	0.100					10/17/16 : 10/17/16	
Chromium	ND	ug/L	0.200	0.200					10/17/16 : 10/17/16	
Copper	ND	ug/L	0.200	0.200					10/17/16 : 10/17/16	
Lead	ND	ug/L	0.100	0.100					10/17/16 : 10/17/16	
Nickel	ND	ug/L	0.200	0.200					10/17/16 : 10/17/16	
Silver	ND	ug/L	0.100	0.100					10/17/16 : 10/17/16	
Zinc	ND	ug/L	0.500	0.500					10/17/16 : 10/17/16	
<b>LCS (B16J246-BS1)</b>										
Arsenic	2.47	ug/L	0.100	0.100	2.50		99% (85-115)		10/17/16 : 10/17/16	
Cadmium	2.50	ug/L	0.100	0.100	2.50		100% (85-115)		10/17/16 : 10/17/16	
Chromium	2.43	ug/L	0.200	0.200	2.50		97% (85-115)		10/17/16 : 10/17/16	
Copper	2.65	ug/L	0.200	0.200	2.50		106% (85-115)		10/17/16 : 10/17/16	
Lead	2.35	ug/L	0.100	0.100	2.50		94% (85-115)		10/17/16 : 10/17/16	
Nickel	2.51	ug/L	0.200	0.200	2.50		100% (85-115)		10/17/16 : 10/17/16	
Silver	2.49	ug/L	0.100	0.100	2.50		100% (85-115)		10/17/16 : 10/17/16	
Zinc	12.8	ug/L	0.500	0.500	12.5		102% (85-115)		10/17/16 : 10/17/16	
<b>Duplicate (B16J246-DUP1) Source: W16J115-01</b>										
Arsenic	0.115	ug/L	0.100	0.100		0.112		2 (20)	10/17/16 : 10/17/16	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	10/17/16 : 10/17/16	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16J118**

**Client: Director's Office**  
**Received: 10/14/16 12:34**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16J246**

<b>Duplicate (B16J246-DUP1)</b>		<b>Source: W16J115-01</b>								
Chromium	0.269	ug/L	0.200	0.200		0.246	9 (20)		10/17/16 :10/17/16	
Copper	2.93	ug/L	0.200	0.200		2.91	0.4 (20)		10/17/16 :10/17/16	
Lead	0.298	ug/L	0.100	0.100		0.311	4 (20)		10/17/16 :10/17/16	
Nickel	0.368	ug/L	0.200	0.200		0.371	0.7 (20)		10/17/16 :10/17/16	
Silver	ND	ug/L	0.100	0.100		ND	(20)		10/17/16 :10/17/16	
Zinc	15.6	ug/L	0.500	0.500		15.4	1 (20)		10/17/16 :10/17/16	

<b>Duplicate (B16J246-DUP2)</b>		<b>Source: W16J118-01</b>								
Arsenic	0.792	ug/L	0.100	0.100		0.824	4 (20)		10/17/16 :10/17/16	
Cadmium	0.110	ug/L	0.100	0.100		0.111	2 (20)		10/17/16 :10/17/16	
Chromium	3.09	ug/L	0.200	0.200		2.23	32 (20)		10/17/16 :10/17/16	M3
Copper	8.55	ug/L	0.200	0.200		8.64	1 (20)		10/17/16 :10/17/16	
Lead	8.03	ug/L	0.100	0.100		8.18	2 (20)		10/17/16 :10/17/16	
Nickel	1.55	ug/L	0.200	0.200		1.55	0.2 (20)		10/17/16 :10/17/16	
Silver	ND	ug/L	0.100	0.100		ND	(20)		10/17/16 :10/17/16	
Zinc	124	ug/L	0.500	0.500		126	2 (20)		10/17/16 :10/17/16	

<b>Matrix Spike (B16J246-MS1)</b>		<b>Source: W16J115-01</b>								
Arsenic	5.08	ug/L	0.100	0.100	5.00	0.112	99% (70-130)		10/17/16 :10/17/16	
Cadmium	5.02	ug/L	0.100	0.100	5.00	ND	100% (70-130)		10/17/16 :10/17/16	
Chromium	5.06	ug/L	0.200	0.200	5.00	0.246	96% (70-130)		10/17/16 :10/17/16	
Copper	8.11	ug/L	0.200	0.200	5.00	2.91	104% (70-130)		10/17/16 :10/17/16	
Lead	5.01	ug/L	0.100	0.100	5.00	0.311	94% (70-130)		10/17/16 :10/17/16	
Nickel	5.32	ug/L	0.200	0.200	5.00	0.371	99% (70-130)		10/17/16 :10/17/16	
Silver	4.95	ug/L	0.100	0.100	5.00	ND	99% (70-130)		10/17/16 :10/17/16	
Zinc	40.1	ug/L	0.500	0.500	25.0	15.4	98% (70-130)		10/17/16 :10/17/16	

<b>Matrix Spike (B16J246-MS2)</b>		<b>Source: W16J118-01</b>								
Arsenic	5.63	ug/L	0.100	0.100	5.00	0.824	96% (70-130)		10/17/16 :10/17/16	
Cadmium	4.99	ug/L	0.100	0.100	5.00	0.111	98% (70-130)		10/17/16 :10/17/16	
Chromium	6.98	ug/L	0.200	0.200	5.00	2.23	95% (70-130)		10/17/16 :10/17/16	
Copper	13.5	ug/L	0.200	0.200	5.00	8.64	98% (70-130)		10/17/16 :10/17/16	
Lead	13.0	ug/L	0.100	0.100	5.00	8.18	96% (70-130)		10/17/16 :10/17/16	
Nickel	6.34	ug/L	0.200	0.200	5.00	1.55	96% (70-130)		10/17/16 :10/17/16	
Silver	4.76	ug/L	0.100	0.100	5.00	ND	95% (70-130)		10/17/16 :10/17/16	
Zinc	148	ug/L	0.500	0.500	25.0	126	89% (70-130)		10/17/16 :10/17/16	

**Total Metals by ICPMS - Batch B16J280**

<b>Blank (B16J280-BLK1)</b>										
Mercury	ND	ug/L	0.000900	0.000900					10/18/16 :10/19/16	

**LCS (B16J280-BS1)**

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**Project: Portland Harbor**  
**Work Order: W16J118**

**Client: Director's Office**  
**Received: 10/14/16 12:34**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Total Metals by ICPMS - Batch B16J280										
<b>LCS (B16J280-BS1)</b>										
Mercury	0.0103	ug/L	0.000900	0.000900	0.0100		103% (85-125)		10/18/16 :10/19/16	
<b>Duplicate (B16J280-DUP1)</b>			<b>Source: W16J115-02</b>							
Mercury	0.00404	ug/L	0.00100	0.00100		0.00400		1 (20)	10/18/16 :10/19/16	
<b>Duplicate (B16J280-DUP2)</b>			<b>Source: W16J145-02</b>							
Mercury	0.00402	ug/L	0.00100	0.00100		0.00409		2 (20)	10/18/16 :10/19/16	
<b>Matrix Spike (B16J280-MS1)</b>			<b>Source: W16J115-02</b>							
Mercury	0.0316	ug/L	0.00100	0.00100	0.0278	0.00400	99% (70-130)		10/18/16 :10/19/16	
<b>Matrix Spike (B16J280-MS2)</b>			<b>Source: W16J145-02</b>							
Mercury	0.0313	ug/L	0.00100	0.00100	0.0278	0.00409	98% (70-130)		10/18/16 :10/19/16	

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**Project: Portland Harbor**  
**Work Order: W16J118**

**Client: Director's Office**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16J263**

**Blank (B16J263-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					10/18/16 :10/18/16	
Acenaphthylene	ND	ug/L	0.020	0.020					10/18/16 :10/18/16	
Anthracene	ND	ug/L	0.020	0.020					10/18/16 :10/18/16	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					10/18/16 :10/18/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					10/18/16 :10/18/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					10/18/16 :10/18/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					10/18/16 :10/18/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					10/18/16 :10/18/16	
Chrysene	ND	ug/L	0.010	0.010					10/18/16 :10/18/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					10/18/16 :10/18/16	
Fluoranthene	ND	ug/L	0.010	0.010					10/18/16 :10/18/16	
Fluorene	ND	ug/L	0.020	0.020					10/18/16 :10/18/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					10/18/16 :10/18/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					10/18/16 :10/18/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					10/18/16 :10/18/16	
Naphthalene	ND	ug/L	0.040	0.040					10/18/16 :10/18/16	
Phenanthrene	ND	ug/L	0.020	0.020					10/18/16 :10/18/16	
Pyrene	ND	ug/L	0.010	0.010					10/18/16 :10/18/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					10/18/16 :10/18/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					10/18/16 :10/18/16	
Diethyl phthalate	ND	ug/L	1.0	0.50					10/18/16 :10/18/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					10/18/16 :10/18/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					10/18/16 :10/18/16	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					10/18/16 :10/18/16	

**Surrogate**

2-Methylnaphthalene-d10	0.17	ug/L			0.229		73% (31-164)		10/18/16 :10/18/16	
Fluoranthene-d10	0.24	ug/L			0.229		106% (65-145)		10/18/16 :10/18/16	

**LCS (B16J263-BS1)**

Acenaphthene	0.216	ug/L	0.020	0.020	0.229		95% (67-125)		10/18/16 :10/18/16	
Acenaphthylene	0.237	ug/L	0.020	0.020	0.229		104% (64-138)		10/18/16 :10/18/16	
Anthracene	0.241	ug/L	0.020	0.020	0.229		106% (65-143)		10/18/16 :10/18/16	
Benzo(a)anthracene	0.210	ug/L	0.010	0.010	0.229		92% (80-130)		10/18/16 :10/18/16	
Benzo(a)pyrene	0.218	ug/L	0.010	0.010	0.229		96% (74-131)		10/18/16 :10/18/16	
Benzo(b)fluoranthene	0.195	ug/L	0.010	0.010	0.229		85% (67-128)		10/18/16 :10/18/16	
Benzo(g,h,i)perylene	0.198	ug/L	0.010	0.010	0.229		87% (57-137)		10/18/16 :10/18/16	
Benzo(k)fluoranthene	0.219	ug/L	0.010	0.010	0.229		96% (63-140)		10/18/16 :10/18/16	
Chrysene	0.245	ug/L	0.010	0.010	0.229		107% (80-134)		10/18/16 :10/18/16	
Dibenzo(a,h)anthracene	0.218	ug/L	0.010	0.010	0.229		96% (56-138)		10/18/16 :10/18/16	
Fluoranthene	0.249	ug/L	0.010	0.010	0.229		109% (70-150)		10/18/16 :10/18/16	
Fluorene	0.222	ug/L	0.020	0.020	0.229		97% (64-130)		10/18/16 :10/18/16	

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**Project: Portland Harbor**  
**Work Order: W16J118**

**Client: Director's Office**  
**Received: 10/14/16 12:34**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16J263**

**LCS (B16J263-BS1)**

Indeno(1,2,3-cd)pyrene	0.211	ug/L	0.010	0.010	0.229		92% (58-138)		10/18/16 :10/18/16	
1-Methylnaphthalene	0.179	ug/L	0.040	0.040	0.229		78% (35-164)		10/18/16 :10/18/16	
2-Methylnaphthalene	0.159	ug/L	0.040	0.040	0.229		69% (29-162)		10/18/16 :10/18/16	
Naphthalene	0.206	ug/L	0.040	0.040	0.229		90% (53-134)		10/18/16 :10/18/16	
Phenanthrene	0.217	ug/L	0.020	0.020	0.229		95% (73-132)		10/18/16 :10/18/16	
Pyrene	0.248	ug/L	0.010	0.010	0.229		108% (69-153)		10/18/16 :10/18/16	
Butyl benzyl phthalate	2.67	ug/L	1.0	0.50	2.29		117% (55-181)		10/18/16 :10/18/16	V1
Di-n-butyl phthalate	2.63	ug/L	1.0	0.50	2.29		115% (61-183)		10/18/16 :10/18/16	
Diethyl phthalate	2.48	ug/L	1.0	0.50	2.29		108% (65-177)		10/18/16 :10/18/16	
Dimethyl phthalate	2.43	ug/L	1.0	0.50	2.29		106% (77-151)		10/18/16 :10/18/16	
Di-n-octyl phthalate	3.16	ug/L	1.0	0.50	2.29		138% (12-185)		10/18/16 :10/18/16	V1
Bis(2-ethylhexyl) phthalate	2.66	ug/L	1.0	0.50	2.29		116% (39-170)		10/18/16 :10/18/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.18	ug/L			0.229		79% (31-164)		10/18/16 :10/18/16	
Fluoranthene-d10	0.26	ug/L			0.229		115% (65-145)		10/18/16 :10/18/16	

**Matrix Spike (B16J263-MS1)**

**Source: W16J118-01**

Acenaphthene	0.258	ug/L	0.020	0.020	0.229	ND	113% (67-125)		10/18/16 :10/18/16	
Acenaphthylene	0.294	ug/L	0.020	0.020	0.229	0.0383	112% (64-138)		10/18/16 :10/18/16	
Anthracene	0.337	ug/L	0.020	0.020	0.229	0.0857	110% (65-143)		10/18/16 :10/18/16	
Benzo(a)anthracene	0.265	ug/L	0.010	0.010	0.229	0.0440	96% (80-130)		10/18/16 :10/18/16	
Benzo(a)pyrene	0.241	ug/L	0.010	0.010	0.229	0.0509	83% (74-131)		10/18/16 :10/18/16	
Benzo(b)fluoranthene	0.257	ug/L	0.010	0.010	0.229	0.0891	74% (67-128)		10/18/16 :10/18/16	
Benzo(g,h,i)perylene	0.230	ug/L	0.010	0.010	0.229	0.0646	72% (57-137)		10/18/16 :10/18/16	
Benzo(k)fluoranthene	0.205	ug/L	0.010	0.010	0.229	0.0263	78% (63-140)		10/18/16 :10/18/16	
Chrysene	0.287	ug/L	0.010	0.010	0.229	0.0594	100% (80-134)		10/18/16 :10/18/16	
Dibenzo(a,h)anthracene	0.170	ug/L	0.010	0.010	0.229	ND	74% (56-138)		10/18/16 :10/18/16	
Fluoranthene	0.351	ug/L	0.010	0.010	0.229	0.103	108% (70-150)		10/18/16 :10/18/16	
Fluorene	0.254	ug/L	0.020	0.020	0.229	0.0217	102% (64-130)		10/18/16 :10/18/16	
Indeno(1,2,3-cd)pyrene	0.210	ug/L	0.010	0.010	0.229	0.0417	74% (58-138)		10/18/16 :10/18/16	
Naphthalene	0.241	ug/L	0.040	0.040	0.229	ND	105% (53-134)		10/18/16 :10/18/16	
Phenanthrene	0.281	ug/L	0.020	0.020	0.229	0.0537	100% (73-132)		10/18/16 :10/18/16	
Pyrene	0.380	ug/L	0.010	0.010	0.229	0.133	108% (69-153)		10/18/16 :10/18/16	
Butyl benzyl phthalate	3.01	ug/L	1.0	0.50	2.29	ND	132% (55-181)		10/18/16 :10/18/16	V1
Di-n-butyl phthalate	2.72	ug/L	1.0	0.50	2.29	ND	119% (61-183)		10/18/16 :10/18/16	
Diethyl phthalate	2.78	ug/L	1.0	0.50	2.29	ND	122% (65-177)		10/18/16 :10/18/16	
Dimethyl phthalate	4.13	ug/L	1.0	0.50	2.29	1.60	111% (77-151)		10/18/16 :10/18/16	
Di-n-octyl phthalate	2.49	ug/L	1.0	0.50	2.29	ND	109% (12-185)		10/18/16 :10/18/16	V1
Bis(2-ethylhexyl) phthalate	4.10	ug/L	1.0	0.50	2.29	2.25	81% (39-170)		10/18/16 :10/18/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.18	ug/L			0.229		77% (31-164)		10/18/16 :10/18/16	
Fluoranthene-d10	0.24	ug/L			0.229		105% (65-145)		10/18/16 :10/18/16	

Reported: 11/08/16 14:52

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16J118**

**Client: Director's Office**  
**Received: 10/14/16 12:34**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16J263**

**Matrix Spike Dup (B16J263-MSD1)**

**Source: W16J118-01**

Acenaphthene	0.242	ug/L	0.020	0.020	0.229	ND	106% (67-125)	6 (30)	10/18/16 :10/18/16	
Acenaphthylene	0.285	ug/L	0.020	0.020	0.229	0.0383	108% (64-138)	3 (30)	10/18/16 :10/18/16	
Anthracene	0.363	ug/L	0.020	0.020	0.229	0.0857	122% (65-143)	8 (30)	10/18/16 :10/18/16	
Benzo(a)anthracene	0.267	ug/L	0.010	0.010	0.229	0.0440	98% (80-130)	1 (30)	10/18/16 :10/18/16	
Benzo(a)pyrene	0.253	ug/L	0.010	0.010	0.229	0.0509	88% (74-131)	5 (30)	10/18/16 :10/18/16	
Benzo(b)fluoranthene	0.261	ug/L	0.010	0.010	0.229	0.0891	75% (67-128)	2 (30)	10/18/16 :10/18/16	
Benzo(g,h,i)perylene	0.238	ug/L	0.010	0.010	0.229	0.0646	76% (57-137)	3 (30)	10/18/16 :10/18/16	
Benzo(k)fluoranthene	0.205	ug/L	0.010	0.010	0.229	0.0263	78% (63-140)	0 (30)	10/18/16 :10/18/16	
Chrysene	0.293	ug/L	0.010	0.010	0.229	0.0594	102% (80-134)	2 (30)	10/18/16 :10/18/16	
Dibenzo(a,h)anthracene	0.182	ug/L	0.010	0.010	0.229	ND	80% (56-138)	7 (30)	10/18/16 :10/18/16	
Fluoranthene	0.366	ug/L	0.010	0.010	0.229	0.103	115% (70-150)	4 (30)	10/18/16 :10/18/16	
Fluorene	0.247	ug/L	0.020	0.020	0.229	0.0217	99% (64-130)	3 (30)	10/18/16 :10/18/16	
Indeno(1,2,3-cd)pyrene	0.227	ug/L	0.010	0.010	0.229	0.0417	81% (58-138)	8 (30)	10/18/16 :10/18/16	
Naphthalene	0.235	ug/L	0.040	0.040	0.229	ND	103% (53-134)	2 (30)	10/18/16 :10/18/16	
Phenanthrene	0.290	ug/L	0.020	0.020	0.229	0.0537	103% (73-132)	3 (30)	10/18/16 :10/18/16	
Pyrene	0.390	ug/L	0.010	0.010	0.229	0.133	112% (69-153)	3 (30)	10/18/16 :10/18/16	
Butyl benzyl phthalate	2.95	ug/L	1.0	0.50	2.29	ND	129% (55-181)	2 (30)	10/18/16 :10/18/16	V1
Di-n-butyl phthalate	2.74	ug/L	1.0	0.50	2.29	ND	120% (61-183)	0.5 (30)	10/18/16 :10/18/16	
Diethyl phthalate	2.74	ug/L	1.0	0.50	2.29	ND	120% (65-177)	1 (30)	10/18/16 :10/18/16	
Dimethyl phthalate	4.11	ug/L	1.0	0.50	2.29	1.60	110% (77-151)	0.7 (30)	10/18/16 :10/18/16	
Di-n-octyl phthalate	2.66	ug/L	1.0	0.50	2.29	ND	117% (12-185)	7 (30)	10/18/16 :10/18/16	V1
Bis(2-ethylhexyl) phthalate	4.24	ug/L	1.0	0.50	2.29	2.25	87% (39-170)	3 (30)	10/18/16 :10/18/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.19	ug/L			0.229		82% (31-164)		10/18/16 :10/18/16	
Fluoranthene-d10	0.25	ug/L			0.229		108% (65-145)		10/18/16 :10/18/16	

**Qualifiers**

M3 Inconsistent results for matrix QC (duplicates and/or matrix spikes) indicate non-homogeneous sample matrix. Sample results should be considered estimates.

V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.

**Definitions**

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 11/08/16 14:52

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain of Custody



Bureau of Environmental Services

Date: 10/14/16

Work Order #: W163118

Collected By: MJS, JXL, ASA, KEB

Client Name: Directors Office Matrix: Stormwater  
 Project Name: Portland Harbor

Requested Analyses

Lab Number	2016 Stormwater Outfall Monitoring Composite Sample COC		Requested Analyses										# of Containers	Remarks									
	Location ID	Composite Start Date/Time	Composite End Date/Time	Sample Type	Total Metals (As, Cd, Cr, Cu)	(Pb, Ni, Ag, Zn)	Total Mercury	Pb Congeners	PAHs + phthalates (low-level)	TSS													
19_SW3	10/13/16 0835	10/14/16 0155	C	●	●	●	●	●	●	●											4	SW-19-AAP918 (OF19) 4900 NW Kittridge Ave, DS of MH	
FIELDUP			C	●	●	●	●	●	●	●													Field Duplicate

Inquired By: Signature: *Matt Bellin* Date: 10/14/16 Time: 1234  
 Relinquished By: Signature: *Nicholas Semness* Date: 10-14-16 Time: 1234  
 Received By: Signature: *Nicholas Semness* Date: 10-14-16 Time: 1234

### WPCL Cooler Receipt Form

Work Order Number: W165118

Cooler Receipt Form Filled Out By: NT

Project: Portland Harbor

Sample transport: Samples received on ice

Courier \_\_\_\_\_

Directly from field \_\_\_\_\_

Temperature (°C) 15°C

	Yes	No	NA
Is the COC present and signed?	✓		
Are sample bottles intact?	✓		
Do the COC and sample labels match?	✓		
Are the appropriate containers used?	✓		
Are samples appropriately preserved?	✓		✓
Do VOA vials have Headspace?			✓
Are samples received within holding times?	✓		

*NT 10-14-16*

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	1601146	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
10-14-16	1310	NT	W165118-01	D	1	

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

November 07, 2016

**Analytical Report for Service Request No: K1612574**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W16J118**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory October 17, 2016  
For your reference, these analyses have been assigned our service request number **K1612574**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

## Table of Contents

Acronyms

Qualifiers

State Certifications, Accreditations, And Licenses

Chain of Custody

Subcontract Lab Results

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

SUBCONTRACT ORDER

City of Portland Water Pollution Control Lab

W16J118

K1612574

SENDING LABORATORY:

City of Portland Water Pollution Control Lab  
6543 N. Burlington Ave  
Portland, OR 97203  
Phone: 503-823-5600  
Fax: 503-823-5656  
Invoice To: Charles Lytle

RECEIVING LABORATORY:

ALS Environmental  
1317 S. 13th Avenue  
Kelso, WA 98626  
Phone : (360) 577-7222  
Fax: (360) 636-1068

WPCL Project Name

Portland Harbor

**TURNAROUND REQUEST**

- Standard
- Rush \_ day(s)

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: W16J118-01	Water	Sampled:10/14/16 01:55		
Out-PCB Congeners 209	10/28/16 17:00	04/12/17 01:55		
<i>Containers Supplied:</i>				
G amber 1L (A)				

Called ALS @ 1600 on 10.14.16

 10/17/16  
 Released By \_\_\_\_\_ Date \_\_\_\_\_  
 Received By *ALS 1000* 10-17-16 10:00  
 Received By \_\_\_\_\_ Date \_\_\_\_\_  
 Received By *Supplied ALS* 10-17-16 11:15  
 Received By \_\_\_\_\_ Date \_\_\_\_\_



PC Howard

### Cooler Receipt and Preservation Form

Client City of Portland Service Request K16 12574  
 Received: 10-17-16 Opened: 10-17-16 By: ES Unloaded: 10-17-16 By: ES

1. Samples were received via? **USPS** **Fed Ex** **UPS** **DHL** **PDX** **Courier** **Hand Delivered**  
 2. Samples were received in: (circle) **Cooler** **Box** **Envelope** **Other** NA  
 3. Were custody seals on coolers? **NA** **Y** **(N)** If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? **Y** **N** If present, were they signed and dated? **Y** **N**

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
8.3	8.2	-	-	-0.1	366	(NA)	(NA)	(NA)

4. Packing material: **Inserts** **Baggies** **Bubble Wrap** **Gel Packs** **Wet Ice** **Dry Ice** **Sleeves** \_\_\_\_\_  
 5. Were custody papers properly filled out (ink, signed, etc.)? **NA** **(Y)** **N**  
 6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* **NA** **(Y)** **N**  
 If applicable, tissue samples were received: **Frozen** **Partially Thawed** **Thawed**  
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? **NA** **(Y)** **N**  
 8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* **NA** **Y** **(N)**  
 9. Were appropriate bottles/containers and volumes received for the tests indicated? **NA** **(Y)** **N**  
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* **(NA)** **(Y)** **N**  
 11. Were VOA vials received without headspace? *Indicate in the table below.* **(NA)** **Y** **N**  
 12. Was C12/Res negative? **(Y)** **Y** **N**

Sample ID on Bottle	Sample ID on COC	Identified by:
W165139-03	W165138-03	<del>All</del> Elimination ES 10-17-16

Sample ID	Bottle Count	Out of	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time
All	All	X								

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Report Prepared for:**

Howard Holmes  
ALS Environmental  
1317 S. 13th Avenue  
Kelso WA 98626

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Prepared Date:**

November 3, 2016

**Report Information:**

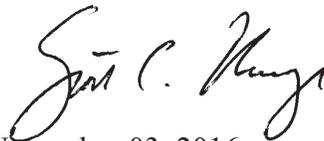
**Pace Project #: 10366754**  
**Sample Receipt Date: 10/19/2016**  
**Client Project #: K1612574**  
**Client Sub PO #: 51K1612574**  
**State Cert #: C755**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



November 03, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

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The results relate only to the samples included in this report.



## **DISCUSSION**

This report was revised to correct a typographical error on the extraction sheet date.

This report presents the results from the analyses performed on one sample submitted by a representative of ALS Environmental. The sample was analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the amount of sample extracted.

The isotopically-labeled PCB internal standards in the sample extracts were recovered at 60-107%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the sample material.

A laboratory spike sample was also prepared with the sample batch using reference material that had been fortified with native standards. The results show that the spiked native compounds were recovered at 95-117%. These results were within the target ranges for this method. Matrix spikes were prepared using a sample from another project in the extraction batch. Results are available upon request.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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# Appendix A

## Sample Management

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes  
10366754

Project Number: K1612574  
Project Manager: Howard Holmes  
QAP: LAB QAP

209 List

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Lab ID
				Date	Time	Pace MN	
K1612574-001	W161118-01	1	Water	10/14/16	0155	Pace MN	X

CI Biphen Cong 1668A

DD1

Test Comments: CI Biphen Cong - 1668A K1612574-001 209 congener list

Folder Comments: Tier II

City of Portland Samples

HL

<b>Special Instructions/Comments</b> Please provide the electronic (PDF and EDD) report to the following e-mail address: ALS.LS.Data@alsglobal.com.  Report # EDD to City of Portland Report # EDD # Invoice to Holmes Holmes email P - Test is On Hold P - Test is Authorized for Prep Only	<b>Turnaround Requirements</b> RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD Requested FAX Date: _____ Requested Report Date: 11/03/16	<b>Report Requirements</b> I. Results Only _____ II. Results + QC Summaries <input checked="" type="checkbox"/> III. Results + QC and Calibration Summaries _____ IV. Data Validation Report with Raw Data _____ PQL/MDL/J Y _____ EDD Y _____	<b>Invoice Information</b> PO# 51K1612574 Bill to _____

Inquired By: Holmes 10/18/16 1115 Received By: Miri / PACE 10/16/16 9:30 Airbill Number: \_\_\_\_\_

**Sample Condition Upon Receipt**

Client Name: ALS Environment Project #: \_\_\_\_\_

**WO# : 10366754**



10366754

Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  SpeedDee  Other: \_\_\_\_\_  
 Tracking Number: 6447 9280 5488

Custody Seal on Cooler/Box Present?  Yes  No Seals Intact?  Yes  No  
 Optional: Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_

Packing Material:  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_ Temp Blank?  Yes  No

Thermometer Used:  151401163  151401164  B88A912167504  B88A0143310098  
 Type of Ice: BC 10/19/16  Wet  Blue  None  Samples on Ice, cooling process has begun

Cooler Temp Read (°C): 5.1 Cooler Temp Corrected (°C): 5.3 Biological Tissue Frozen?  Yes  No  N/A  
 Temp should be above freezing to 6°C Correction Factor: 10.2 Date and Initials of Person Examining Contents: BC 10/19/16

USDA Regulated Soil (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes  No  
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
**If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.**

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <u>BC 10/19/16</u> <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH >12 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Field Data Required?  Yes  No  
 Comments/Resolution: \_\_\_\_\_

Project Manager Review: William Berg Date: 10/20/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

## REPORT OF LABORATORY ANALYSIS

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# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1612574-001		
Lab Sample ID	10366754001		
Filename	P161101B_09		
Injected By	CVS		
Total Amount Extracted	1000 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/14/2016 01:55
ICAL ID	P161101B02	Received	10/19/2016 09:30
CCal Filename(s)	P161101B_01	Extracted	10/28/2016 12:10
Method Blank ID	BLANK-52578	Analyzed	11/02/2016 06:39

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.756	3.33	2.0	1.41	70
13C-4-MoCB	3	11.368	3.52	2.0	1.52	76
13C-2,2'-DiCB	4	11.620	1.59	2.0	1.20	60
13C-4,4'-DiCB	15	18.422	1.52	2.0	1.50	75
13C-2,2',6-TrCB	19	15.200	1.03	2.0	1.37	69
13C-3,4,4'-TrCB	37	26.052	1.04	2.0	1.78	89
13C-2,2',6,6'-TeCB	54	18.674	0.82	2.0	1.23	61
13C-3,4,4',5'-TeCB	81	33.117	0.81	2.0	1.95	97
13C-3,3',4,4'-TeCB	77	33.687	0.81	2.0	1.93	97
13C-2,2',4,6,6'-PeCB	104	24.644	1.64	2.0	1.44	72
13C-2,3,3',4,4'-PeCB	105	37.263	1.55	2.0	1.72	86
13C-2,3,4,4',5'-PeCB	114	36.593	1.56	2.0	1.74	87
13C-2,3',4,4',5'-PeCB	118	36.039	1.63	2.0	1.86	93
13C-2,3',4,4',5'-PeCB	123	35.687	1.62	2.0	1.82	91
13C-3,3',4,4',5'-PeCB	126	40.449	1.52	2.0	1.71	85
13C-2,2',4,4',6,6'-HxCB	155	30.601	1.30	2.0	1.65	83
13C-HxCB (156/157)	156/157	43.472	1.28	4.0	3.14	78
13C-2,3',4,4',5,5'-HxCB	167	42.282	1.35	2.0	1.67	83
13C-3,3',4,4',5,5'-HxCB	169	46.792	1.24	2.0	1.49	75
13C-2,2',3,4',5,6,6'-HpCB	188	36.492	1.06	2.0	2.01	101
13C-2,3,3',4,4',5,5'-HpCB	189	49.307	1.06	2.0	1.68	84
13C-2,2',3,3',5,5',6,6'-OxCB	202	41.964	0.90	2.0	2.13	107
13C-2,3,3',4,4',5,5',6-OxCB	205	51.894	0.90	2.0	1.64	82
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.575	0.78	2.0	1.59	79
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	48.725	0.84	2.0	1.88	94
13C--DeCB	209	55.191	0.67	2.0	2.00	100
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.709	1.05	2.0	1.95	97
13C-2,3,3',5,5'-PeCB	111	33.653	1.57	2.0	1.73	86
13C-2,2',3,3',5,5',6-HpCB	178	39.611	1.05	2.0	1.88	94
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	13.930	1.53	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.654	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.853	1.64	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.192	1.35	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.376	0.95	2.0	NA	NA

Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612574-001  
 Lab Sample ID 10366754001  
 Filename P161101B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.250
2		---	---	ND	---	0.250
3		---	---	ND	---	0.250
4		---	---	ND	---	0.250
5		---	---	ND	---	0.250
6		---	---	ND	---	0.250
7		---	---	ND	---	0.250
8		---	---	ND	---	0.250
9		---	---	ND	---	0.250
10		---	---	ND	---	0.250
11		---	---	ND	---	2.45
12	12/13	---	---	ND	---	0.500
13	12/13	---	---	ND	---	0.500
14		---	---	ND	---	0.250
15		---	---	ND	---	0.330
16		---	---	ND	---	0.250
17		---	---	ND	---	0.250
18	18/30	---	---	ND	---	0.500
19		---	---	ND	---	0.250
20	20/28	---	---	ND	---	1.29
21	21/33	---	---	ND	---	1.35
22		---	---	ND	---	0.949
23		---	---	ND	---	0.250
24		---	---	ND	---	0.250
25		---	---	ND	---	0.250
26	26/29	---	---	ND	---	0.500
27		---	---	ND	---	0.250
28	20/28	---	---	ND	---	1.29
29	26/29	---	---	ND	---	0.500
30	18/30	---	---	ND	---	0.500
31		---	---	ND	---	1.30
32		---	---	ND	---	0.250
33	21/33	---	---	ND	---	1.35
34		---	---	ND	---	0.250
35		---	---	ND	---	0.250
36		---	---	ND	---	0.250
37		---	---	ND	---	0.530
38		---	---	ND	---	0.250
39		---	---	ND	---	0.250
40	40/41/71	---	---	ND	---	1.50
41	40/41/71	---	---	ND	---	1.50
42		---	---	ND	---	0.500
43	43/73	---	---	ND	---	0.500
44	44/47/65	---	---	ND	---	1.50
45	45/51	---	---	ND	---	0.999
46		---	---	ND	---	0.500
47	44/47/65	---	---	ND	---	1.50
48		---	---	ND	---	0.500

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
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 ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612574-001  
Lab Sample ID 10366754001  
Filename P161101B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.999
50	50/53	---	---	ND	---	0.999
51	45/51	---	---	ND	---	0.999
52		---	---	ND	---	1.54
53	50/53	---	---	ND	---	0.999
54		---	---	ND	---	0.500
55		---	---	ND	---	0.500
56		---	---	ND	---	0.500
57		---	---	ND	---	0.500
58		---	---	ND	---	0.500
59	59/62/75	---	---	ND	---	1.50
60		---	---	ND	---	0.500
61	61/70/74/76	---	---	ND	---	2.00
62	59/62/75	---	---	ND	---	1.50
63		---	---	ND	---	0.500
64		---	---	ND	---	0.500
65	44/47/65	---	---	ND	---	1.50
66		---	---	ND	---	0.839
67		---	---	ND	---	0.500
68		---	---	ND	---	0.500
69	49/69	---	---	ND	---	0.999
70	61/70/74/76	---	---	ND	---	2.00
71	40/41/71	---	---	ND	---	1.50
72		---	---	ND	---	0.500
73	43/73	---	---	ND	---	0.500
74	61/70/74/76	---	---	ND	---	2.00
75	59/62/75	---	---	ND	---	1.50
76	61/70/74/76	---	---	ND	---	2.00
77		---	---	ND	---	0.500
78		---	---	ND	---	0.500
79		---	---	ND	---	0.500
80		---	---	ND	---	0.500
81		---	---	ND	---	0.500
82		---	---	ND	---	0.500
83		---	---	ND	---	0.500
84		---	---	ND	---	0.500
85	85/116/117	---	---	ND	---	1.50
86	86/87/97/108/119/125	---	---	ND	---	3.00
87	86/87/97/108/119/125	---	---	ND	---	3.00
88	88/91	---	---	ND	---	0.999
89		---	---	ND	---	0.500
90	90/101/113	---	---	ND	---	1.50
91	88/91	---	---	ND	---	0.999
92		---	---	ND	---	0.500
93	93/98/100/102	---	---	ND	---	2.00
94		---	---	ND	---	0.500
95		---	---	ND	---	0.949
96		---	---	ND	---	0.500

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
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NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID      K1612574-001  
Lab Sample ID        10366754001  
Filename                P161101B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.00
98	93/98/100/102	---	---	ND	---	2.00
99		---	---	ND	---	0.500
100	93/98/100/102	---	---	ND	---	2.00
101	90/101/113	---	---	ND	---	1.50
102	93/98/100/102	---	---	ND	---	2.00
103		---	---	ND	---	0.500
104		---	---	ND	---	0.500
105		---	---	ND	---	0.500
106		---	---	ND	---	0.500
107	107/124	---	---	ND	---	0.999
108	86/87/97/108/119/125	---	---	ND	---	3.00
109		---	---	ND	---	0.500
110	110/115	---	---	ND	---	0.999
111		---	---	ND	---	0.500
112		---	---	ND	---	0.500
113	90/101/113	---	---	ND	---	1.50
114		---	---	ND	---	0.500
115	110/115	---	---	ND	---	0.999
116	85/116/117	---	---	ND	---	1.50
117	85/116/117	---	---	ND	---	1.50
118		---	---	ND	---	0.640
119	86/87/97/108/119/125	---	---	ND	---	3.00
120		---	---	ND	---	0.500
121		---	---	ND	---	0.500
122		---	---	ND	---	0.500
123		---	---	ND	---	0.500
124	107/124	---	---	ND	---	0.999
125	86/87/97/108/119/125	---	---	ND	---	3.00
126		---	---	ND	---	0.500
127		---	---	ND	---	0.500
128	128/166	---	---	ND	---	0.999
129	129/138/163	---	---	ND	---	1.50
130		---	---	ND	---	0.500
131		---	---	ND	---	0.500
132		---	---	ND	---	0.500
133		---	---	ND	---	0.500
134	134/143	---	---	ND	---	0.999
135	135/151	---	---	ND	---	0.999
136		---	---	ND	---	0.500
137		---	---	ND	---	0.500
138	129/138/163	---	---	ND	---	1.50
139	139/140	---	---	ND	---	0.999
140	139/140	---	---	ND	---	0.999
141		---	---	ND	---	0.500
142		---	---	ND	---	0.500
143	134/143	---	---	ND	---	0.999
144		---	---	ND	---	0.500

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612574-001  
 Lab Sample ID 10366754001  
 Filename P161101B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.500
146		---	---	ND	---	0.500
147	147/149	---	---	ND	---	0.999
148		---	---	ND	---	0.500
149	147/149	---	---	ND	---	0.999
150		---	---	ND	---	0.500
151	135/151	---	---	ND	---	0.999
152		---	---	ND	---	0.500
153	153/168	---	---	ND	---	0.999
154		---	---	ND	---	0.500
155		---	---	ND	---	0.500
156	156/157	---	---	ND	---	0.999
157	156/157	---	---	ND	---	0.999
158		---	---	ND	---	0.500
159		---	---	ND	---	0.500
160		---	---	ND	---	0.500
161		---	---	ND	---	0.500
162		---	---	ND	---	0.500
163	129/138/163	---	---	ND	---	1.50
164		---	---	ND	---	0.500
165		---	---	ND	---	0.500
166	128/166	---	---	ND	---	0.999
167		---	---	ND	---	0.500
168	153/168	---	---	ND	---	0.999
169		---	---	ND	---	0.500
170		---	---	ND	---	0.500
171	171/173	---	---	ND	---	0.999
172		---	---	ND	---	0.500
173	171/173	---	---	ND	---	0.999
174		---	---	ND	---	0.500
175		---	---	ND	---	0.500
176		---	---	ND	---	0.500
177		---	---	ND	---	0.500
178		---	---	ND	---	0.500
179		---	---	ND	---	0.500
180	180/193	---	---	ND	---	0.999
181		---	---	ND	---	0.500
182		---	---	ND	---	0.500
183	183/185	---	---	ND	---	0.999
184		---	---	ND	---	0.500
185	183/185	---	---	ND	---	0.999
186		---	---	ND	---	0.500
187		---	---	ND	---	0.500
188		---	---	ND	---	0.500
189		---	---	ND	---	0.500
190		---	---	ND	---	0.500
191		---	---	ND	---	0.500
192		---	---	ND	---	0.500

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
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 ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1612574-001  
 Lab Sample ID        10366754001  
 Filename                P161101B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.999
194		---	---	ND	---	0.749
195		---	---	ND	---	0.749
196		---	---	ND	---	0.749
197	197/200	---	---	ND	---	1.50
198	198/199	---	---	ND	---	1.50
199	198/199	---	---	ND	---	1.50
200	197/200	---	---	ND	---	1.50
201		---	---	ND	---	0.749
202		---	---	ND	---	0.749
203		---	---	ND	---	0.749
204		---	---	ND	---	0.749
205		---	---	ND	---	0.749
206		---	---	ND	---	0.749
207		---	---	ND	---	0.749
208		---	---	ND	---	0.749
209		---	---	ND	---	0.749

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

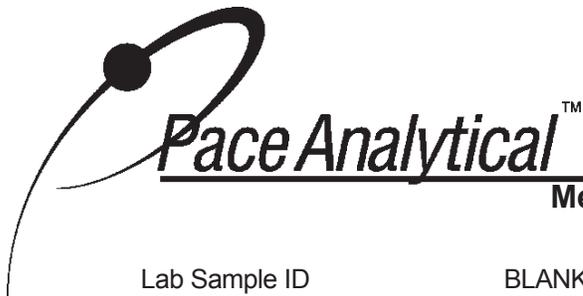
Client Sample ID            K1612574-001  
Lab Sample ID                10366754001  
Filename                        P161101B\_09

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-52578	Matrix	Water
Filename	P161101B_07	Extracted	10/28/2016 12:10
Injected By	CVS	Analyzed	11/02/2016 04:42
Total Amount Extracted	1030 mL	Dilution	5
ICAL ID	P161101B02		
CCal Filename(s)	P161101B_01		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
------------	-------	----	-------	------------	------------	------------

Labeled Analytes

13C-2-MoCB	1	8.756	2.90	2.0	1.19	60
13C-4-MoCB	3	11.368	3.34	2.0	1.17	58
13C-2,2'-DiCB	4	11.620	1.73	2.0	0.945	47
13C-4,4'-DiCB	15	18.422	1.53	2.0	1.25	62
13C-2,2',6-TrCB	19	15.212	1.03	2.0	1.13	57
13C-3,4,4'-TrCB	37	26.069	1.17	2.0	1.58	79
13C-2,2',6,6'-TeCB	54	18.674	0.85	2.0	1.12	56
13C-3,4,4',5-TeCB	81	33.117	0.75	2.0	1.56	78
13C-3,3',4,4'-TeCB	77	33.704	0.77	2.0	1.62	81
13C-2,2',4,6,6'-PeCB	104	24.644	1.70	2.0	1.21	61
13C-2,3,3',4,4'-PeCB	105	37.264	1.60	2.0	1.46	73
13C-2,3,4,4',5-PeCB	114	36.594	1.57	2.0	1.54	77
13C-2,3',4,4',5-PeCB	118	36.040	1.65	2.0	1.55	77
13C-2,3',4,4',5'-PeCB	123	35.688	1.66	2.0	1.51	76
13C-3,3',4,4',5-PeCB	126	40.450	1.63	2.0	1.45	73
13C-2,2',4,4',6,6'-HxCB	155	30.619	1.31	2.0	1.44	72
13C-HxCB (156/157)	156/157	43.491	1.25	4.0	2.84	71
13C-2,3',4,4',5,5'-HxCB	167	42.283	1.25	2.0	1.50	75
13C-3,3',4,4',5,5'-HxCB	169	46.811	1.29	2.0	1.31	66
13C-2,2',3,4',5,6,6'-HpCB	188	36.493	1.06	2.0	1.73	87
13C-2,3,3',4,4',5,5'-HpCB	189	49.310	1.09	2.0	1.50	75
13C-2,2',3,3',5,5',6,6'-OoCB	202	41.965	0.88	2.0	1.91	95
13C-2,3,3',4,4',5,5',6-OoCB	205	51.896	0.85	2.0	1.53	76
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.599	0.77	2.0	1.43	72
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	48.749	0.78	2.0	1.69	85
13C-DeCB	209	55.172	0.71	2.0	1.88	94

Cleanup Standards

13C-2,4,4'-TrCB	28	21.726	1.05	2.0	1.78	89
13C-2,3,3',5,5'-PeCB	111	33.671	1.61	2.0	1.57	78
13C-2,2',3,3',5,5',6-HpCB	178	39.629	1.03	2.0	1.71	86

Recovery Standards

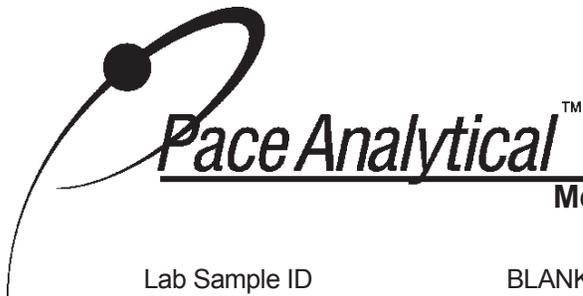
13C-2,5-DiCB	9	13.942	1.61	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.654	0.78	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.870	1.62	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.193	1.32	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	51.400	0.86	2.0	NA	NA

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EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52578  
 Filename P161101B\_07

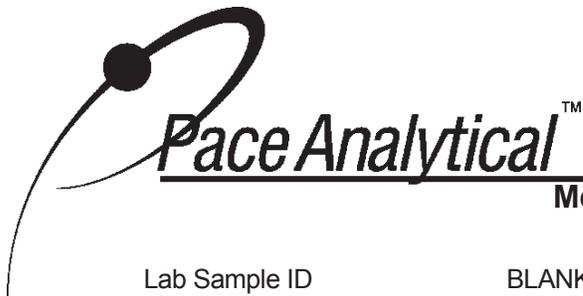
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		--	--	ND	--	0.243
2		--	--	ND	--	0.243
3		--	--	ND	--	0.243
4		--	--	ND	--	0.243
5		--	--	ND	--	0.243
6		--	--	ND	--	0.243
7		--	--	ND	--	0.243
8		--	--	ND	--	0.243
9		--	--	ND	--	0.243
10		--	--	ND	--	0.243
11		--	--	ND	--	2.38
12	12/13	--	--	ND	--	0.486
13	12/13	--	--	ND	--	0.486
14		--	--	ND	--	0.243
15		--	--	ND	--	0.243
16		--	--	ND	--	0.243
17		--	--	ND	--	0.243
18	18/30	--	--	ND	--	0.486
19		--	--	ND	--	0.243
20	20/28	--	--	ND	--	1.25
21	21/33	--	--	ND	--	1.31
22		--	--	ND	--	0.923
23		--	--	ND	--	0.243
24		--	--	ND	--	0.243
25		--	--	ND	--	0.243
26	26/29	--	--	ND	--	0.486
27		--	--	ND	--	0.243
28	20/28	--	--	ND	--	1.25
29	26/29	--	--	ND	--	0.486
30	18/30	--	--	ND	--	0.486
31		--	--	ND	--	1.26
32		--	--	ND	--	0.243
33	21/33	--	--	ND	--	1.31
34		--	--	ND	--	0.243
35		--	--	ND	--	0.243
36		--	--	ND	--	0.243
37		--	--	ND	--	0.515
38		--	--	ND	--	0.243
39		--	--	ND	--	0.243
40	40/41/71	--	--	ND	--	1.46
41	40/41/71	--	--	ND	--	1.46
42		--	--	ND	--	0.486
43	43/73	--	--	ND	--	0.486
44	44/47/65	--	--	ND	--	1.46
45	45/51	--	--	ND	--	0.972

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
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 RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52578  
 Filename P161101B\_07

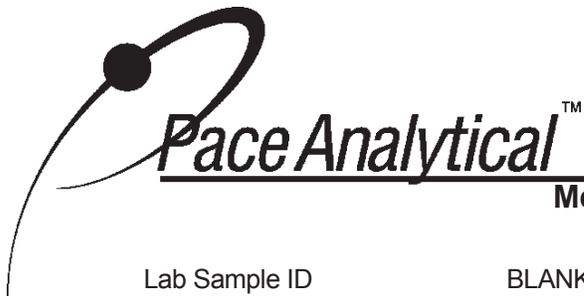
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		--	--	ND	--	0.486
47	44/47/65	--	--	ND	--	1.46
48		--	--	ND	--	0.486
49	49/69	--	--	ND	--	0.972
50	50/53	--	--	ND	--	0.972
51	45/51	--	--	ND	--	0.972
52		--	--	ND	--	1.50
53	50/53	--	--	ND	--	0.972
54		--	--	ND	--	0.486
55		--	--	ND	--	0.486
56		--	--	ND	--	0.486
57		--	--	ND	--	0.486
58		--	--	ND	--	0.486
59	59/62/75	--	--	ND	--	1.46
60		--	--	ND	--	0.486
61	61/70/74/76	--	--	ND	--	1.94
62	59/62/75	--	--	ND	--	1.46
63		--	--	ND	--	0.486
64		--	--	ND	--	0.486
65	44/47/65	--	--	ND	--	1.46
66		--	--	ND	--	0.816
67		--	--	ND	--	0.486
68		--	--	ND	--	0.486
69	49/69	--	--	ND	--	0.972
70	61/70/74/76	--	--	ND	--	1.94
71	40/41/71	--	--	ND	--	1.46
72		--	--	ND	--	0.486
73	43/73	--	--	ND	--	0.486
74	61/70/74/76	--	--	ND	--	1.94
75	59/62/75	--	--	ND	--	1.46
76	61/70/74/76	--	--	ND	--	1.94
77		--	--	ND	--	0.486
78		--	--	ND	--	0.486
79		--	--	ND	--	0.486
80		--	--	ND	--	0.486
81		--	--	ND	--	0.486
82		--	--	ND	--	0.486
83		--	--	ND	--	0.486
84		--	--	ND	--	0.486
85	85/116/117	--	--	ND	--	1.46
86	86/87/97/108/119/125	--	--	ND	--	2.92
87	86/87/97/108/119/125	--	--	ND	--	2.92
88	88/91	--	--	ND	--	0.972
89		--	--	ND	--	0.486
90	90/101/113	--	--	ND	--	1.46

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52578  
 Filename P161101B\_07

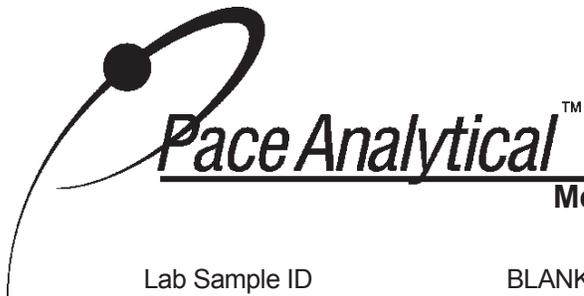
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	--	--	ND	--	0.972
92		--	--	ND	--	0.486
93	93/98/100/102	--	--	ND	--	1.94
94		--	--	ND	--	0.486
95		--	--	ND	--	0.923
96		--	--	ND	--	0.486
97	86/87/97/108/119/125	--	--	ND	--	2.92
98	93/98/100/102	--	--	ND	--	1.94
99		--	--	ND	--	0.486
100	93/98/100/102	--	--	ND	--	1.94
101	90/101/113	--	--	ND	--	1.46
102	93/98/100/102	--	--	ND	--	1.94
103		--	--	ND	--	0.486
104		--	--	ND	--	0.486
105		--	--	ND	--	0.486
106		--	--	ND	--	0.486
107	107/124	--	--	ND	--	0.972
108	86/87/97/108/119/125	--	--	ND	--	2.92
109		--	--	ND	--	0.486
110	110/115	--	--	ND	--	0.972
111		--	--	ND	--	0.486
112		--	--	ND	--	0.486
113	90/101/113	--	--	ND	--	1.46
114		--	--	ND	--	0.486
115	110/115	--	--	ND	--	0.972
116	85/116/117	--	--	ND	--	1.46
117	85/116/117	--	--	ND	--	1.46
118		--	--	ND	--	0.622
119	86/87/97/108/119/125	--	--	ND	--	2.92
120		--	--	ND	--	0.486
121		--	--	ND	--	0.486
122		--	--	ND	--	0.486
123		--	--	ND	--	0.486
124	107/124	--	--	ND	--	0.972
125	86/87/97/108/119/125	--	--	ND	--	2.92
126		--	--	ND	--	0.486
127		--	--	ND	--	0.486
128	128/166	--	--	ND	--	0.972
129	129/138/163	--	--	ND	--	1.46
130		--	--	ND	--	0.486
131		--	--	ND	--	0.486
132		--	--	ND	--	0.486
133		--	--	ND	--	0.486
134	134/143	--	--	ND	--	0.972
135	135/151	--	--	ND	--	0.972

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52578  
 Filename P161101B\_07

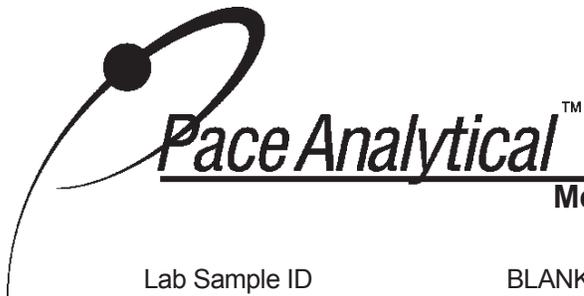
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		--	--	ND	--	0.486
137		--	--	ND	--	0.486
138	129/138/163	--	--	ND	--	1.46
139	139/140	--	--	ND	--	0.972
140	139/140	--	--	ND	--	0.972
141		--	--	ND	--	0.486
142		--	--	ND	--	0.486
143	134/143	--	--	ND	--	0.972
144		--	--	ND	--	0.486
145		--	--	ND	--	0.486
146		--	--	ND	--	0.486
147	147/149	--	--	ND	--	0.972
148		--	--	ND	--	0.486
149	147/149	--	--	ND	--	0.972
150		--	--	ND	--	0.486
151	135/151	--	--	ND	--	0.972
152		--	--	ND	--	0.486
153	153/168	--	--	ND	--	0.972
154		--	--	ND	--	0.486
155		--	--	ND	--	0.486
156	156/157	--	--	ND	--	0.972
157	156/157	--	--	ND	--	0.972
158		--	--	ND	--	0.486
159		--	--	ND	--	0.486
160		--	--	ND	--	0.486
161		--	--	ND	--	0.486
162		--	--	ND	--	0.486
163	129/138/163	--	--	ND	--	1.46
164		--	--	ND	--	0.486
165		--	--	ND	--	0.486
166	128/166	--	--	ND	--	0.972
167		--	--	ND	--	0.486
168	153/168	--	--	ND	--	0.972
169		--	--	ND	--	0.486
170		--	--	ND	--	0.486
171	171/173	--	--	ND	--	0.972
172		--	--	ND	--	0.486
173	171/173	--	--	ND	--	0.972
174		--	--	ND	--	0.486
175		--	--	ND	--	0.486
176		--	--	ND	--	0.486
177		--	--	ND	--	0.486
178		--	--	ND	--	0.486
179		--	--	ND	--	0.486
180	180/193	--	--	ND	--	0.972

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52578  
Filename P161101B\_07

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		--	--	ND	--	0.486
182		--	--	ND	--	0.486
183	183/185	--	--	ND	--	0.972
184		--	--	ND	--	0.486
185	183/185	--	--	ND	--	0.972
186		--	--	ND	--	0.486
187		--	--	ND	--	0.486
188		--	--	ND	--	0.486
189		--	--	ND	--	0.486
190		--	--	ND	--	0.486
191		--	--	ND	--	0.486
192		--	--	ND	--	0.486
193	180/193	--	--	ND	--	0.972
194		--	--	ND	--	0.729
195		--	--	ND	--	0.729
196		--	--	ND	--	0.729
197	197/200	--	--	ND	--	1.46
198	198/199	--	--	ND	--	1.46
199	198/199	--	--	ND	--	1.46
200	197/200	--	--	ND	--	1.46
201		--	--	ND	--	0.729
202		--	--	ND	--	0.729
203		--	--	ND	--	0.729
204		--	--	ND	--	0.729
205		--	--	ND	--	0.729
206		--	--	ND	--	0.729
207		--	--	ND	--	0.729
208		--	--	ND	--	0.729
209		--	--	ND	--	0.729

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID            CBLKTO  
Lab Sample ID              BLANK-52578  
Filename                     P161101B\_07

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCS-52579	Matrix	Water
Filename	P161101B_03	Dilution	5
Total Amount Extracted	4050 mL	Extracted	10/28/2016 12:10
ICAL ID	P161101B02	Analyzed	11/02/2016 00:46
CCal Filename(s)	P161101B_01	Injected By	CVS
Method Blank ID	BLANK-52578		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.08	108	2.0	1.07	54
3	1.0	1.11	111	2.0	1.14	57
4	1.0	1.12	112	2.0	0.857	43
15	1.0	1.11	111	2.0	1.14	57
19	1.0	1.01	101	2.0	1.07	54
37	1.0	1.01	101	2.0	1.40	70
54	1.0	1.17	117	2.0	1.03	51
81	1.0	0.966	97	2.0	1.47	73
77	1.0	1.01	101	2.0	1.44	72
104	1.0	1.13	113	2.0	1.09	55
105	1.0	1.03	103	2.0	1.40	70
114	1.0	1.07	107	2.0	1.37	69
118	1.0	1.01	101	2.0	1.37	69
123	1.0	1.07	107	2.0	1.40	70
126	1.0	1.01	101	2.0	1.30	65
155	1.0	1.03	103	2.0	1.33	67
156/157	2.0	2.04	102	4.0	2.52	63
167	1.0	0.983	98	2.0	1.35	68
169	1.0	1.03	103	2.0	1.20	60
188	1.0	1.10	110	2.0	1.56	78
189	1.0	1.02	102	2.0	1.36	68
202	1.0	0.985	99	2.0	1.69	84
205	1.0	1.05	105	2.0	1.29	65
206	1.0	0.961	103	2.0	1.32	66
208	1.0	0.986	99	2.0	1.52	76
209	1.0	0.947	95	2.0	1.66	83

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Water Solutions, Inc.**

55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# **Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Sampling in City Outfall Basins 16, 19, 44, 45, 52D, 53A, and M2**

**To:** File  
**From:** Brian Anderson, GSI Water Solutions, Inc.  
**Date:** January 16, 2017

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in October 2016. A total of nine stormwater grab samples were collected in Outfall Basins 16, 19, 44, 45, 52D, 53A, and M2 on October 13, 2016, and submitted for analysis. Sample laboratory identification numbers are presented in Table 1.

The laboratory analyses for these samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Conductivity – FO SOP 1.03a
  - pH – FO SOP 1.01a
  - Temp – FO SOP 1.05a
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- Pace Analytical Services (Pace)
  - Polychlorinated Biphenyls (PCB) Congeners – EPA 1668A
- ALS Environmental

- Organochlorine Pesticides by EPA Method 8081 (Sample 44\_SW20 only)

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with these source control program samples.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method and field decontamination blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control and duplicate laboratory control (LC/DLC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for field duplicate and laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## **Analysis Holding Times**

Samples were extracted and analyzed within the acceptable holding times.

## **Method Blanks**

Method blanks were analyzed during the laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, and subcontracted analysis of PCB congeners. No analytes were detected in the method blanks processed during any of the analyses.

## **Field Decontamination Blanks**

One field decontamination blank was collected during the sampling event and submitted for the same analysis of TSS, total metals including mercury, PCB congeners, and PAHs & phthalates. Zinc was detected in the sample at a concentration of 0.611 µg/L. Detection of zinc in field samples this event was greater than at least 10 times the detection in the field decontamination blank, thus data have not been qualified.

## **Surrogate Recoveries**

Surrogate recoveries were completed during the analyses of pesticides, PAHs and phthalates. Surrogate recoveries for the field samples, field decontamination blank, field duplicate, and all associated QC samples were within control criteria.

## **Internal Standard Recoveries**

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. The laboratory reported that internal standards in the sample extracts were recovered at 16-119%. With seven exceptions from the field duplicate and method blank that are flagged “R” in the laboratory report, these internal standard recoveries were within the target ranges specified in the method. Because the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery, which allowed accurate values to be obtained.

## **Matrix Spike/Matrix Spike Duplicates**

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates. MS recoveries were within acceptance limits for metals and total mercury. Several constituents in the MS and MSD samples for PAHs and phthalates showed low matrix spike recovery, and the lab reported the data are possibly low estimates due to matrix interference. Affected data have been qualified as estimates possibly biased low (J-).

## **Laboratory Control Sample / Duplicate Laboratory Control Samples**

LC samples were processed during the analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. DLC samples were processed during the analysis of PCB congeners. Due to insufficient sample volume, LC and DLC samples processed for PCB congeners were analyzed in place of matrix spike and matrix spike duplicates. LC/DLC sample recoveries and RPDs were within laboratory control limits for all analyses.

## **Laboratory Duplicate**

WPCL processed two laboratory duplicate samples during TSS analysis, total metals analysis, and mercury analysis. RPDs were within laboratory acceptance limits with the exception of a high RPD for chromium. Affected data are qualified as estimated values (J).

## **Field Duplicate**

One field duplicate (W16J112-11) was collected for parent sample 19\_SW2 (W16J112-09). Results for the parent sample and field duplicate are summarized in Table 2. The relative percent difference between samples did not exceed 16% for constituents of interest with the exception of Lead, which had an RPD of 60%. Affected data are qualified as estimated values (J).

## Other

Samples were delivered to WPCL at a temperature of 15 degrees C, which is above the required holding temperature, but may not largely affect data quality due to the short time between sample collection and delivery to the laboratory.

WPCL reports that the continuing calibration verification was outside acceptance limits for several phthalate and one PAH compound in laboratory QC and field samples. The biases in the QC samples are not expected to impact field sample results, thus data were qualified as a high estimate (J+) only where field samples were affected.

ALS analytical reports that detection limits were elevated for several analytes due to the presence of non-target background components, which prevented adequate resolution of the target compound at the normal limit. There were no detections at or above the laboratory reporting limit, thus the reporting limit has been identified and no qualifications were made.

Also, there was insufficient sample volume for MS and MSD O-Pesticides analysis. To substitute, the laboratory analyzed LCS and DLCS samples for QC.

No other anomalies were reported by WPCL or the subcontracted laboratories. A list of additional data qualifications added during validation is provided in Table 3.

**Table 1. Field Samples Submitted with Corresponding Laboratory Identifications**

City of Portland

*Outfalls 16, 19, 44, 45, 52D, 53A, & M2*

Field Sample ID	Sample Date	BES Sample ID	Analytes	Notes
44_SW20	10/13/2016	W16J112-01	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Pest, Cond, pH, Temp	
45_SW1	10/13/2016	W16J112-02	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Pest, Cond, pH, Temp	
M2_SW1	10/13/2016	W16J112-03	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	
52D_SW6	10/13/2016	W16J112-04	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	
52D_SW5	10/13/2016	W16J112-05	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	
53A_SW1	10/13/2016	W16J112-06	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	
16_SW1	10/13/2016	W16J112-07	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	
16_SW2	10/13/2016	W16J112-08	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	
19_SW2	10/13/2016	W16J112-09	TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Cond, pH, Temp	
FDB	10/13/2016	W16J112-10	TSS, Tot Met, Tot Hg, PCB Cong, PAHs	
Field Duplicate	10/13/2016	W16J112-11	TSS, Tot Met, Tot Hg, PCB Cong, PAHs	Duplicate of 19_SW2

**Notes**

BES = City of Portland Bureau of Environmental Services

MS/MSD = matrix spike/matrix spike duplicate

TSS = Total Suspended Solids

Tot Met = Total Metals

Tot Hg = Total Mercury

PCB Cong = PCB Congeners

PAHs = PAHs + phthalates

Pest = Low level organochlorine pesticides

Cond = Conductivity

Temp = temperature

**Table 2. Field Duplicate Detections**

City of Portland  
 Outfalls 16, 19, 44, 45, 52D, 53A, & M2

Sample IDs	Analyte	Unit	Reporting Limit	Primary Sample	Field Duplicate	Relative Percent Difference	Notes
<b>Total Suspended Solids</b>							
W16C092-06 & W16C092-12	Total Suspended Solids	mg/L	2	47	43	9	
<b>Total Metals</b>							
W16J112-09 & W16J112-11	Arsenic	µg/L	0.100	0.568	0.602	6	
	Cadmium	µg/L	0.100	0.267	0.277	4	
	Chromium	µg/L	0.200	3.07	3.13	2	
	Copper	µg/L	0.200	57.1	48.8	16	
	Lead	µg/L	0.100	76.7	41.1	60	1
	Mercury	µg/L	0.001	0.0235	0.0257	9	
	Nickel	µg/L	0.200	2.72	2.91	7	
	Silver	µg/L	0.100	ND U	ND U	0	
Zinc	µg/L	1.50	167	173	4		
<b>PAHs and phthalates</b>							
W16J112-09 & W16J112-11	Benzo(a)anthracene	µg/L	0.01	0.026	0.025	4	
	Benzo(a)pyrene	µg/L	0.01	0.038	0.037	3	
	Benzo(b)fluoranthene	µg/L	0.01	0.075	0.072	4	
	Benzo(g,h,i)perylene	µg/L	0.01	0.085	0.086	1	
	Benzo(k)fluoranthene	µg/L	0.01	0.029	0.03	3	
	Bis(2-ethylhexyl) phthalate	µg/L	1	3.7	3.3	11	
	Chrysene	µg/L	0.01	0.041	0.043	5	
	Fluoranthene	µg/L	0.01	0.082	0.081	1	
	Fluorene	µg/L	0.02	0.025	0.023	8	
	Indeno(1,2,3-cd)pyrene	µg/L	0.01	0.047	0.048	2	
	Phenanthrene	µg/L	0.02	0.095	0.097	2	
	Pyrene	µg/L	0.01	0.11	0.11	0	
<b>PCB Congeners</b>							
W16J112-09 & W16J112-11	PCB-090,PCB-101,PCB-113	ng/L	1.480	1.81	1.86	3	
	PCB-095	ng/L	0.936	1.12	1.13	1	
	PCB-099	ng/L	0.493	0.734	0.806	9	
	PCB-105	ng/L	0.493	1.2	1.22	2	
	PCB-110,PCB-115	ng/L	0.986	2.86	2.91	2	
	PCB-118	ng/L	0.631	2.52	2.58	2	
	PCB-129,PCB-138,PCB-163	ng/L	1.48	3.16	3.24	3	
	PCB-132	ng/L	0.493	0.943	0.924	2	
	PCB-147,PCB-149	ng/L	0.986	1.45	1.47	1	
	PCB-153,PCB-168	ng/L	0.986	1.82	1.82	0	
	Total PCBs	ng/L		17.6	18	2	

1 RPD exceeds acceptance criteria. Results flagged as estimates.

**Table 3. Qualifiers Added or Modified During Validation**

City of Portland

Outfalls 16, 19, 44, 45, 52D, 53A, &amp; M2

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
W16J112-02	Bis(2-ethylhexyl) phthalate	ug/L	1.20	J+	CCV
W16J112-03	Bis(2-ethylhexyl) phthalate	ug/L	1.40	J+	CCV
W16J112-04	Bis(2-ethylhexyl) phthalate	ug/L	3.30	J+	CCV
W16J112-05	Benzo(a)anthracene	ug/L	0.1	J-	MS
W16J112-05	Benzo(a)pyrene	ug/L	0.1	J-	MS
W16J112-05	Benzo(b)fluoranthene	ug/L	0.2	J-	MS
W16J112-05	Benzo(g,h,i)perylene	ug/L	0.250	J-	MS
W16J112-05	Benzo(k)fluoranthene	ug/L	0.08	J-	MS
W16J112-05	Chrysene	ug/L	0.14	J-	MS
W16J112-05	Dibenzo(a,h)anthracene	ug/L	0.04	J-	MS
W16J112-05	Indeno(1,2,3-cd)pyrene	ug/L	0.14	J-	MS
W16J112-05	Bis(2-ethylhexyl) phthalate	ug/L	2.10	J+	CCV
W16J112-06	Bis(2-ethylhexyl) phthalate	ug/L	1.00	J+	CCV
W16J112-07	Bis(2-ethylhexyl) phthalate	ug/L	2.60	J+	CCV
W16J112-08	Bis(2-ethylhexyl) phthalate	ug/L	2.000	J+	CCV
W16J112-09	Lead	ug/L	77	J	RPD
W16J112-09	Bis(2-ethylhexyl) phthalate	ug/L	3.70	J+	CCV
W16J112-11	Chromium	ug/L	3	J	MS
W16J112-11	Lead	ug/L	41.1	J	RPD
W16J112-11	Bis(2-ethylhexyl) phthalate	ug/L	3.300	J+	CCV

**Notes**

µg/L = micrograms per liter

**Qualifier Definitions**

J = Detection of analyte is considered an estimate with unknown bias

J- = Detection of analyte is considered a low estimate

J+ = Detection of analyte is considered a high estimate

**Reason Code Definitions**

RPD = The RPD between the results in the sample and sample duplicate exceeded control criteria

CCV = The continuing calibration verification was high and the sample results may be high estimates

MS = Sample results are considered estimates due to matrix interference or non-homogeneous sample matrix



City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



December 02, 2016

Linda Scheffler  
Director's Office

---

Work Order  
**W16J112**

Project  
**Portland Harbor**

Received  
10/13/16 14:49

---

Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project: **Portland Harbor**  
Work Order: **W16J112**  
Received: 10/13/16 14:49  
Submitted By: Field Operations

Client: Director's Office  
Project Mgr: Linda Scheffler

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
44_SW20	W16J112-01	Stormwater	Grab	10/13/16 09:04	10/13/16 09:04	
45_SW1	W16J112-02	Stormwater	Grab	10/13/16 09:16	10/13/16 09:16	
M2_SW1	W16J112-03	Stormwater	Grab	10/13/16 09:48	10/13/16 09:48	
52D_SW6	W16J112-04	Stormwater	Grab	10/13/16 10:46	10/13/16 10:46	
52D_SW5	W16J112-05	Stormwater	Grab	10/13/16 11:05	10/13/16 11:05	
53A_SW1	W16J112-06	Stormwater	Grab	10/13/16 11:25	10/13/16 11:25	
16_SW1	W16J112-07	Stormwater	Grab	10/13/16 12:51	10/13/16 12:51	
16_SW2	W16J112-08	Stormwater	Grab	10/13/16 13:16	10/13/16 13:16	
19_SW2	W16J112-09	Stormwater	Grab	10/13/16 13:40	10/13/16 13:40	
FDB	W16J112-10	Stormwater	Grab	10/13/16 13:32	10/13/16 13:32	
Field Duplicate	W16J112-11	Stormwater	Grab	10/13/16 00:00	10/13/16 00:00	

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field conductivity

44_SW20 : W16J112-01	Conductivity*	39	umhos/cm		1	B16J223	10/13/16	10/13/16	FO SOP 1.03a	
45_SW1 : W16J112-02	Conductivity*	30	umhos/cm		1	B16J223	10/13/16	10/13/16	FO SOP 1.03a	
M2_SW1 : W16J112-03	Conductivity*	24	umhos/cm		1	B16J223	10/13/16	10/13/16	FO SOP 1.03a	
52D_SW6 : W16J112-04	Conductivity*	115	umhos/cm		1	B16J223	10/13/16	10/13/16	FO SOP 1.03a	
52D_SW5 : W16J112-05	Conductivity*	72	umhos/cm		1	B16J223	10/13/16	10/13/16	FO SOP 1.03a	
53A_SW1 : W16J112-06	Conductivity*	37	umhos/cm		1	B16J223	10/13/16	10/13/16	FO SOP 1.03a	
16_SW1 : W16J112-07	Conductivity*	21	umhos/cm		1	B16J223	10/13/16	10/13/16	FO SOP 1.03a	
16_SW2 : W16J112-08										

Reported: 12/02/16 13:06

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
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**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field conductivity

16_SW2 : W16J112-08 Conductivity*	144	umhos/cm			1	B16J223	10/13/16	10/13/16	FO SOP 1.03a	
19_SW2 : W16J112-09 Conductivity*	12	umhos/cm			1	B16J223	10/13/16	10/13/16	FO SOP 1.03a	

Field pH

44_SW20 : W16J112-01 pH*	7.1	pH Units			1	B16J223	10/13/16 09:04	10/13/16	FO SOP 1.01a	
45_SW1 : W16J112-02 pH*	7.1	pH Units			1	B16J223	10/13/16 09:16	10/13/16	FO SOP 1.01a	
M2_SW1 : W16J112-03 pH*	7.0	pH Units			1	B16J223	10/13/16 09:48	10/13/16	FO SOP 1.01a	
52D_SW6 : W16J112-04 pH*	8.4	pH Units			1	B16J223	10/13/16 10:46	10/13/16	FO SOP 1.01a	
52D_SW5 : W16J112-05 pH*	8.8	pH Units			1	B16J223	10/13/16 11:05	10/13/16	FO SOP 1.01a	
53A_SW1 : W16J112-06 pH*	8.2	pH Units			1	B16J223	10/13/16 11:25	10/13/16	FO SOP 1.01a	
16_SW1 : W16J112-07 pH*	7.3	pH Units			1	B16J223	10/13/16 12:51	10/13/16	FO SOP 1.01a	
16_SW2 : W16J112-08 pH*	7.1	pH Units			1	B16J223	10/13/16 13:16	10/13/16	FO SOP 1.01a	
19_SW2 : W16J112-09 pH*	7.5	pH Units			1	B16J223	10/13/16 13:40	10/13/16	FO SOP 1.01a	

Field temperature

44_SW20 : W16J112-01 Temperature*	14.2	°C			1	B16J223	10/13/16 09:04	10/13/16	FO SOP 1.05a	
45_SW1 : W16J112-02 Temperature*	13.9	°C			1	B16J223	10/13/16 09:16	10/13/16	FO SOP 1.05a	
M2_SW1 : W16J112-03 Temperature*	14.1	°C			1	B16J223	10/13/16 09:48	10/13/16	FO SOP 1.05a	
52D_SW6 : W16J112-04 Temperature*	12.6	°C			1	B16J223	10/13/16 10:46	10/13/16	FO SOP 1.05a	
52D_SW5 : W16J112-05 Temperature*	13.5	°C			1	B16J223	10/13/16 11:05	10/13/16	FO SOP 1.05a	
53A_SW1 : W16J112-06										

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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field temperature

53A_SW1 : W16J112-06 Temperature*	14.3	°C			1	B16J223	10/13/16 11:25	10/13/16	FO SOP 1.05a	
16_SW1 : W16J112-07 Temperature*	14.7	°C			1	B16J223	10/13/16 12:51	10/13/16	FO SOP 1.05a	
16_SW2 : W16J112-08 Temperature*	15.1	°C			1	B16J223	10/13/16 13:16	10/13/16	FO SOP 1.05a	
19_SW2 : W16J112-09 Temperature*	15.5	°C			1	B16J223	10/13/16 13:40	10/13/16	FO SOP 1.05a	

**General Chemistry**

Total Suspended Solids

44_SW20 : W16J112-01 Total suspended solids	14	mg/L	2	2		B16J226	10/15/16	10/15/16	SM 2540D	
45_SW1 : W16J112-02 Total suspended solids	42	mg/L	2	2		B16J226	10/15/16	10/15/16	SM 2540D	
M2_SW1 : W16J112-03 Total suspended solids	24	mg/L	2	2		B16J226	10/15/16	10/15/16	SM 2540D	
52D_SW6 : W16J112-04 Total suspended solids	1500	mg/L	2	2		B16J226	10/15/16	10/15/16	SM 2540D	
52D_SW5 : W16J112-05 Total suspended solids	610	mg/L	2	2		B16J226	10/15/16	10/15/16	SM 2540D	
53A_SW1 : W16J112-06 Total suspended solids	47	mg/L	2	2		B16J226	10/15/16	10/15/16	SM 2540D	
16_SW1 : W16J112-07 Total suspended solids	21	mg/L	2	2		B16J226	10/15/16	10/15/16	SM 2540D	
16_SW2 : W16J112-08 Total suspended solids	43	mg/L	2	2		B16J226	10/15/16	10/15/16	SM 2540D	
19_SW2 : W16J112-09 Total suspended solids	47	mg/L	2	2		B16J226	10/15/16	10/15/16	SM 2540D	
FDB : W16J112-10 Total suspended solids	ND	mg/L	2	2		B16J226	10/15/16	10/15/16	SM 2540D	
Field Duplicate : W16J112-11 Total suspended solids	43	mg/L	2	2		B16J226	10/15/16	10/15/16	SM 2540D	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Total Metals**

Total Metals by ICPMS

44\_SW20 : W16J112-01

Arsenic	0.591	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Cadmium	0.151	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Chromium	1.64	ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Copper	8.82	ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Lead	3.33	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Mercury	0.00661	ug/L	0.00100	0.00100	1	B16J206	10/14/16	10/14/16	WPCLSOP M-10	
Nickel	1.27	ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Zinc	52.0	ug/L	0.500	0.500	1	B16J245	10/17/16	10/17/16	EPA 200.8	

45\_SW1 : W16J112-02

Arsenic	1.14	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Cadmium	0.170	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Chromium	7.00	ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Copper	13.1	ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Lead	10.9	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Mercury	0.0115	ug/L	0.00100	0.00100	1	B16J206	10/14/16	10/14/16	WPCLSOP M-10	
Nickel	5.49	ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Zinc	341	ug/L	2.50	2.50	5	B16J245	10/17/16	10/18/16	EPA 200.8	

M2\_SW1 : W16J112-03

Arsenic	0.478	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Cadmium	ND	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Chromium	1.55	ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Copper	6.39	ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Lead	2.06	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Mercury	0.00473	ug/L	0.00100	0.00100	1	B16J206	10/14/16	10/14/16	WPCLSOP M-10	
Nickel	1.05	ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Zinc	61.2	ug/L	0.500	0.500	1	B16J245	10/17/16	10/17/16	EPA 200.8	

52D\_SW6 : W16J112-04

Arsenic	2.86	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Cadmium	1.13	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Chromium	165	ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Copper	69.7	ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Lead	106	ug/L	0.500	0.500	5	B16J245	10/17/16	10/17/16	EPA 200.8	
Mercury	0.0793	ug/L	0.00100	0.00100	3	B16J206	10/14/16	10/14/16	WPCLSOP M-10	
Nickel	12.8	ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Silver	0.152	ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Zinc	703	ug/L	2.50	2.50	5	B16J245	10/17/16	10/17/16	EPA 200.8	

52D\_SW5 : W16J112-05

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Total Metals**

Total Metals by ICPMS

52D\_SW5 : W16J112-05

Arsenic	2.31 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Cadmium	0.722 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Chromium	106 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Copper	48.9 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Lead	61.0 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Mercury	0.0229 ug/L	0.00100	0.00100	3	B16J206	10/14/16	10/14/16	WPCLSOP M-10	
Nickel	9.34 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Zinc	444 ug/L	2.50	2.50	5	B16J245	10/17/16	10/17/16	EPA 200.8	

53A\_SW1 : W16J112-06

Arsenic	1.03 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Cadmium	0.348 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Chromium	14.4 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Copper	12.2 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Lead	12.8 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Mercury	0.00902 ug/L	0.00100	0.00100	1	B16J206	10/14/16	10/14/16	WPCLSOP M-10	
Nickel	2.61 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Zinc	466 ug/L	2.50	2.50	5	B16J245	10/17/16	10/17/16	EPA 200.8	

16\_SW1 : W16J112-07

Arsenic	0.926 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Cadmium	0.196 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Chromium	2.14 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Copper	11.0 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Lead	4.93 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Mercury	0.00732 ug/L	0.00100	0.00100	1	B16J206	10/14/16	10/14/16	WPCLSOP M-10	
Nickel	1.81 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Zinc	56.6 ug/L	0.500	0.500	1	B16J245	10/17/16	10/17/16	EPA 200.8	

16\_SW2 : W16J112-08

Arsenic	0.316 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Cadmium	1.42 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Chromium	2.23 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Copper	44.0 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Lead	26.2 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Mercury	0.0390 ug/L	0.00100	0.00100	1	B16J206	10/14/16	10/14/16	WPCLSOP M-10	
Nickel	2.71 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Zinc	77.9 ug/L	0.500	0.500	1	B16J245	10/17/16	10/17/16	EPA 200.8	

19\_SW2 : W16J112-09

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Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Total Metals**

Total Metals by ICPMS

19\_SW2 : W16J112-09

Arsenic	0.568 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Cadmium	0.267 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Chromium	3.07 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Copper	57.1 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Lead	76.7 ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Mercury	0.0235 ug/L	0.00100	0.00100	1	B16J206	10/14/16	10/14/16	WPCLSOP M-10	
Nickel	2.72 ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Zinc	167 ug/L	0.500	0.500	1	B16J245	10/17/16	10/17/16	EPA 200.8	

FDB : W16J112-10

Arsenic	ND ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Cadmium	ND ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Chromium	ND ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Copper	ND ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Lead	ND ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Mercury	ND ug/L	0.00100	0.00100	1	B16J206	10/14/16	10/14/16	WPCLSOP M-10	
Nickel	ND ug/L	0.200	0.200	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16J245	10/17/16	10/17/16	EPA 200.8	
Zinc	0.611 ug/L	0.500	0.500	1	B16J245	10/17/16	10/17/16	EPA 200.8	

Field Duplicate : W16J112-11

Arsenic	0.602 ug/L	0.100	0.100	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Cadmium	0.277 ug/L	0.100	0.100	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Chromium	3.13 ug/L	0.200	0.200	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Copper	48.8 ug/L	0.200	0.200	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Lead	41.1 ug/L	0.100	0.100	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Mercury	0.0257 ug/L	0.00100	0.00100	1	B16J206	10/14/16	10/14/16	WPCLSOP M-10	
Nickel	2.91 ug/L	0.200	0.200	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16J246	10/17/16	10/17/16	EPA 200.8	
Zinc	173 ug/L	0.500	0.500	1	B16J246	10/17/16	10/17/16	EPA 200.8	

Reported: 12/02/16 13:06

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

44\_SW20 : W16J112-01

Acenaphthene	ND	ug/L	0.020	0.020	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Acenaphthylene	0.064	ug/L	0.020	0.020	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Anthracene	0.16	ug/L	0.020	0.020	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.085	ug/L	0.010	0.010	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.093	ug/L	0.010	0.010	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.16	ug/L	0.010	0.010	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.11	ug/L	0.010	0.010	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.054	ug/L	0.010	0.010	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Chrysene	0.081	ug/L	0.010	0.010	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.017	ug/L	0.010	0.010	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Fluoranthene	0.13	ug/L	0.010	0.010	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Fluorene	0.021	ug/L	0.020	0.020	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.070	ug/L	0.010	0.010	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Phenanthrene	0.040	ug/L	0.020	0.020	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Pyrene	0.15	ug/L	0.010	0.010	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	3.3	ug/L	1.0	0.50	1	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.20	ug/L	0.229	89%	31-164	B16J244	10/17/16	10/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.24	ug/L	0.229	106%	65-145	B16J244	10/17/16	10/17/16	EPA 8270-SIM	

45\_SW1 : W16J112-02

Acenaphthene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Acenaphthylene	0.069	ug/L	0.020	0.020	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Anthracene	0.051	ug/L	0.020	0.020	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(a)anthracene	0.034	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(a)pyrene	0.063	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.12	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.12	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.033	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Chrysene	0.066	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.017	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Fluoranthene	0.11	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.075	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

45\_SW1 : W16J112-02

2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Phenanthrene	0.063	ug/L	0.020	0.020	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Pyrene	0.13	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.2	ug/L	1.0	0.50	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.19	ug/L	0.229	85%	31-164	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.23	ug/L	0.229	102%	65-145	B16J252	10/17/16	10/17/16	EPA 8270-SIM	

M2\_SW1 : W16J112-03

Acenaphthene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Anthracene	0.020	ug/L	0.020	0.020	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.016	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.033	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Chrysene	0.015	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Fluoranthene	0.039	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
1-Methylnaphthalene	0.051	ug/L	0.040	0.040	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
2-Methylnaphthalene	0.054	ug/L	0.040	0.040	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Phenanthrene	0.069	ug/L	0.020	0.020	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Pyrene	0.070	ug/L	0.010	0.010	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.4	ug/L	1.0	0.50	1	B16J252	10/17/16	10/17/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.20	ug/L	0.229	86%	31-164	B16J252	10/17/16	10/17/16	EPA 8270-SIM	
Fluoranthene-d10	0.24	ug/L	0.229	103%	65-145	B16J252	10/17/16	10/17/16	EPA 8270-SIM	

52D\_SW6 : W16J112-04

Reported: 12/02/16 13:06

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*Jennifer Shackelford*

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**Project: Portland Harbor**  
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**Client: Director's Office**  
**Received: 10/13/16 14:49**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

52D\_SW6 : W16J112-04

Acenaphthene	ND ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Acenaphthylene	0.15 ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Anthracene	0.14 ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)anthracene	0.19 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)pyrene	0.27 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.44 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.48 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.19 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Chrysene	0.30 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.061 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene	0.51 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluorene	ND ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.27 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
1-Methylnaphthalene	ND ug/L	0.080	0.080	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
2-Methylnaphthalene	ND ug/L	0.080	0.080	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Naphthalene	ND ug/L	0.080	0.080	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Phenanthrene	0.15 ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Pyrene	0.76 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND ug/L	2.0	1.0	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND ug/L	2.0	1.0	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Diethyl phthalate	ND ug/L	2.0	1.0	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dimethyl phthalate	ND ug/L	2.0	1.0	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND ug/L	2.0	1.0	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	3.3 ug/L	2.0	1.0	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.18 ug/L	0.229	78%	31-164	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene-d10	0.15 ug/L	0.229	65%	65-145	B16J252	10/17/16	10/18/16	EPA 8270-SIM	

52D\_SW5 : W16J112-05

Acenaphthene	ND ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Acenaphthylene	0.071 ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Anthracene	0.065 ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)anthracene	0.088 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	M4
Benzo(a)pyrene	0.11 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	M4
Benzo(b)fluoranthene	0.20 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	M4
Benzo(g,h,i)perylene	0.25 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	M4
Benzo(k)fluoranthene	0.077 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	M4
Chrysene	0.14 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	M4
Dibenzo(a,h)anthracene	0.035 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	M4
Fluoranthene	0.24 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluorene	ND ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.14 ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	M4
1-Methylnaphthalene	ND ug/L	0.080	0.080	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

52D\_SW5 : W16J112-05

2-Methylnaphthalene	ND	ug/L	0.080	0.080	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.080	0.080	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Phenanthrene	0.074	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Pyrene	0.36	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	2.0	1.0	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	2.0	1.0	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	2.0	1.0	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	2.0	1.0	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	2.0	1.0	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.1	ug/L	2.0	1.0	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.17	ug/L	0.229	75%	31-164	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene-d10	0.16	ug/L	0.229	71%	65-145	B16J252	10/17/16	10/18/16	EPA 8270-SIM	

53A\_SW1 : W16J112-06

Acenaphthene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)anthracene	0.018	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)pyrene	0.024	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.064	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.058	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.026	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Chrysene	0.047	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene	0.12	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.030	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Phenanthrene	0.051	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Pyrene	0.11	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.0	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.20	ug/L	0.229	87%	31-164	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene-d10	0.24	ug/L	0.229	106%	65-145	B16J252	10/17/16	10/18/16	EPA 8270-SIM	

16\_SW1 : W16J112-07RE1

Reported: 12/02/16 13:06

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

16\_SW1 : W16J112-07RE1

Acenaphthene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Benzo(a)anthracene	0.018	ug/L	0.010	0.010	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Benzo(a)pyrene	0.032	ug/L	0.010	0.010	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.077	ug/L	0.010	0.010	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.065	ug/L	0.010	0.010	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.018	ug/L	0.010	0.010	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Chrysene	0.033	ug/L	0.010	0.010	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Fluoranthene	0.054	ug/L	0.010	0.010	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.042	ug/L	0.010	0.010	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Phenanthrene	0.046	ug/L	0.020	0.020	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Pyrene	0.069	ug/L	0.010	0.010	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.6	ug/L	1.0	0.50	1	B16J252	10/17/16	10/26/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.25	ug/L	0.229	109%	31-164	B16J252	10/17/16	10/26/16	EPA 8270-SIM	
Fluoranthene-d10	0.24	ug/L	0.229	103%	65-145	B16J252	10/17/16	10/26/16	EPA 8270-SIM	

16\_SW2 : W16J112-08

Acenaphthene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)anthracene	0.017	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.046	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.022	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.015	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Chrysene	0.044	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene	0.074	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.014	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	

Reported: 12/02/16 13:06

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

16\_SW2 : W16J112-08

2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Phenanthrene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Pyrene	0.064	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.0	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.20	ug/L	0.229	87%	31-164	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene-d10	0.25	ug/L	0.229	108%	65-145	B16J252	10/17/16	10/18/16	EPA 8270-SIM	

19\_SW2 : W16J112-09

Acenaphthene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)anthracene	0.026	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)pyrene	0.038	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.075	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.085	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.029	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Chrysene	0.041	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene	0.082	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluorene	0.025	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.047	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Phenanthrene	0.095	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Pyrene	0.11	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	3.7	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.19	ug/L	0.229	84%	31-164	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene-d10	0.25	ug/L	0.229	108%	65-145	B16J252	10/17/16	10/18/16	EPA 8270-SIM	

FDB : W16J112-10

Reported: 12/02/16 13:06

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
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**Received: 10/13/16 14:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

FDB : W16J112-10

Acenaphthene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Phenanthrene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Pyrene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.20	ug/L	0.229	88%	31-164	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene-d10	0.24	ug/L	0.229	106%	65-145	B16J252	10/17/16	10/18/16	EPA 8270-SIM	

Field Duplicate : W16J112-11

Acenaphthene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)anthracene	0.025	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(a)pyrene	0.037	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.072	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.086	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.030	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Chrysene	0.043	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene	0.081	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluorene	0.023	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.048	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	

Reported: 12/02/16 13:06

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

Field Duplicate : W16J112-11

2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Phenanthrene	<b>0.097</b>	ug/L	0.020	0.020	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Pyrene	<b>0.11</b>	ug/L	0.010	0.010	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	<b>3.3</b>	ug/L	1.0	0.50	1	B16J252	10/17/16	10/18/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.19	ug/L	0.229	84%	31-164	B16J252	10/17/16	10/18/16	EPA 8270-SIM	
Fluoranthene-d10	0.24	ug/L	0.229	105%	65-145	B16J252	10/17/16	10/18/16	EPA 8270-SIM	

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**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B16J226</b>										
<b>Blank (B16J226-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					10/15/16 :10/15/16	
<b>LCS (B16J226-BS1)</b>										
Total suspended solids	97	mg/L			100		97% (90-110)		10/15/16 :10/15/16	
<b>Duplicate (B16J226-DUP1) Source: W16J109-01</b>										
Total suspended solids	322	mg/L	2	2		345	7 (20)		10/15/16 :10/15/16	
<b>Duplicate (B16J226-DUP2) Source: W16J129-02</b>										
Total suspended solids	65	mg/L	2	2		71	9 (20)		10/15/16 :10/15/16	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B16J206</b>										
<b>Blank (B16J206-BLK1)</b>										
Mercury	ND	ug/L	0.000900	0.000900					10/14/16 :10/14/16	
<b>LCS (B16J206-BS1)</b>										
Mercury	0.0101	ug/L	0.000900	0.000900	0.0100		101% (85-125)		10/14/16 :10/14/16	
<b>Duplicate (B16J206-DUP1) Source: W16J111-01</b>										
Mercury	0.00486	ug/L	0.00100	0.00100		0.00472	3 (20)		10/14/16 :10/14/16	
<b>Duplicate (B16J206-DUP2) Source: W16J112-11</b>										
Mercury	0.0269	ug/L	0.00100	0.00100		0.0257	5 (20)		10/14/16 :10/14/16	
<b>Matrix Spike (B16J206-MS1) Source: W16J111-01</b>										
Mercury	0.0158	ug/L	0.00100	0.00100	0.0111	0.00472	100% (70-130)		10/14/16 :10/14/16	
<b>Matrix Spike (B16J206-MS2) Source: W16J112-11</b>										
Mercury	0.0441	ug/L	0.00100	0.00100	0.0222	0.0257	83% (70-130)		10/14/16 :10/14/16	

**Total Metals by ICPMS - Batch B16J245**

<b>Blank (B16J245-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					10/17/16 :10/17/16	
Cadmium	ND	ug/L	0.100	0.100					10/17/16 :10/17/16	
Chromium	ND	ug/L	0.200	0.200					10/17/16 :10/17/16	
Copper	ND	ug/L	0.200	0.200					10/17/16 :10/17/16	

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**Project: Portland Harbor**  
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**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16J245**

**Blank (B16J245-BLK1)**

Lead	ND	ug/L	0.100	0.100					10/17/16 :10/17/16	
Nickel	ND	ug/L	0.200	0.200					10/17/16 :10/17/16	
Silver	ND	ug/L	0.100	0.100					10/17/16 :10/17/16	
Zinc	ND	ug/L	0.500	0.500					10/17/16 :10/17/16	

**LCS (B16J245-BS1)**

Arsenic	2.50	ug/L	0.100	0.100	2.50		100% (85-115)		10/17/16 :10/17/16	
Cadmium	2.54	ug/L	0.100	0.100	2.50		102% (85-115)		10/17/16 :10/17/16	
Chromium	2.61	ug/L	0.200	0.200	2.50		104% (85-115)		10/17/16 :10/17/16	
Copper	2.69	ug/L	0.200	0.200	2.50		108% (85-115)		10/17/16 :10/17/16	
Lead	2.34	ug/L	0.100	0.100	2.50		94% (85-115)		10/17/16 :10/17/16	
Nickel	2.55	ug/L	0.200	0.200	2.50		102% (85-115)		10/17/16 :10/17/16	
Silver	2.49	ug/L	0.100	0.100	2.50		100% (85-115)		10/17/16 :10/17/16	
Zinc	12.9	ug/L	0.500	0.500	12.5		103% (85-115)		10/17/16 :10/17/16	

**Duplicate (B16J245-DUP1)**

**Source: W16J108-04**

Arsenic	0.326	ug/L	0.100	0.100		0.318		2 (20)	10/17/16 :10/17/16	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	10/17/16 :10/17/16	
Chromium	0.920	ug/L	0.200	0.200		0.862		7 (20)	10/17/16 :10/17/16	
Copper	5.08	ug/L	0.200	0.200		5.12		0.7 (20)	10/17/16 :10/17/16	
Lead	2.19	ug/L	0.100	0.100		2.23		2 (20)	10/17/16 :10/17/16	
Nickel	1.10	ug/L	0.200	0.200		0.923		18 (20)	10/17/16 :10/17/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	10/17/16 :10/17/16	
Zinc	16.9	ug/L	0.500	0.500		16.8		0.08 (20)	10/17/16 :10/17/16	

**Duplicate (B16J245-DUP2)**

**Source: W16J112-01**

Arsenic	0.571	ug/L	0.100	0.100		0.591		4 (20)	10/17/16 :10/17/16	
Cadmium	0.149	ug/L	0.100	0.100		0.151		2 (20)	10/17/16 :10/17/16	
Chromium	1.64	ug/L	0.200	0.200		1.64		0.01 (20)	10/17/16 :10/17/16	
Copper	8.66	ug/L	0.200	0.200		8.82		2 (20)	10/17/16 :10/17/16	
Lead	3.27	ug/L	0.100	0.100		3.33		2 (20)	10/17/16 :10/17/16	
Nickel	1.25	ug/L	0.200	0.200		1.27		1 (20)	10/17/16 :10/17/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	10/17/16 :10/17/16	
Zinc	52.0	ug/L	0.500	0.500		52.0		0.1 (20)	10/17/16 :10/17/16	

**Matrix Spike (B16J245-MS1)**

**Source: W16J108-04**

Arsenic	5.12	ug/L	0.100	0.100	5.00	0.318	96% (70-130)		10/17/16 :10/17/16	
Cadmium	4.96	ug/L	0.100	0.100	5.00	ND	99% (70-130)		10/17/16 :10/17/16	
Chromium	5.57	ug/L	0.200	0.200	5.00	0.862	94% (70-130)		10/17/16 :10/17/16	
Copper	10.1	ug/L	0.200	0.200	5.00	5.12	99% (70-130)		10/17/16 :10/17/16	
Lead	7.11	ug/L	0.100	0.100	5.00	2.23	98% (70-130)		10/17/16 :10/17/16	
Nickel	5.81	ug/L	0.200	0.200	5.00	0.923	98% (70-130)		10/17/16 :10/17/16	
Silver	4.84	ug/L	0.100	0.100	5.00	ND	97% (70-130)		10/17/16 :10/17/16	

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**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16J245**

**Matrix Spike (B16J245-MS1)**

**Source: W16J108-04**

Zinc	41.1	ug/L	0.500	0.500	25.0	16.8	97% (70-130)		10/17/16 :10/17/16	
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**Matrix Spike (B16J245-MS2)**

**Source: W16J112-01**

Arsenic	5.45	ug/L	0.100	0.100	5.00	0.591	97% (70-130)		10/17/16 :10/17/16	
Cadmium	5.08	ug/L	0.100	0.100	5.00	0.151	99% (70-130)		10/17/16 :10/17/16	
Chromium	6.49	ug/L	0.200	0.200	5.00	1.64	97% (70-130)		10/17/16 :10/17/16	
Copper	13.7	ug/L	0.200	0.200	5.00	8.82	98% (70-130)		10/17/16 :10/17/16	
Lead	8.10	ug/L	0.100	0.100	5.00	3.33	95% (70-130)		10/17/16 :10/17/16	
Nickel	6.14	ug/L	0.200	0.200	5.00	1.27	97% (70-130)		10/17/16 :10/17/16	
Silver	4.85	ug/L	0.100	0.100	5.00	ND	97% (70-130)		10/17/16 :10/17/16	
Zinc	75.3	ug/L	0.500	0.500	25.0	52.0	93% (70-130)		10/17/16 :10/17/16	

**Total Metals by ICPMS - Batch B16J246**

**Blank (B16J246-BLK1)**

Arsenic	ND	ug/L	0.100	0.100					10/17/16 :10/17/16	
Cadmium	ND	ug/L	0.100	0.100					10/17/16 :10/17/16	
Chromium	ND	ug/L	0.200	0.200					10/17/16 :10/17/16	
Copper	ND	ug/L	0.200	0.200					10/17/16 :10/17/16	
Lead	ND	ug/L	0.100	0.100					10/17/16 :10/17/16	
Nickel	ND	ug/L	0.200	0.200					10/17/16 :10/17/16	
Silver	ND	ug/L	0.100	0.100					10/17/16 :10/17/16	
Zinc	ND	ug/L	0.500	0.500					10/17/16 :10/17/16	

**LCS (B16J246-BS1)**

Arsenic	2.47	ug/L	0.100	0.100	2.50		99% (85-115)		10/17/16 :10/17/16	
Cadmium	2.50	ug/L	0.100	0.100	2.50		100% (85-115)		10/17/16 :10/17/16	
Chromium	2.43	ug/L	0.200	0.200	2.50		97% (85-115)		10/17/16 :10/17/16	
Copper	2.65	ug/L	0.200	0.200	2.50		106% (85-115)		10/17/16 :10/17/16	
Lead	2.35	ug/L	0.100	0.100	2.50		94% (85-115)		10/17/16 :10/17/16	
Nickel	2.51	ug/L	0.200	0.200	2.50		100% (85-115)		10/17/16 :10/17/16	
Silver	2.49	ug/L	0.100	0.100	2.50		100% (85-115)		10/17/16 :10/17/16	
Zinc	12.8	ug/L	0.500	0.500	12.5		102% (85-115)		10/17/16 :10/17/16	

**Duplicate (B16J246-DUP1)**

**Source: W16J115-01**

Arsenic	0.115	ug/L	0.100	0.100		0.112		2 (20)	10/17/16 :10/17/16	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	10/17/16 :10/17/16	
Chromium	0.269	ug/L	0.200	0.200		0.246		9 (20)	10/17/16 :10/17/16	
Copper	2.93	ug/L	0.200	0.200		2.91		0.4 (20)	10/17/16 :10/17/16	
Lead	0.298	ug/L	0.100	0.100		0.311		4 (20)	10/17/16 :10/17/16	
Nickel	0.368	ug/L	0.200	0.200		0.371		0.7 (20)	10/17/16 :10/17/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	10/17/16 :10/17/16	
Zinc	15.6	ug/L	0.500	0.500		15.4		1 (20)	10/17/16 :10/17/16	

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**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16J246**

**Duplicate (B16J246-DUP2)**

**Source: W16J118-01**

Arsenic	0.792	ug/L	0.100	0.100		0.824		4 (20)	10/17/16 :10/17/16	
Cadmium	0.110	ug/L	0.100	0.100		0.111		2 (20)	10/17/16 :10/17/16	
Chromium	3.09	ug/L	0.200	0.200		2.23		32 (20)	10/17/16 :10/17/16	M3
Copper	8.55	ug/L	0.200	0.200		8.64		1 (20)	10/17/16 :10/17/16	
Lead	8.03	ug/L	0.100	0.100		8.18		2 (20)	10/17/16 :10/17/16	
Nickel	1.55	ug/L	0.200	0.200		1.55		0.2 (20)	10/17/16 :10/17/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	10/17/16 :10/17/16	
Zinc	124	ug/L	0.500	0.500		126		2 (20)	10/17/16 :10/17/16	

**Matrix Spike (B16J246-MS1)**

**Source: W16J115-01**

Arsenic	5.08	ug/L	0.100	0.100	5.00	0.112	99% (70-130)		10/17/16 :10/17/16	
Cadmium	5.02	ug/L	0.100	0.100	5.00	ND	100% (70-130)		10/17/16 :10/17/16	
Chromium	5.06	ug/L	0.200	0.200	5.00	0.246	96% (70-130)		10/17/16 :10/17/16	
Copper	8.11	ug/L	0.200	0.200	5.00	2.91	104% (70-130)		10/17/16 :10/17/16	
Lead	5.01	ug/L	0.100	0.100	5.00	0.311	94% (70-130)		10/17/16 :10/17/16	
Nickel	5.32	ug/L	0.200	0.200	5.00	0.371	99% (70-130)		10/17/16 :10/17/16	
Silver	4.95	ug/L	0.100	0.100	5.00	ND	99% (70-130)		10/17/16 :10/17/16	
Zinc	40.1	ug/L	0.500	0.500	25.0	15.4	98% (70-130)		10/17/16 :10/17/16	

**Matrix Spike (B16J246-MS2)**

**Source: W16J118-01**

Arsenic	5.63	ug/L	0.100	0.100	5.00	0.824	96% (70-130)		10/17/16 :10/17/16	
Cadmium	4.99	ug/L	0.100	0.100	5.00	0.111	98% (70-130)		10/17/16 :10/17/16	
Chromium	6.98	ug/L	0.200	0.200	5.00	2.23	95% (70-130)		10/17/16 :10/17/16	
Copper	13.5	ug/L	0.200	0.200	5.00	8.64	98% (70-130)		10/17/16 :10/17/16	
Lead	13.0	ug/L	0.100	0.100	5.00	8.18	96% (70-130)		10/17/16 :10/17/16	
Nickel	6.34	ug/L	0.200	0.200	5.00	1.55	96% (70-130)		10/17/16 :10/17/16	
Silver	4.76	ug/L	0.100	0.100	5.00	ND	95% (70-130)		10/17/16 :10/17/16	
Zinc	148	ug/L	0.500	0.500	25.0	126	89% (70-130)		10/17/16 :10/17/16	

Reported: 12/02/16 13:06

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16J244**

**Blank (B16J244-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					10/17/16 :10/17/16	
Acenaphthylene	ND	ug/L	0.020	0.020					10/17/16 :10/17/16	
Anthracene	ND	ug/L	0.020	0.020					10/17/16 :10/17/16	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Chrysene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Fluoranthene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Fluorene	ND	ug/L	0.020	0.020					10/17/16 :10/17/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					10/17/16 :10/17/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					10/17/16 :10/17/16	
Naphthalene	ND	ug/L	0.040	0.040					10/17/16 :10/17/16	
Phenanthrene	ND	ug/L	0.020	0.020					10/17/16 :10/17/16	
Pyrene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					10/17/16 :10/17/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					10/17/16 :10/17/16	
Diethyl phthalate	ND	ug/L	1.0	0.50					10/17/16 :10/17/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					10/17/16 :10/17/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					10/17/16 :10/17/16	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					10/17/16 :10/17/16	

**Surrogate**

2-Methylnaphthalene-d10	0.22	ug/L			0.229		94% (31-164)		10/17/16 :10/17/16	
Fluoranthene-d10	0.27	ug/L			0.229		119% (65-145)		10/17/16 :10/17/16	

**LCS (B16J244-BS1)**

Acenaphthene	0.235	ug/L	0.020	0.020	0.229		103% (67-125)		10/17/16 :10/17/16	
Acenaphthylene	0.242	ug/L	0.020	0.020	0.229		106% (64-138)		10/17/16 :10/17/16	
Anthracene	0.239	ug/L	0.020	0.020	0.229		105% (65-143)		10/17/16 :10/17/16	
Benzo(a)anthracene	0.222	ug/L	0.010	0.010	0.229		97% (80-130)		10/17/16 :10/17/16	
Benzo(a)pyrene	0.210	ug/L	0.010	0.010	0.229		92% (74-131)		10/17/16 :10/17/16	
Benzo(b)fluoranthene	0.198	ug/L	0.010	0.010	0.229		87% (67-128)		10/17/16 :10/17/16	
Benzo(g,h,i)perylene	0.211	ug/L	0.010	0.010	0.229		93% (57-137)		10/17/16 :10/17/16	
Benzo(k)fluoranthene	0.271	ug/L	0.010	0.010	0.229		118% (63-140)		10/17/16 :10/17/16	
Chrysene	0.254	ug/L	0.010	0.010	0.229		111% (80-134)		10/17/16 :10/17/16	
Dibenzo(a,h)anthracene	0.223	ug/L	0.010	0.010	0.229		97% (56-138)		10/17/16 :10/17/16	
Fluoranthene	0.247	ug/L	0.010	0.010	0.229		108% (70-150)		10/17/16 :10/17/16	
Fluorene	0.246	ug/L	0.020	0.020	0.229		108% (64-130)		10/17/16 :10/17/16	

Reported: 12/02/16 13:06

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16J244**

**LCS (B16J244-BS1)**

Indeno(1,2,3-cd)pyrene	0.232	ug/L	0.010	0.010	0.229		102% (58-138)		10/17/16 :10/17/16	
1-Methylnaphthalene	0.201	ug/L	0.040	0.040	0.229		88% (35-164)		10/17/16 :10/17/16	
2-Methylnaphthalene	0.187	ug/L	0.040	0.040	0.229		82% (29-162)		10/17/16 :10/17/16	
Naphthalene	0.226	ug/L	0.040	0.040	0.229		99% (53-134)		10/17/16 :10/17/16	
Pentachlorophenol	1.56	ug/L	1.0	1.0	1.14		136% (50-150)		10/17/16 :10/17/16	V1
Phenanthrene	0.230	ug/L	0.020	0.020	0.229		100% (73-132)		10/17/16 :10/17/16	
Pyrene	0.238	ug/L	0.010	0.010	0.229		104% (69-153)		10/17/16 :10/17/16	
Butyl benzyl phthalate	3.05	ug/L	1.0	0.50	2.29		134% (55-181)		10/17/16 :10/17/16	
Di-n-butyl phthalate	2.72	ug/L	1.0	0.50	2.29		119% (61-183)		10/17/16 :10/17/16	
Diethyl phthalate	2.74	ug/L	1.0	0.50	2.29		120% (65-177)		10/17/16 :10/17/16	
Dimethyl phthalate	2.65	ug/L	1.0	0.50	2.29		116% (77-151)		10/17/16 :10/17/16	
Di-n-octyl phthalate	3.02	ug/L	1.0	0.50	2.29		132% (12-185)		10/17/16 :10/17/16	
Bis(2-ethylhexyl) phthalate	2.87	ug/L	1.0	0.50	2.29		126% (39-170)		10/17/16 :10/17/16	

**Surrogate**

2-Methylnaphthalene-d10	0.21	ug/L			0.229		92% (31-164)		10/17/16 :10/17/16	
Fluoranthene-d10	0.27	ug/L			0.229		116% (65-145)		10/17/16 :10/17/16	

**Matrix Spike (B16J244-MS1)**

**Source: W16J098-01**

Acenaphthene	0.252	ug/L	0.020	0.020	0.229	ND	110% (67-125)		10/17/16 :10/17/16	
Acenaphthylene	0.282	ug/L	0.020	0.020	0.229	ND	123% (64-138)		10/17/16 :10/17/16	
Anthracene	0.265	ug/L	0.020	0.020	0.229	ND	116% (65-143)		10/17/16 :10/17/16	
Benzo(a)anthracene	0.244	ug/L	0.010	0.010	0.229	ND	107% (80-130)		10/17/16 :10/17/16	
Benzo(a)pyrene	0.217	ug/L	0.010	0.010	0.229	ND	95% (74-131)		10/17/16 :10/17/16	
Benzo(b)fluoranthene	0.201	ug/L	0.010	0.010	0.229	ND	88% (67-128)		10/17/16 :10/17/16	
Benzo(g,h,i)perylene	0.229	ug/L	0.010	0.010	0.229	0.0114	95% (57-137)		10/17/16 :10/17/16	
Benzo(k)fluoranthene	0.197	ug/L	0.010	0.010	0.229	ND	86% (63-140)		10/17/16 :10/17/16	
Chrysene	0.257	ug/L	0.010	0.010	0.229	ND	112% (80-134)		10/17/16 :10/17/16	
Dibenzo(a,h)anthracene	0.225	ug/L	0.010	0.010	0.229	ND	98% (56-138)		10/17/16 :10/17/16	
Fluoranthene	0.261	ug/L	0.010	0.010	0.229	ND	114% (70-150)		10/17/16 :10/17/16	
Fluorene	0.253	ug/L	0.020	0.020	0.229	ND	110% (64-130)		10/17/16 :10/17/16	
Indeno(1,2,3-cd)pyrene	0.226	ug/L	0.010	0.010	0.229	ND	99% (58-138)		10/17/16 :10/17/16	
1-Methylnaphthalene	0.222	ug/L	0.040	0.040	0.229	ND	97% (35-164)		10/17/16 :10/17/16	
2-Methylnaphthalene	0.210	ug/L	0.040	0.040	0.229	ND	92% (29-162)		10/17/16 :10/17/16	
Naphthalene	0.270	ug/L	0.040	0.040	0.229	ND	118% (53-134)		10/17/16 :10/17/16	
Pentachlorophenol	2.61	ug/L	1.0	1.0	1.14	ND	229% (50-150)		10/17/16 :10/17/16	V1
Phenanthrene	0.255	ug/L	0.020	0.020	0.229	ND	112% (73-132)		10/17/16 :10/17/16	
Pyrene	0.259	ug/L	0.010	0.010	0.229	0.0131	108% (69-153)		10/17/16 :10/17/16	
Butyl benzyl phthalate	3.50	ug/L	1.0	0.50	2.29	ND	153% (55-181)		10/17/16 :10/17/16	
Di-n-butyl phthalate	2.98	ug/L	1.0	0.50	2.29	ND	131% (61-183)		10/17/16 :10/17/16	
Diethyl phthalate	2.84	ug/L	1.0	0.50	2.29	ND	124% (65-177)		10/17/16 :10/17/16	
Dimethyl phthalate	2.70	ug/L	1.0	0.50	2.29	ND	118% (77-151)		10/17/16 :10/17/16	

Reported: 12/02/16 13:06

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Water Pollution Control Laboratory**

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**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16J244**

**Matrix Spike (B16J244-MS1)**

**Source: W16J098-01**

Di-n-octyl phthalate	3.73	ug/L	1.0	0.50	2.29	0.530	140% (12-185)		10/17/16 :10/17/16	
Bis(2-ethylhexyl) phthalate	5.89	ug/L	1.0	0.50	2.29	3.34	112% (39-170)		10/17/16 :10/17/16	
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.22	ug/L				0.229	96% (31-164)		10/17/16 :10/17/16	
Fluoranthene-d10	0.27	ug/L				0.229	116% (65-145)		10/17/16 :10/17/16	

**Matrix Spike Dup (B16J244-MSD1)**

**Source: W16J098-01**

Acenaphthene	0.261	ug/L	0.020	0.020	0.229	ND	114% (67-125)	3 (30)	10/17/16 :10/17/16	
Acenaphthylene	0.284	ug/L	0.020	0.020	0.229	ND	124% (64-138)	0.8 (30)	10/17/16 :10/17/16	
Anthracene	0.280	ug/L	0.020	0.020	0.229	ND	122% (65-143)	6 (30)	10/17/16 :10/17/16	
Benzo(a)anthracene	0.249	ug/L	0.010	0.010	0.229	ND	109% (80-130)	2 (30)	10/17/16 :10/17/16	
Benzo(a)pyrene	0.223	ug/L	0.010	0.010	0.229	ND	97% (74-131)	3 (30)	10/17/16 :10/17/16	
Benzo(b)fluoranthene	0.207	ug/L	0.010	0.010	0.229	ND	90% (67-128)	3 (30)	10/17/16 :10/17/16	
Benzo(g,h,i)perylene	0.224	ug/L	0.010	0.010	0.229	0.0114	93% (57-137)	2 (30)	10/17/16 :10/17/16	
Benzo(k)fluoranthene	0.201	ug/L	0.010	0.010	0.229	ND	88% (63-140)	2 (30)	10/17/16 :10/17/16	
Chrysene	0.263	ug/L	0.010	0.010	0.229	ND	115% (80-134)	2 (30)	10/17/16 :10/17/16	
Dibenzo(a,h)anthracene	0.225	ug/L	0.010	0.010	0.229	ND	99% (56-138)	0.3 (30)	10/17/16 :10/17/16	
Fluoranthene	0.268	ug/L	0.010	0.010	0.229	ND	117% (70-150)	3 (30)	10/17/16 :10/17/16	
Fluorene	0.257	ug/L	0.020	0.020	0.229	ND	112% (64-130)	2 (30)	10/17/16 :10/17/16	
Indeno(1,2,3-cd)pyrene	0.230	ug/L	0.010	0.010	0.229	ND	101% (58-138)	2 (30)	10/17/16 :10/17/16	
1-Methylnaphthalene	0.232	ug/L	0.040	0.040	0.229	ND	102% (35-164)	5 (30)	10/17/16 :10/17/16	
2-Methylnaphthalene	0.222	ug/L	0.040	0.040	0.229	ND	97% (29-162)	5 (30)	10/17/16 :10/17/16	
Naphthalene	0.283	ug/L	0.040	0.040	0.229	ND	124% (53-134)	5 (30)	10/17/16 :10/17/16	
Pentachlorophenol	2.73	ug/L	1.0	1.0	1.14	ND	239% (50-150)	4 (30)	10/17/16 :10/17/16	V1
Phenanthrene	0.269	ug/L	0.020	0.020	0.229	ND	118% (73-132)	5 (30)	10/17/16 :10/17/16	
Pyrene	0.268	ug/L	0.010	0.010	0.229	0.0131	112% (69-153)	3 (30)	10/17/16 :10/17/16	
Butyl benzyl phthalate	3.46	ug/L	1.0	0.50	2.29	ND	151% (55-181)	1 (30)	10/17/16 :10/17/16	
Di-n-butyl phthalate	3.05	ug/L	1.0	0.50	2.29	ND	133% (61-183)	2 (30)	10/17/16 :10/17/16	
Diethyl phthalate	2.82	ug/L	1.0	0.50	2.29	ND	124% (65-177)	0.6 (30)	10/17/16 :10/17/16	
Dimethyl phthalate	2.73	ug/L	1.0	0.50	2.29	ND	119% (77-151)	1 (30)	10/17/16 :10/17/16	
Di-n-octyl phthalate	3.85	ug/L	1.0	0.50	2.29	0.530	145% (12-185)	3 (30)	10/17/16 :10/17/16	
Bis(2-ethylhexyl) phthalate	5.91	ug/L	1.0	0.50	2.29	3.34	113% (39-170)	0.4 (30)	10/17/16 :10/17/16	
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.23	ug/L				0.229	101% (31-164)		10/17/16 :10/17/16	
Fluoranthene-d10	0.27	ug/L				0.229	116% (65-145)		10/17/16 :10/17/16	

**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16J252**

**Blank (B16J252-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					10/17/16 :10/17/16	
Acenaphthylene	ND	ug/L	0.020	0.020					10/17/16 :10/17/16	
Anthracene	ND	ug/L	0.020	0.020					10/17/16 :10/17/16	

Reported: 12/02/16 13:06

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16J252**

**Blank (B16J252-BLK1)**

Benzo(a)anthracene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Chrysene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Fluoranthene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Fluorene	ND	ug/L	0.020	0.020					10/17/16 :10/17/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					10/17/16 :10/17/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					10/17/16 :10/17/16	
Naphthalene	ND	ug/L	0.040	0.040					10/17/16 :10/17/16	
Phenanthrene	ND	ug/L	0.020	0.020					10/17/16 :10/17/16	
Pyrene	ND	ug/L	0.010	0.010					10/17/16 :10/17/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					10/17/16 :10/17/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					10/17/16 :10/17/16	
Diethyl phthalate	ND	ug/L	1.0	0.50					10/17/16 :10/17/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					10/17/16 :10/17/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					10/17/16 :10/17/16	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					10/17/16 :10/17/16	
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.18	ug/L			0.229		78% (31-164)		10/17/16 :10/17/16	
Fluoranthene-d10	0.22	ug/L			0.229		97% (65-145)		10/17/16 :10/17/16	

**LCS (B16J252-BS1)**

Acenaphthene	0.235	ug/L	0.020	0.020	0.229		103% (67-125)		10/17/16 :10/17/16	
Acenaphthylene	0.251	ug/L	0.020	0.020	0.229		110% (64-138)		10/17/16 :10/17/16	
Anthracene	0.250	ug/L	0.020	0.020	0.229		109% (65-143)		10/17/16 :10/17/16	
Benzo(a)anthracene	0.223	ug/L	0.010	0.010	0.229		98% (80-130)		10/17/16 :10/17/16	
Benzo(a)pyrene	0.238	ug/L	0.010	0.010	0.229		104% (74-131)		10/17/16 :10/17/16	
Benzo(b)fluoranthene	0.201	ug/L	0.010	0.010	0.229		88% (67-128)		10/17/16 :10/17/16	
Benzo(g,h,i)perylene	0.253	ug/L	0.010	0.010	0.229		110% (57-137)		10/17/16 :10/17/16	
Benzo(k)fluoranthene	0.221	ug/L	0.010	0.010	0.229		96% (63-140)		10/17/16 :10/17/16	
Chrysene	0.243	ug/L	0.010	0.010	0.229		106% (80-134)		10/17/16 :10/17/16	
Dibenzo(a,h)anthracene	0.269	ug/L	0.010	0.010	0.229		118% (56-138)		10/17/16 :10/17/16	
Fluoranthene	0.243	ug/L	0.010	0.010	0.229		106% (70-150)		10/17/16 :10/17/16	
Fluorene	0.243	ug/L	0.020	0.020	0.229		106% (64-130)		10/17/16 :10/17/16	
Indeno(1,2,3-cd)pyrene	0.269	ug/L	0.010	0.010	0.229		118% (58-138)		10/17/16 :10/17/16	
1-Methylnaphthalene	0.195	ug/L	0.040	0.040	0.229		85% (35-164)		10/17/16 :10/17/16	
2-Methylnaphthalene	0.181	ug/L	0.040	0.040	0.229		79% (29-162)		10/17/16 :10/17/16	

Reported: 12/02/16 13:06

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16J252**

**LCS (B16J252-BS1)**

Naphthalene	0.222	ug/L	0.040	0.040	0.229		97% (53-134)		10/17/16 :10/17/16	
Phenanthrene	0.227	ug/L	0.020	0.020	0.229		100% (73-132)		10/17/16 :10/17/16	
Pyrene	0.236	ug/L	0.010	0.010	0.229		103% (69-153)		10/17/16 :10/17/16	
Butyl benzyl phthalate	3.07	ug/L	1.0	0.50	2.29		134% (55-181)		10/17/16 :10/17/16	V1
Di-n-butyl phthalate	2.76	ug/L	1.0	0.50	2.29		121% (61-183)		10/17/16 :10/17/16	
Diethyl phthalate	2.71	ug/L	1.0	0.50	2.29		118% (65-177)		10/17/16 :10/17/16	
Dimethyl phthalate	2.59	ug/L	1.0	0.50	2.29		114% (77-151)		10/17/16 :10/17/16	
Di-n-octyl phthalate	3.01	ug/L	1.0	0.50	2.29		132% (12-185)		10/17/16 :10/17/16	V1
Bis(2-ethylhexyl) phthalate	2.75	ug/L	1.0	0.50	2.29		120% (39-170)		10/17/16 :10/17/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.20	ug/L			0.229		87% (31-164)		10/17/16 :10/17/16	
Fluoranthene-d10	0.26	ug/L			0.229		112% (65-145)		10/17/16 :10/17/16	

**Matrix Spike (B16J252-MS1)**

**Source: W16J112-05**

Acenaphthene	0.205	ug/L	0.040	0.040	0.229	ND	90% (67-125)		10/17/16 :10/18/16	
Acenaphthylene	0.296	ug/L	0.040	0.040	0.229	0.0709	99% (64-138)		10/17/16 :10/18/16	
Anthracene	0.256	ug/L	0.040	0.040	0.229	0.0651	84% (65-143)		10/17/16 :10/18/16	
Benzo(a)anthracene	0.221	ug/L	0.020	0.020	0.229	0.0880	58% (80-130)		10/17/16 :10/18/16	M4
Benzo(a)pyrene	0.237	ug/L	0.020	0.020	0.229	0.113	54% (74-131)		10/17/16 :10/18/16	M4
Benzo(b)fluoranthene	0.346	ug/L	0.020	0.020	0.229	0.205	62% (67-128)		10/17/16 :10/18/16	M4
Benzo(g,h,i)perylene	0.377	ug/L	0.020	0.020	0.229	0.247	57% (57-137)		10/17/16 :10/18/16	
Benzo(k)fluoranthene	0.183	ug/L	0.020	0.020	0.229	0.0766	46% (63-140)		10/17/16 :10/18/16	M4
Chrysene	0.320	ug/L	0.020	0.020	0.229	0.142	78% (80-134)		10/17/16 :10/18/16	M4
Dibenzo(a,h)anthracene	0.0949	ug/L	0.020	0.020	0.229	0.0354	26% (56-138)		10/17/16 :10/18/16	M4
Fluoranthene	0.441	ug/L	0.020	0.020	0.229	0.240	88% (70-150)		10/17/16 :10/18/16	
Fluorene	0.207	ug/L	0.040	0.040	0.229	ND	90% (64-130)		10/17/16 :10/18/16	
Indeno(1,2,3-cd)pyrene	0.242	ug/L	0.020	0.020	0.229	0.137	46% (58-138)		10/17/16 :10/18/16	M4
Naphthalene	0.223	ug/L	0.080	0.080	0.229	ND	97% (53-134)		10/17/16 :10/18/16	
Phenanthrene	0.250	ug/L	0.040	0.040	0.229	0.0743	77% (73-132)		10/17/16 :10/18/16	
Pyrene	0.586	ug/L	0.020	0.020	0.229	0.361	98% (69-153)		10/17/16 :10/18/16	
Butyl benzyl phthalate	1.80	ug/L	1.0	0.50	2.29	ND	79% (55-181)		10/17/16 :10/18/16	V1
Di-n-butyl phthalate	1.71	ug/L	2.0	1.0	2.29	ND	75% (61-183)		10/17/16 :10/18/16	J
Diethyl phthalate	2.23	ug/L	2.0	1.0	2.29	ND	97% (65-177)		10/17/16 :10/18/16	
Dimethyl phthalate	2.42	ug/L	2.0	1.0	2.29	ND	106% (77-151)		10/17/16 :10/18/16	
Di-n-octyl phthalate	0.706	ug/L	1.0	0.50	2.29	ND	31% (12-185)		10/17/16 :10/18/16	J, V1
Bis(2-ethylhexyl) phthalate	2.95	ug/L	2.0	1.0	2.29	2.07	39% (39-170)		10/17/16 :10/18/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.18	ug/L			0.229		80% (31-164)		10/17/16 :10/18/16	
Fluoranthene-d10	0.15	ug/L			0.229		67% (65-145)		10/17/16 :10/18/16	

**Matrix Spike Dup (B16J252-MSD1)**

**Source: W16J112-05**

Acenaphthene	0.210	ug/L	0.040	0.040	0.229	ND	92% (67-125)	3 (30)	10/17/16 :10/18/16	
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Reported: 12/02/16 13:06

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16J112**

**Client: Director's Office**  
**Received: 10/13/16 14:49**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16J252**

**Matrix Spike Dup (B16J252-MSD1)**

**Source: W16J112-05**

Acenaphthylene	0.303	ug/L	0.040	0.040	0.229	0.0709	102% (64-138)	2 (30)	10/17/16 :10/18/16	
Anthracene	0.264	ug/L	0.040	0.040	0.229	0.0651	87% (65-143)	3 (30)	10/17/16 :10/18/16	
Benzo(a)anthracene	0.241	ug/L	0.020	0.020	0.229	0.0880	67% (80-130)	9 (30)	10/17/16 :10/18/16	M4
Benzo(a)pyrene	0.250	ug/L	0.020	0.020	0.229	0.113	60% (74-131)	6 (30)	10/17/16 :10/18/16	M4
Benzo(b)fluoranthene	0.357	ug/L	0.020	0.020	0.229	0.205	67% (67-128)	3 (30)	10/17/16 :10/18/16	M4
Benzo(g,h,i)perylene	0.367	ug/L	0.020	0.020	0.229	0.247	52% (57-137)	3 (30)	10/17/16 :10/18/16	M4
Benzo(k)fluoranthene	0.195	ug/L	0.020	0.020	0.229	0.0766	52% (63-140)	7 (30)	10/17/16 :10/18/16	M4
Chrysene	0.333	ug/L	0.020	0.020	0.229	0.142	83% (80-134)	4 (30)	10/17/16 :10/18/16	
Dibenzo(a,h)anthracene	0.0903	ug/L	0.020	0.020	0.229	0.0354	24% (56-138)	5 (30)	10/17/16 :10/18/16	M4
Fluoranthene	0.450	ug/L	0.020	0.020	0.229	0.240	92% (70-150)	2 (30)	10/17/16 :10/18/16	
Fluorene	0.217	ug/L	0.040	0.040	0.229	ND	95% (64-130)	5 (30)	10/17/16 :10/18/16	
Indeno(1,2,3-cd)pyrene	0.232	ug/L	0.020	0.020	0.229	0.137	41% (58-138)	4 (30)	10/17/16 :10/18/16	M4
Naphthalene	0.218	ug/L	0.080	0.080	0.229	ND	96% (53-134)	2 (30)	10/17/16 :10/18/16	
Phenanthrene	0.259	ug/L	0.040	0.040	0.229	0.0743	81% (73-132)	4 (30)	10/17/16 :10/18/16	
Pyrene	0.593	ug/L	0.020	0.020	0.229	0.361	102% (69-153)	1 (30)	10/17/16 :10/18/16	
Butyl benzyl phthalate	1.91	ug/L	1.0	0.50	2.29	ND	84% (55-181)	6 (30)	10/17/16 :10/18/16	V1
Di-n-butyl phthalate	1.84	ug/L	2.0	1.0	2.29	ND	81% (61-183)	8 (30)	10/17/16 :10/18/16	J
Diethyl phthalate	2.31	ug/L	2.0	1.0	2.29	ND	101% (65-177)	4 (30)	10/17/16 :10/18/16	
Dimethyl phthalate	2.43	ug/L	2.0	1.0	2.29	ND	106% (77-151)	0.3 (30)	10/17/16 :10/18/16	
Di-n-octyl phthalate	0.801	ug/L	1.0	0.50	2.29	ND	35% (12-185)	(30)	10/17/16 :10/18/16	J, V1
Bis(2-ethylhexyl) phthalate	3.00	ug/L	2.0	1.0	2.29	2.07	41% (39-170)	2 (30)	10/17/16 :10/18/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.18	ug/L			0.229		78% (31-164)		10/17/16 :10/18/16	
Fluoranthene-d10	0.16	ug/L			0.229		71% (65-145)		10/17/16 :10/18/16	

**Qualifiers**

- J Analyte was detected but at a concentration below the reporting limit; the result is an estimate.
- M3 Inconsistent results for matrix QC (duplicates and/or matrix spikes) indicate non-homogeneous sample matrix. Sample results should be considered estimates.
- M4 Based on low matrix spike recovery, the sample result may be a low estimate due to matrix interference.
- V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.

**Definitions**

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 12/02/16 13:06

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC

Date: 10/13/16  
 Work Order #: W16J112  
 Collected By: MJS, AJA



City of Portland  
 Chain-of-Custody



Bureau of Environmental Services

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681

Client Name: Director's Office Matrix: Stormwater  
 Project Name: Portland Harbor

**Requested Analyses**

Lab Number	2016 Stormwater Outfall Monitoring COC			Sample Date	Sample Time	Sample Type	Requested Analyses										# of Containers	Remarks		
	*Pesticides only required for samples from Outfalls 17 and 44							TSS	Total Metals (As, Cd, Cr, Cu, Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs + phthalates (low-level)	Pesticides (Low-level)	Conductivity (umhos/cm) Meter:	pH (pH units) Meter:	Temperature (Deg C) Meter:				
01	44_SW20	10/13/16	0904	G												39	7.1	14.2	5	
02	45_SW1		0916	G												30	7.1	13.9	4	
03	M2_SW1		0948	G												24	7.0	14.1	4	
04	52D_SW6		1046	G												115	8.4	12.6	4	
05	52D_SW5		1105	G												72	8.8	13.5	4	
06	53A_SW1		1125	G												37	8.2	14.3	4	
07	16_SW1		1251	G												21	<del>7.3</del> 7.3	14.7	4	
08	16_SW2		1316	G												144	7.1	15.1	4	
09	19_SW2		1340	G												12	7.6	15.5	4	
			1932																	

Received By: [Signature] Date: 10/13/16 Time: 1449  
 Relinquished By: [Signature] Date: 10/13/16 Time: 1449  
 Received By: [Signature] Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Portland Harbor 2016 Stormwater Outfall Monitoring Grab COC (3-8-16)

Date: 10/13/16

Work Order #: W165112

Collected By: MJS, AJA



City of Portland  
Chain-of-Custody

Bureau of Environmental Services



Water Pollution Control Laboratory  
6543 N. Burlington Ave.  
Portland, Oregon 97203-4552  
Sample Custodian: (503) 823-5696  
General Lab: (503) 823-5681

Client Name: Director's Office Matrix: Stormwater

Project Name: Portland Harbor

### Requested Analyses

Lab Number	2016 Stormwater Outfall Monitoring COC			Sample Date	Sample Time	Sample Type	Requested Analyses										# of Containers	Remarks	
	*Pesticides only required for samples from Outfalls 17 and 44						TSS	Total Metals (As, Cd, Cr, Cu, Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs + phthalates (low-level)	Pesticides (Low-level)	Conductivity (umhos/cm)	pH (pH units)	Temperature (Deg C)	Meter:			
80	FDB	10/13/16	1332	G			0	0	0	0	0	0	0	0	0	0	0	4	
11	DUP	10/13/16	-	G			0	0	0	0	0	0	0	0	0	0	0	4	

Relinquished By: Signature: <i>Matt Sullivan</i> Date: 10/13/16 Time: 1449	Received By: Signature: <i>R. Kester</i> Date: 10/13/16 Time: 1445
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### WPCL Cooler Receipt Form

Work Order Number: W165112

Cooler Receipt Form Filled Out By: RK

Project: Portland Harbor

Sample transport: Samples received on ice  Courier \_\_\_\_\_  
 Directly from field   
 Temperature (°C) 15

	Yes	No	NA
Is the COC present and signed?	/		
Are sample bottles intact?	/		
Do the COC and sample labels match?	/		
Are the appropriate containers used?	/		
Are samples appropriately preserved?	/		
Do VOA vials have Headspace?			/
Are samples received within holding times?	/		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	1601146	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
10-13-16	1530	LCE	W165112-01 TO 11	C	1	
			-01	D	1	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

November 07, 2016

**Analytical Report for Service Request No: K1612528**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W16J112**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory October 14, 2016  
For your reference, these analyses have been assigned our service request number **K1612528**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

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Subcontract Lab Results

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



## Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

ALS ENVIRONMENTAL

**Client:** Portland, City of  
**Project:** Portland Harbor/ W16J112  
**Sample Matrix:** Water

**Service Request No.:** K1612528  
**Date Received:** 10/14/16

**Case Narrative**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

**Sample Receipt**

Eleven water samples were received for analysis at ALS Environmental on 10/14/16. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

**Organochlorine Pesticides by EPA Method 8081**

**Matrix Spike Recovery Exceptions:**

Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD) for all analytes. A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD for these samples.

**Elevated Detection Limits:**

The detection limit was elevated for several analytes in this field sample. The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compound at the normal limit. The results were flagged to indicate the matrix interference.

No other anomalies associated with the analysis of these samples were observed.

**Chlorinated Biphenyl Congeners by EPA Method 1668C**

The analysis for PCB Congeners was performed at Pace Analytical. The data for this analysis is included in the corresponding section of this report.

Approved by \_\_\_\_\_





# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

**SUBCONTRACT ORDER**

City of Portland Water Pollution Control Lab

**W16J112**

*K1612528*

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

ALS Environmental  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

**WPCL Project Name**

**Portland Harbor**

<b>TURNAROUND REQUEST</b>	
<input checked="" type="checkbox"/> Standard	
<input type="checkbox"/> Rush _ day(s)	

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W16J112-01</b>	<b>Water</b>	<b>Sampled: 10/13/16 09:04</b>		
Out-Pesticides Chlor LL	10/27/16 17:00	10/20/16 09:04		Report to MDL
Out-PCB Congeners 209	10/27/16 17:00	04/11/17 09:04		
<i>Containers Supplied:</i>				
<b>Sample ID: W16J112-02</b>	<b>Water</b>	<b>Sampled: 10/13/16 09:16</b>		
Out-PCB Congeners 209	10/27/16 17:00	04/11/17 09:16		
<i>Containers Supplied:</i>				
<b>Sample ID: W16J112-03</b>	<b>Water</b>	<b>Sampled: 10/13/16 09:48</b>		
Out-PCB Congeners 209	10/27/16 17:00	04/11/17 09:48		
<i>Containers Supplied:</i>				
<b>Sample ID: W16J112-04</b>	<b>Water</b>	<b>Sampled: 10/13/16 10:46</b>		
Out-PCB Congeners 209	10/27/16 17:00	04/11/17 10:46		
<i>Containers Supplied:</i>				
<b>Sample ID: W16J112-05</b>	<b>Water</b>	<b>Sampled: 10/13/16 11:05</b>		
Out-PCB Congeners 209	10/27/16 17:00	04/11/17 11:05		
<i>Containers Supplied:</i>				

Released By	Date	Received By	Date

**SUBCONTRACT ORDER**  
**City of Portland Water Pollution Control Lab**  
**W16J112**

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W16J112-06</b>	<b>Water</b>	<b>Sampled: 10/13/16 11:25</b>		
Out-PCB Congeners 209	10/27/16 17:00	04/11/17 11:25		
<i>Containers Supplied:</i>				
<b>Sample ID: W16J112-07</b>	<b>Water</b>	<b>Sampled: 10/13/16 12:51</b>		
Out-PCB Congeners 209	10/27/16 17:00	04/11/17 12:51		
<i>Containers Supplied:</i>				
<b>Sample ID: W16J112-08</b>	<b>Water</b>	<b>Sampled: 10/13/16 13:16</b>		
Out-PCB Congeners 209	10/27/16 17:00	04/11/17 13:16		
<i>Containers Supplied:</i>				
<b>Sample ID: W16J112-09</b>	<b>Water</b>	<b>Sampled: 10/13/16 13:40</b>		
Out-PCB Congeners 209	10/27/16 17:00	04/11/17 13:40		
<i>Containers Supplied:</i>				
<b>Sample ID: W16J112-10</b>	<b>Water</b>	<b>Sampled: 10/13/16 13:32</b>		
Out-PCB Congeners 209	10/27/16 17:00	04/11/17 13:32		
<i>Containers Supplied:</i>				
<b>Sample ID: W16J112-11</b>	<b>Water</b>	<b>Sampled: 10/13/16 00:00</b>		
Out-PCB Congeners 209	10/27/16 17:00	04/11/17 00:00		
<i>Containers Supplied:</i>				

Released By	Date	Received By	Date
Released By	Date	Received By	Date



PC H2

### Cooler Receipt and Preservation Form

12528

Client City of Portland WPCL Service Request K16  
Received: 10/14/16 Opened: 10/14/16 By: SW Unloaded: 10/14/16 By: SW

- 1. Samples were received via?  USPS  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- 2. Samples were received in: (circle)  Cooler  Box  Envelope  Other  NA
- 3. Were custody seals on coolers?  NA  Y  N If yes, how many and where? \_\_\_\_\_  
If present, were custody seals intact?  Y  N If present, were they signed and dated?  Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
0.2	0.2	-	-	0	351	NA		NA	
3.9	3.6	-	-	-0.3	349				
3.8	3.7	-	-	-0.1	323				

- 4. Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves
- 5. Were custody papers properly filled out (ink, signed, etc.)?  NA  Y  N
- 6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.*  NA  Y  N  
If applicable, tissue samples were received:  Frozen  Partially Thawed  Thawed
- 7. Were all sample labels complete (i.e analysis, preservation, etc.)?  NA  Y  N
- 8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.*  NA  Y  N
- 9. Were appropriate bottles/containers and volumes received for the tests indicated?  NA  Y  N
- 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below*  NA  Y  N
- 11. Were VOA vials received without headspace? *Indicate in the table below.*  NA  Y  N
- 12. Was C12/Res negative?  NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: 10/13 1332  
~~2 samples not on COC W16J112-10A and W16J112-11A 10/13 COC~~  
~~Rec'd only one amber per sample~~  
~~Cannot split W16J112-01~~



# Organochlorine Pesticides

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W16J112  
**Sample Matrix:** Water

**Service Request:** K1612528  
**Date Collected:** 10/13/2016  
**Date Received:** 10/14/2016

**Organochlorine Pesticides**

**Sample Name:** W16J112-01  
**Lab Code:** K1612528-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	Ui	1.1	1.1	1	10/18/16	11/01/16	KWG1609444	
beta-BHC	ND	Ui	1.3	1.3	1	10/18/16	11/01/16	KWG1609444	
gamma-BHC (Lindane)	ND	Ui	1.1	1.1	1	10/18/16	11/01/16	KWG1609444	
delta-BHC	ND	Ui	1.1	0.54	1	10/18/16	11/01/16	KWG1609444	
Heptachlor	ND	U	1.1	0.14	1	10/18/16	11/01/16	KWG1609444	
Aldrin	ND	U	1.1	0.21	1	10/18/16	11/01/16	KWG1609444	
Heptachlor Epoxide	ND	U	1.1	0.71	1	10/18/16	11/01/16	KWG1609444	
gamma-Chlordane†	ND	U	1.1	0.22	1	10/18/16	11/01/16	KWG1609444	
Endosulfan I	ND	Ui	1.1	0.36	1	10/18/16	11/01/16	KWG1609444	
alpha-Chlordane	ND	Ui	1.1	0.85	1	10/18/16	11/01/16	KWG1609444	
Dieldrin	ND	U	1.1	0.24	1	10/18/16	11/01/16	KWG1609444	
4,4'-DDE	ND	U	1.1	0.12	1	10/18/16	11/01/16	KWG1609444	
Endrin	ND	U	1.1	0.19	1	10/18/16	11/01/16	KWG1609444	
Endosulfan II	ND	U	1.1	0.21	1	10/18/16	11/01/16	KWG1609444	
4,4'-DDD	ND	U	1.1	0.29	1	10/18/16	11/01/16	KWG1609444	
Endrin Aldehyde	ND	Ui	3.9	3.9	1	10/18/16	11/01/16	KWG1609444	
Endosulfan Sulfate	ND	Ui	1.1	1.1	1	10/18/16	11/01/16	KWG1609444	
4,4'-DDT	ND	Ui	4.3	4.3	1	10/18/16	11/01/16	KWG1609444	
Endrin Ketone	ND	U	1.1	0.29	1	10/18/16	11/01/16	KWG1609444	
Methoxychlor	ND	U	1.1	0.23	1	10/18/16	11/01/16	KWG1609444	
Toxaphene	ND	U	52	20	1	10/18/16	11/01/16	KWG1609444	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	59	20-106	11/01/16	Acceptable
Decachlorobiphenyl	56	19-127	11/01/16	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W16J112  
**Sample Matrix:** Water

**Service Request:** K1612528  
**Date Collected:** 10/13/2016  
**Date Received:** 10/14/2016

**Organochlorine Pesticides**

**Sample Name:** W16J112-01  
**Lab Code:** K1612528-001

**Units:** ng/L  
**Basis:** NA

† Analyte Comments

gamma-Chlordane

For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W16J112  
**Sample Matrix:** Water

**Service Request:** K1612528  
**Date Collected:** NA  
**Date Received:** NA

Organochlorine Pesticides

**Sample Name:** Method Blank  
**Lab Code:** KWG1609444-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	0.97	0.19	1	10/18/16	11/01/16	KWG1609444	
beta-BHC	ND	U	0.97	0.47	1	10/18/16	11/01/16	KWG1609444	
gamma-BHC (Lindane)	ND	U	0.97	0.22	1	10/18/16	11/01/16	KWG1609444	
delta-BHC	ND	U	0.97	0.20	1	10/18/16	11/01/16	KWG1609444	
Heptachlor	ND	U	0.97	0.13	1	10/18/16	11/01/16	KWG1609444	
Aldrin	ND	U	0.97	0.20	1	10/18/16	11/01/16	KWG1609444	
Heptachlor Epoxide	ND	U	0.97	0.69	1	10/18/16	11/01/16	KWG1609444	
gamma-Chlordane†	ND	U	0.97	0.21	1	10/18/16	11/01/16	KWG1609444	
Endosulfan I	ND	U	0.97	0.15	1	10/18/16	11/01/16	KWG1609444	
alpha-Chlordane	ND	U	0.97	0.17	1	10/18/16	11/01/16	KWG1609444	
Dieldrin	ND	U	0.97	0.23	1	10/18/16	11/01/16	KWG1609444	
4,4'-DDE	ND	U	0.97	0.11	1	10/18/16	11/01/16	KWG1609444	
Endrin	ND	U	0.97	0.18	1	10/18/16	11/01/16	KWG1609444	
Endosulfan II	ND	U	0.97	0.20	1	10/18/16	11/01/16	KWG1609444	
4,4'-DDD	ND	U	0.97	0.28	1	10/18/16	11/01/16	KWG1609444	
Endrin Aldehyde	ND	U	0.97	0.22	1	10/18/16	11/01/16	KWG1609444	
Endosulfan Sulfate	ND	U	0.97	0.84	1	10/18/16	11/01/16	KWG1609444	
4,4'-DDT	ND	U	0.97	0.30	1	10/18/16	11/01/16	KWG1609444	
Endrin Ketone	ND	U	0.97	0.28	1	10/18/16	11/01/16	KWG1609444	
Methoxychlor	ND	U	0.97	0.22	1	10/18/16	11/01/16	KWG1609444	
Toxaphene	ND	U	49	19	1	10/18/16	11/01/16	KWG1609444	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	55	20-106	11/01/16	Acceptable
Decachlorobiphenyl	59	19-127	11/01/16	Acceptable

**Comments:** \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W16J112  
**Sample Matrix:** Water

**Service Request:** K1612528  
**Date Collected:** NA  
**Date Received:** NA

**Organochlorine Pesticides**

**Sample Name:** Method Blank  
**Lab Code:** KWG1609444-5

**Units:** ng/L  
**Basis:** NA

† Analyte Comments

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gamma-Chlordane                      For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

**Comments:** \_\_\_\_\_

---

**Client:** Portland, City of  
**Project:** Portland Harbor/W16J112  
**Sample Matrix:** Water

**Service Request:** K1612528

**Surrogate Recovery Summary  
 Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>	<u>Sur2</u>
W16J112-01	K1612528-001	59	56
Method Blank	KWG1609444-5	55	59
Lab Control Sample	KWG1609444-1	66	61
Duplicate Lab Control Sample	KWG1609444-2	64	60

**Surrogate Recovery Control Limits (%)**

---

Sur1 = Tetrachloro-m-xylene	20-106
Sur2 = Decachlorobiphenyl	19-127

---

Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.

**Client:** Portland, City of  
**Project:** Portland Harbor/W16J112  
**Sample Matrix:** Water

**Service Request:** K1612528  
**Date Extracted:** 10/18/2016  
**Date Analyzed:** 11/01/2016

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1609444

Analyte Name	Lab Control Sample KWG1609444-1 Lab Control Spike			Duplicate Lab Control Sample KWG1609444-2 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
alpha-BHC	7.18	10.0	72	6.69	10.0	67	36-122	7	30
beta-BHC	8.04	10.0	80	6.93	10.0	69	42-125	15	30
gamma-BHC (Lindane)	7.44	10.0	74	6.78	10.0	68	44-117	9	30
delta-BHC	7.53	10.0	75	6.67	10.0	67	48-123	12	30
Heptachlor	7.58	10.0	76	7.38	10.0	74	40-115	3	30
Aldrin	6.97	10.0	70	6.60	10.0	66	10-102	5	30
Heptachlor Epoxide	7.32	10.0	73	6.75	10.0	68	49-109	8	30
gamma-Chlordane	7.32	10.0	73	7.19	10.0	72	47-113	2	30
Endosulfan I	5.74	10.0	57	5.38	10.0	54	35-115	6	30
alpha-Chlordane	7.47	10.0	75	6.96	10.0	70	45-115	7	30
Dieldrin	8.19	10.0	82	7.57	10.0	76	50-115	8	30
4,4'-DDE	6.54	10.0	65	6.27	10.0	63	41-116	4	30
Endrin	7.28	10.0	73	6.84	10.0	68	48-126	6	30
Endosulfan II	6.58	10.0	66	6.17	10.0	62	28-128	6	30
4,4'-DDD	8.78	10.0	88	7.99	10.0	80	33-132	9	30
Endrin Aldehyde	8.15	10.0	81	7.99	10.0	80	27-104	2	30
Endosulfan Sulfate	7.47	10.0	75	7.26	10.0	73	38-118	3	30
4,4'-DDT	9.94	10.0	99	9.65	10.0	97	42-143	3	30
Endrin Ketone	6.36	10.0	64	5.84	10.0	58	30-124	9	30
Methoxychlor	8.42	10.0	84	8.44	10.0	84	43-143	0	30
Toxaphene	249	400	62	245	400	61	36-137	2	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Report Prepared for:**

Howard Holmes  
ALS Environmental  
1317 S. 13th Avenue  
Kelso WA 98626

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Prepared Date:**

November 2, 2016

**Report Information:**

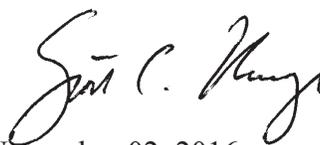
**Pace Project #: 10366755**  
**Sample Receipt Date: 10/19/2016**  
**Client Project #: K1612528**  
**Client Sub PO #: 51K1612528**  
**State Cert #: MN200001-005**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



November 02, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

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The results relate only to the samples included in this report.

## **DISCUSSION**

This report presents the results from the analyses performed on eleven samples submitted by a representative of ALS Environmental. The samples were analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the amount of sample extracted.

The isotopically-labeled PCB internal standards in the sample extracts were recovered at 16-119%. With seven exceptions, primarily in the method blank and flagged "R", the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained. Several internal standard recoveries in the method blank were below the target range for this method. These reporting limits were verified by comparison to the signal to noise based estimated detection limits.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the sample material.

Laboratory spike samples were also prepared with the sample batch using reference material that had been fortified with native standards. The results show that the spiked native compounds were recovered at 99-125%, with relative percent differences of 0.0-6.8%. These results were within the target ranges for this method. Matrix spikes were not prepared with the sample batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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Report No.....10366755

# Appendix A

## Sample Management

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

10366755

Project Number: K1612528  
 Project Manager: Howard Holmes  
 QAP: LAB QAP

Report No.....10366755\_1668A

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Lab ID
				Date	Time		
K1612528-001	W161112-01	1	Water	10/13/16	0904	Pace MN	X
K1612528-002	W161112-02		Water	10/13/16	0916	Pace MN	X
K1612528-003	W161112-03		Water	10/13/16	0948	Pace MN	X
K1612528-004	W161112-04		Water	10/13/16	1046	Pace MN	X
K1612528-005	W161112-05		Water	10/13/16	1105	Pace MN	X
K1612528-006	W161112-06		Water	10/13/16	1125	Pace MN	X
K1612528-007	W161112-07		Water	10/13/16	1251	Pace MN	X
K1612528-008	W161112-08		Water	10/13/16	1316	Pace MN	X
K1612528-009	W161112-09		Water	10/13/16	1340	Pace MN	X
K1612528-010	W161112-10		Water	10/13/16	1332	Pace MN	X
K1612528-011	W161112-11		Water	10/13/16	0000	Pace MN	X

209 List

Cl Biphen Cong  
1668A

City of Portland Samples



<b>Special Instructions/Comments</b> Please provide the electronic (PDF and EDD) report to the following e-mail address: ALKLS.Data@alsglobal.com.  <i>Report # EDD to City of Portland</i> <i>Report # EDD &amp; Invoice to Howard Holmes</i> <i>even!</i>	<b>Turnaround Requirements</b> RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD Requested FAX Date: _____ Requested Report Date: 10/31/16	<b>Report Requirements</b> I. Results Only _____ II. Results + QC Summaries <input checked="" type="checkbox"/> III. Results + QC and Calibration Summaries _____ IV. Data Validation Report with Raw Data _____ PQL/MDL/J <input type="checkbox"/> Y <input type="checkbox"/> EDD <input type="checkbox"/> Y <input type="checkbox"/>	<b>Invoice Information</b> PO# 51K1612528 Bill to _____
	H - Test is On Hold P - Test is Authorized for Prep Only		

Inquired By: *Krishna 10/18/16 115* Received By: *20/PACE 10/19/16* Airbill Number: \_\_\_\_\_  
 9:30

**Sample Condition Upon Receipt**

Client Name: ALS Environment Project #: WO# : 10366755

**WO# : 10366755**



10366755

Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  SpeedDee  Other: \_\_\_\_\_  
 Tracking Number: 6447 9280 5488

Custody Seal on Cooler/Box Present?  Yes  No Seals Intact?  Yes  No  
 Packing Material:  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_ Temp Blank?  Yes  No  
 Thermometer Used:  151401163  151401164  B88A912167504  B88A0143310098  
 Type of Ice: BC 10/19/16  Wet  Blue  None  Samples on ice, cooling process has begun  
 Cooler Temp Read (°C): 5.1 Cooler Temp Corrected (°C): 5.3 Biological Tissue Frozen?  Yes  No  N/A  
 Temp should be above freezing to 6°C Correction Factor: 10.2 Date and Initials of Person Examining Contents: BC 10/19/16

USDA Regulated Soil (  N/A, water sample)  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes  No  
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
 If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <u>BC 10/19/16</u> <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION** Field Data Required?  Yes  No  
 Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Comments/Resolution: \_\_\_\_\_

Project Manager Review: William Berg Date: 10/20/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

### REPORT OF LABORATORY ANALYSIS

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# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1612528-001	Matrix	Water
Lab Sample ID	10366755001	Dilution	5
Filename	P161029B_08	Collected	10/13/2016 09:04
Injected By	BAL	Received	10/19/2016 09:30
Total Amount Extracted	954 mL	Extracted	10/25/2016 14:00
% Moisture	NA	Analyzed	10/30/2016 05:35
Dry Weight Extracted	NA		
ICAL ID	P161029B02		
CCal Filename(s)	P161029B_01		
Method Blank ID	BLANK-52509		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.873	2.89	2.0	0.983	49
13C-4-MoCB	3	11.520	3.07	2.0	0.938	47
13C-2,2'-DiCB	4	11.760	1.60	2.0	0.680	34
13C-4,4'-DiCB	15	18.599	1.58	2.0	1.06	53
13C-2,2',6-TrCB	19	15.388	1.13	2.0	0.898	45
13C-3,4,4'-TrCB	37	26.215	1.00	2.0	1.49	74
13C-2,2',6,6'-TeCB	54	18.854	0.83	2.0	1.07	53
13C-3,4,4',5'-TeCB	81	33.245	0.81	2.0	1.78	89
13C-3,3',4,4'-TeCB	77	33.848	0.83	2.0	1.63	81
13C-2,2',4,6,6'-PeCB	104	24.789	1.64	2.0	1.05	52
13C-2,3,3',4,4'-PeCB	105	37.392	1.60	2.0	1.66	83
13C-2,3,4,4',5'-PeCB	114	36.721	1.54	2.0	1.67	83
13C-2,3',4,4',5'-PeCB	118	36.168	1.53	2.0	1.71	85
13C-2,3',4,4',5'-PeCB	123	35.832	1.61	2.0	1.74	87
13C-3,3',4,4',5'-PeCB	126	40.594	1.63	2.0	1.52	76
13C-2,2',4,4',6,6'-HxCB	155	30.747	1.26	2.0	1.26	63
13C-HxCB (156/157)	156/157	43.601	1.27	4.0	2.77	69
13C-2,3',4,4',5,5'-HxCB	167	42.410	1.31	2.0	1.51	76
13C-3,3',4,4',5,5'-HxCB	169	46.904	1.29	2.0	1.13	56
13C-2,2',3,4',5,6,6'-HpCB	188	36.620	1.04	2.0	1.73	87
13C-2,3,3',4,4',5,5'-HpCB	189	49.391	1.02	2.0	1.43	71
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.075	0.93	2.0	1.86	93
13C-2,3,3',4,4',5,5',6-OxCB	205	51.977	0.92	2.0	1.40	70
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.680	0.84	2.0	1.23	62
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	48.830	0.77	2.0	1.68	84
13C--DeCB	209	55.274	0.70	2.0	1.56	78
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.889	1.09	2.0	1.52	76
13C-2,3,3',5,5'-PeCB	111	33.798	1.57	2.0	1.49	74
13C-2,2',3,3',5,5',6-HpCB	178	39.739	1.05	2.0	1.51	76
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.094	1.61	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.817	0.82	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.015	1.53	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.320	1.29	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.481	0.90	2.0	NA	NA

Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-001  
 Lab Sample ID 10366755001  
 Filename P161029B\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.262
2		---	---	ND	---	0.262
3		---	---	ND	---	0.262
4		---	---	ND	---	0.262
5		---	---	ND	---	0.262
6		---	---	ND	---	0.262
7		---	---	ND	---	0.262
8		---	---	ND	---	0.262
9		---	---	ND	---	0.262
10		---	---	ND	---	0.262
11		---	---	ND	---	2.57
12	12/13	---	---	ND	---	0.524
13	12/13	---	---	ND	---	0.524
14		---	---	ND	---	0.262
15		---	---	ND	---	0.346
16		---	---	ND	---	0.262
17		---	---	ND	---	0.262
18	18/30	---	---	ND	---	0.524
19		---	---	ND	---	0.262
20	20/28	---	---	ND	---	1.35
21	21/33	---	---	ND	---	1.42
22		---	---	ND	---	0.996
23		---	---	ND	---	0.262
24		---	---	ND	---	0.262
25		---	---	ND	---	0.262
26	26/29	---	---	ND	---	0.524
27		---	---	ND	---	0.262
28	20/28	---	---	ND	---	1.35
29	26/29	---	---	ND	---	0.524
30	18/30	---	---	ND	---	0.524
31		---	---	ND	---	1.36
32		---	---	ND	---	0.262
33	21/33	---	---	ND	---	1.42
34		---	---	ND	---	0.262
35		---	---	ND	---	0.262
36		---	---	ND	---	0.262
37		---	---	ND	---	0.556
38		---	---	ND	---	0.262
39		---	---	ND	---	0.262
40	40/41/71	---	---	ND	---	1.57
41	40/41/71	---	---	ND	---	1.57
42		---	---	ND	---	0.524
43	43/73	---	---	ND	---	0.524
44	44/47/65	---	---	ND	---	1.57
45	45/51	---	---	ND	---	1.05
46		---	---	ND	---	0.524
47	44/47/65	---	---	ND	---	1.57
48		---	---	ND	---	0.524

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-001  
 Lab Sample ID 10366755001  
 Filename P161029B\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.05
50	50/53	---	---	ND	---	1.05
51	45/51	---	---	ND	---	1.05
52		---	---	ND	---	1.61
53	50/53	---	---	ND	---	1.05
54		---	---	ND	---	0.524
55		---	---	ND	---	0.524
56		---	---	ND	---	0.524
57		---	---	ND	---	0.524
58		---	---	ND	---	0.524
59	59/62/75	---	---	ND	---	1.57
60		---	---	ND	---	0.524
61	61/70/74/76	---	---	ND	---	2.10
62	59/62/75	---	---	ND	---	1.57
63		---	---	ND	---	0.524
64		---	---	ND	---	0.524
65	44/47/65	---	---	ND	---	1.57
66		---	---	ND	---	0.881
67		---	---	ND	---	0.524
68		---	---	ND	---	0.524
69	49/69	---	---	ND	---	1.05
70	61/70/74/76	---	---	ND	---	2.10
71	40/41/71	---	---	ND	---	1.57
72		---	---	ND	---	0.524
73	43/73	---	---	ND	---	0.524
74	61/70/74/76	---	---	ND	---	2.10
75	59/62/75	---	---	ND	---	1.57
76	61/70/74/76	---	---	ND	---	2.10
77		---	---	ND	---	0.524
78		---	---	ND	---	0.524
79		---	---	ND	---	0.524
80		---	---	ND	---	0.524
81		---	---	ND	---	0.524
82		---	---	ND	---	0.524
83		---	---	ND	---	0.524
84		---	---	ND	---	0.524
85	85/116/117	---	---	ND	---	1.57
86	86/87/97/108/119/125	---	---	ND	---	3.15
87	86/87/97/108/119/125	---	---	ND	---	3.15
88	88/91	---	---	ND	---	1.05
89		---	---	ND	---	0.524
90	90/101/113	---	---	ND	---	1.57
91	88/91	---	---	ND	---	1.05
92		---	---	ND	---	0.524
93	93/98/100/102	---	---	ND	---	2.10
94		---	---	ND	---	0.524
95		---	---	ND	---	0.996
96		---	---	ND	---	0.524

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-001  
 Lab Sample ID 10366755001  
 Filename P161029B\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.15
98	93/98/100/102	---	---	ND	---	2.10
99		---	---	ND	---	0.524
100	93/98/100/102	---	---	ND	---	2.10
101	90/101/113	---	---	ND	---	1.57
102	93/98/100/102	---	---	ND	---	2.10
103		---	---	ND	---	0.524
104		---	---	ND	---	0.524
105		---	---	ND	---	0.524
106		---	---	ND	---	0.524
107	107/124	---	---	ND	---	1.05
108	86/87/97/108/119/125	---	---	ND	---	3.15
109		---	---	ND	---	0.524
110	110/115	---	---	ND	---	1.05
111		---	---	ND	---	0.524
112		---	---	ND	---	0.524
113	90/101/113	---	---	ND	---	1.57
114		---	---	ND	---	0.524
115	110/115	---	---	ND	---	1.05
116	85/116/117	---	---	ND	---	1.57
117	85/116/117	---	---	ND	---	1.57
118		---	---	ND	---	0.671
119	86/87/97/108/119/125	---	---	ND	---	3.15
120		---	---	ND	---	0.524
121		---	---	ND	---	0.524
122		---	---	ND	---	0.524
123		---	---	ND	---	0.524
124	107/124	---	---	ND	---	1.05
125	86/87/97/108/119/125	---	---	ND	---	3.15
126		---	---	ND	---	0.524
127		---	---	ND	---	0.524
128	128/166	---	---	ND	---	1.05
129	129/138/163	---	---	ND	---	1.57
130		---	---	ND	---	0.524
131		---	---	ND	---	0.524
132		---	---	ND	---	0.524
133		---	---	ND	---	0.524
134	134/143	---	---	ND	---	1.05
135	135/151	---	---	ND	---	1.05
136		---	---	ND	---	0.524
137		---	---	ND	---	0.524
138	129/138/163	---	---	ND	---	1.57
139	139/140	---	---	ND	---	1.05
140	139/140	---	---	ND	---	1.05
141		---	---	ND	---	0.524
142		---	---	ND	---	0.524
143	134/143	---	---	ND	---	1.05
144		---	---	ND	---	0.524

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID      K1612528-001  
Lab Sample ID         10366755001  
Filename                P161029B\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.524
146		---	---	ND	---	0.524
147	147/149	---	---	ND	---	1.05
148		---	---	ND	---	0.524
149	147/149	---	---	ND	---	1.05
150		---	---	ND	---	0.524
151	135/151	---	---	ND	---	1.05
152		---	---	ND	---	0.524
153	153/168	---	---	ND	---	1.05
154		---	---	ND	---	0.524
155		---	---	ND	---	0.524
156	156/157	---	---	ND	---	1.05
157	156/157	---	---	ND	---	1.05
158		---	---	ND	---	0.524
159		---	---	ND	---	0.524
160		---	---	ND	---	0.524
161		---	---	ND	---	0.524
162		---	---	ND	---	0.524
163	129/138/163	---	---	ND	---	1.57
164		---	---	ND	---	0.524
165		---	---	ND	---	0.524
166	128/166	---	---	ND	---	1.05
167		---	---	ND	---	0.524
168	153/168	---	---	ND	---	1.05
169		---	---	ND	---	0.524
170		---	---	ND	---	0.524
171	171/173	---	---	ND	---	1.05
172		---	---	ND	---	0.524
173	171/173	---	---	ND	---	1.05
174		---	---	ND	---	0.524
175		---	---	ND	---	0.524
176		---	---	ND	---	0.524
177		---	---	ND	---	0.524
178		---	---	ND	---	0.524
179		---	---	ND	---	0.524
180	180/193	---	---	ND	---	1.05
181		---	---	ND	---	0.524
182		---	---	ND	---	0.524
183	183/185	---	---	ND	---	1.05
184		---	---	ND	---	0.524
185	183/185	---	---	ND	---	1.05
186		---	---	ND	---	0.524
187		---	---	ND	---	0.524
188		---	---	ND	---	0.524
189		---	---	ND	---	0.524
190		---	---	ND	---	0.524
191		---	---	ND	---	0.524
192		---	---	ND	---	0.524

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1612528-001  
 Lab Sample ID        10366755001  
 Filename                P161029B\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.05
194		---	---	ND	---	0.786
195		---	---	ND	---	0.786
196		---	---	ND	---	0.786
197	197/200	---	---	ND	---	1.57
198	198/199	---	---	ND	---	1.57
199	198/199	---	---	ND	---	1.57
200	197/200	---	---	ND	---	1.57
201		---	---	ND	---	0.786
202		---	---	ND	---	0.786
203		---	---	ND	---	0.786
204		---	---	ND	---	0.786
205		---	---	ND	---	0.786
206		---	---	ND	---	0.786
207		---	---	ND	---	0.786
208		---	---	ND	---	0.786
209		---	---	ND	---	0.786

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-001  
Lab Sample ID             10366755001  
Filename                    P161029B\_08

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1612528-002		
Lab Sample ID	10366755002		
Filename	P161029B_09		
Injected By	BAL		
Total Amount Extracted	934 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/13/2016 09:16
ICAL ID	P161029B02	Received	10/19/2016 09:30
CCal Filename(s)	P161029B_01	Extracted	10/25/2016 14:00
Method Blank ID	BLANK-52509	Analyzed	10/30/2016 06:34

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.873	2.79	2.0	1.09	54
13C-4-MoCB	3	11.496	3.37	2.0	1.02	51
13C-2,2'-DiCB	4	11.760	1.55	2.0	0.749	37
13C-4,4'-DiCB	15	18.587	1.60	2.0	1.17	59
13C-2,2',6-TrCB	19	15.412	1.13	2.0	0.975	49
13C-3,4,4'-TrCB	37	26.197	1.14	2.0	1.68	84
13C-2,2',6,6'-TeCB	54	18.836	0.76	2.0	1.18	59
13C-3,4,4',5'-TeCB	81	33.245	0.81	2.0	1.94	97
13C-3,3',4,4'-TeCB	77	33.848	0.81	2.0	1.75	88
13C-2,2',4,6,6'-PeCB	104	24.789	1.59	2.0	1.10	55
13C-2,3,3',4,4'-PeCB	105	37.392	1.54	2.0	1.71	85
13C-2,3,4,4',5'-PeCB	114	36.721	1.57	2.0	1.84	92
13C-2,3',4,4',5'-PeCB	118	36.168	1.63	2.0	1.86	93
13C-2,3',4,4',5'-PeCB	123	35.815	1.63	2.0	1.83	91
13C-3,3',4,4',5'-PeCB	126	40.578	1.57	2.0	1.63	81
13C-2,2',4,4',6,6'-HxCB	155	30.729	1.27	2.0	1.31	65
13C-HxCB (156/157)	156/157	43.585	1.35	4.0	2.72	68
13C-2,3',4,4',5,5'-HxCB	167	42.394	1.29	2.0	1.54	77
13C-3,3',4,4',5,5'-HxCB	169	46.922	1.25	2.0	1.15	58
13C-2,2',3,4',5,6,6'-HpCB	188	36.604	1.02	2.0	1.97	99
13C-2,3,3',4,4',5,5'-HpCB	189	49.391	1.04	2.0	1.57	79
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.059	0.90	2.0	2.09	105
13C-2,3,3',4,4',5,5',6-OxCB	205	51.956	0.87	2.0	1.50	75
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.681	0.79	2.0	1.32	66
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.831	0.80	2.0	1.78	89
13C--DeCB	209	55.254	0.73	2.0	1.61	81
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.871	1.13	2.0	1.69	85
13C-2,3,3',5,5'-PeCB	111	33.782	1.67	2.0	1.54	77
13C-2,2',3,3',5,5',6-HpCB	178	39.739	1.02	2.0	1.56	78
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.082	1.57	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.799	0.84	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.998	1.58	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.304	1.30	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.461	0.90	2.0	NA	NA

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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-002  
 Lab Sample ID 10366755002  
 Filename P161029B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.268
2		---	---	ND	---	0.268
3		---	---	ND	---	0.268
4		---	---	ND	---	0.268
5		---	---	ND	---	0.268
6		---	---	ND	---	0.268
7		---	---	ND	---	0.268
8		---	---	ND	---	0.268
9		---	---	ND	---	0.268
10		---	---	ND	---	0.268
11		---	---	ND	---	2.62
12	12/13	---	---	ND	---	0.536
13	12/13	---	---	ND	---	0.536
14		---	---	ND	---	0.268
15		---	---	ND	---	0.353
16		---	---	ND	---	0.268
17		---	---	ND	---	0.268
18	18/30	---	---	ND	---	0.536
19		---	---	ND	---	0.268
20	20/28	---	---	ND	---	1.38
21	21/33	---	---	ND	---	1.45
22		---	---	ND	---	1.02
23		---	---	ND	---	0.268
24		---	---	ND	---	0.268
25		---	---	ND	---	0.268
26	26/29	---	---	ND	---	0.536
27		---	---	ND	---	0.268
28	20/28	---	---	ND	---	1.38
29	26/29	---	---	ND	---	0.536
30	18/30	---	---	ND	---	0.536
31		---	---	ND	---	1.39
32		---	---	ND	---	0.268
33	21/33	---	---	ND	---	1.45
34		---	---	ND	---	0.268
35		---	---	ND	---	0.268
36		---	---	ND	---	0.268
37		---	---	ND	---	0.568
38		---	---	ND	---	0.268
39		---	---	ND	---	0.268
40	40/41/71	---	---	ND	---	1.61
41	40/41/71	---	---	ND	---	1.61
42		---	---	ND	---	0.536
43	43/73	---	---	ND	---	0.536
44	44/47/65	---	---	ND	---	1.61
45	45/51	---	---	ND	---	1.07
46		---	---	ND	---	0.536
47	44/47/65	---	---	ND	---	1.61
48		---	---	ND	---	0.536

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
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ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-002  
Lab Sample ID 10366755002  
Filename P161029B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.07
50	50/53	---	---	ND	---	1.07
51	45/51	---	---	ND	---	1.07
52		---	---	ND	---	1.65
53	50/53	---	---	ND	---	1.07
54		---	---	ND	---	0.536
55		---	---	ND	---	0.536
56		---	---	ND	---	0.536
57		---	---	ND	---	0.536
58		---	---	ND	---	0.536
59	59/62/75	---	---	ND	---	1.61
60		---	---	ND	---	0.536
61	61/70/74/76	---	---	ND	---	2.14
62	59/62/75	---	---	ND	---	1.61
63		---	---	ND	---	0.536
64		---	---	ND	---	0.536
65	44/47/65	---	---	ND	---	1.61
66		---	---	ND	---	0.900
67		---	---	ND	---	0.536
68		---	---	ND	---	0.536
69	49/69	---	---	ND	---	1.07
70	61/70/74/76	---	---	ND	---	2.14
71	40/41/71	---	---	ND	---	1.61
72		---	---	ND	---	0.536
73	43/73	---	---	ND	---	0.536
74	61/70/74/76	---	---	ND	---	2.14
75	59/62/75	---	---	ND	---	1.61
76	61/70/74/76	---	---	ND	---	2.14
77		---	---	ND	---	0.536
78		---	---	ND	---	0.536
79		---	---	ND	---	0.536
80		---	---	ND	---	0.536
81		---	---	ND	---	0.536
82		---	---	ND	---	0.536
83		---	---	ND	---	0.536
84		---	---	ND	---	0.536
85	85/116/117	---	---	ND	---	1.61
86	86/87/97/108/119/125	---	---	ND	---	3.21
87	86/87/97/108/119/125	---	---	ND	---	3.21
88	88/91	---	---	ND	---	1.07
89		---	---	ND	---	0.536
90	90/101/113	---	---	ND	---	1.61
91	88/91	---	---	ND	---	1.07
92		---	---	ND	---	0.536
93	93/98/100/102	---	---	ND	---	2.14
94		---	---	ND	---	0.536
95		---	---	ND	---	1.02
96		---	---	ND	---	0.536

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-002  
Lab Sample ID 10366755002  
Filename P161029B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.21
98	93/98/100/102	---	---	ND	---	2.14
99		---	---	ND	---	0.536
100	93/98/100/102	---	---	ND	---	2.14
101	90/101/113	---	---	ND	---	1.61
102	93/98/100/102	---	---	ND	---	2.14
103		---	---	ND	---	0.536
104		---	---	ND	---	0.536
105		---	---	ND	---	0.536
106		---	---	ND	---	0.536
107	107/124	---	---	ND	---	1.07
108	86/87/97/108/119/125	---	---	ND	---	3.21
109		---	---	ND	---	0.536
110	110/115	---	---	ND	---	1.07
111		---	---	ND	---	0.536
112		---	---	ND	---	0.536
113	90/101/113	---	---	ND	---	1.61
114		---	---	ND	---	0.536
115	110/115	---	---	ND	---	1.07
116	85/116/117	---	---	ND	---	1.61
117	85/116/117	---	---	ND	---	1.61
118		---	---	ND	---	0.686
119	86/87/97/108/119/125	---	---	ND	---	3.21
120		---	---	ND	---	0.536
121		---	---	ND	---	0.536
122		---	---	ND	---	0.536
123		---	---	ND	---	0.536
124	107/124	---	---	ND	---	1.07
125	86/87/97/108/119/125	---	---	ND	---	3.21
126		---	---	ND	---	0.536
127		---	---	ND	---	0.536
128	128/166	---	---	ND	---	1.07
129	129/138/163	---	---	ND	---	1.61
130		---	---	ND	---	0.536
131		---	---	ND	---	0.536
132		---	---	ND	---	0.536
133		---	---	ND	---	0.536
134	134/143	---	---	ND	---	1.07
135	135/151	---	---	ND	---	1.07
136		---	---	ND	---	0.536
137		---	---	ND	---	0.536
138	129/138/163	---	---	ND	---	1.61
139	139/140	---	---	ND	---	1.07
140	139/140	---	---	ND	---	1.07
141		---	---	ND	---	0.536
142		---	---	ND	---	0.536
143	134/143	---	---	ND	---	1.07
144		---	---	ND	---	0.536

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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-002  
Lab Sample ID 10366755002  
Filename P161029B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.536
146		---	---	ND	---	0.536
147	147/149	---	---	ND	---	1.07
148		---	---	ND	---	0.536
149	147/149	---	---	ND	---	1.07
150		---	---	ND	---	0.536
151	135/151	---	---	ND	---	1.07
152		---	---	ND	---	0.536
153	153/168	---	---	ND	---	1.07
154		---	---	ND	---	0.536
155		---	---	ND	---	0.536
156	156/157	---	---	ND	---	1.07
157	156/157	---	---	ND	---	1.07
158		---	---	ND	---	0.536
159		---	---	ND	---	0.536
160		---	---	ND	---	0.536
161		---	---	ND	---	0.536
162		---	---	ND	---	0.536
163	129/138/163	---	---	ND	---	1.61
164		---	---	ND	---	0.536
165		---	---	ND	---	0.536
166	128/166	---	---	ND	---	1.07
167		---	---	ND	---	0.536
168	153/168	---	---	ND	---	1.07
169		---	---	ND	---	0.536
170		---	---	ND	---	0.536
171	171/173	---	---	ND	---	1.07
172		---	---	ND	---	0.536
173	171/173	---	---	ND	---	1.07
174		---	---	ND	---	0.536
175		---	---	ND	---	0.536
176		---	---	ND	---	0.536
177		---	---	ND	---	0.536
178		---	---	ND	---	0.536
179		---	---	ND	---	0.536
180	180/193	---	---	ND	---	1.07
181		---	---	ND	---	0.536
182		---	---	ND	---	0.536
183	183/185	---	---	ND	---	1.07
184		---	---	ND	---	0.536
185	183/185	---	---	ND	---	1.07
186		---	---	ND	---	0.536
187		---	---	ND	---	0.536
188		---	---	ND	---	0.536
189		---	---	ND	---	0.536
190		---	---	ND	---	0.536
191		---	---	ND	---	0.536
192		---	---	ND	---	0.536

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1612528-002  
 Lab Sample ID        10366755002  
 Filename                P161029B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.07
194		---	---	ND	---	0.803
195		---	---	ND	---	0.803
196		---	---	ND	---	0.803
197	197/200	---	---	ND	---	1.61
198	198/199	---	---	ND	---	1.61
199	198/199	---	---	ND	---	1.61
200	197/200	---	---	ND	---	1.61
201		---	---	ND	---	0.803
202		---	---	ND	---	0.803
203		---	---	ND	---	0.803
204		---	---	ND	---	0.803
205		---	---	ND	---	0.803
206		---	---	ND	---	0.803
207		---	---	ND	---	0.803
208		---	---	ND	---	0.803
209		---	---	ND	---	0.803

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
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ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-002  
Lab Sample ID             10366755002  
Filename                    P161029B\_09

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1612528-003		
Lab Sample ID	10366755003		
Filename	P161029B_10		
Injected By	BAL		
Total Amount Extracted	964 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/13/2016 09:48
ICAL ID	P161029B02	Received	10/19/2016 09:30
CCal Filename(s)	P161029B_01	Extracted	10/25/2016 14:00
Method Blank ID	BLANK-52509	Analyzed	10/30/2016 07:32

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.873	2.93	2.0	0.925	46
13C-4-MoCB	3	11.508	2.90	2.0	0.972	49
13C-2,2'-DiCB	4	11.760	1.58	2.0	0.666	33
13C-4,4'-DiCB	15	18.599	1.53	2.0	1.15	58
13C-2,2',6-TrCB	19	15.388	1.12	2.0	0.901	45
13C-3,4,4'-TrCB	37	26.214	1.10	2.0	1.64	82
13C-2,2',6,6'-TeCB	54	18.836	0.82	2.0	1.07	53
13C-3,4,4',5'-TeCB	81	33.245	0.81	2.0	1.81	90
13C-3,3',4,4'-TeCB	77	33.849	0.85	2.0	1.74	87
13C-2,2',4,6,6'-PeCB	104	24.789	1.57	2.0	1.07	53
13C-2,3,3',4,4'-PeCB	105	37.375	1.56	2.0	1.68	84
13C-2,3,4,4',5'-PeCB	114	36.704	1.67	2.0	1.77	88
13C-2,3',4,4',5'-PeCB	118	36.168	1.58	2.0	1.77	89
13C-2,3',4,4',5'-PeCB	123	35.816	1.61	2.0	1.73	86
13C-3,3',4,4',5'-PeCB	126	40.561	1.57	2.0	1.47	73
13C-2,2',4,4',6,6'-HxCB	155	30.730	1.27	2.0	1.29	65
13C-HxCB (156/157)	156/157	43.584	1.20	4.0	2.88	72
13C-2,3',4,4',5,5'-HxCB	167	42.394	1.27	2.0	1.56	78
13C-3,3',4,4',5,5'-HxCB	169	46.921	1.27	2.0	1.14	57
13C-2,2',3,4',5,6,6'-HpCB	188	36.604	1.06	2.0	1.92	96
13C-2,3,3',4,4',5,5'-HpCB	189	49.434	1.02	2.0	1.53	76
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.076	0.91	2.0	2.02	101
13C-2,3,3',4,4',5,5',6-OxCB	205	52.064	0.86	2.0	1.48	74
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.809	0.76	2.0	1.29	64
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	48.852	0.81	2.0	1.71	85
13C--DeCB	209	55.447	0.69	2.0	1.48	74
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.888	1.13	2.0	1.65	83
13C-2,3,3',5,5'-PeCB	111	33.782	1.63	2.0	1.51	75
13C-2,2',3,3',5,5',6-HpCB	178	39.723	1.02	2.0	1.54	77
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.094	1.59	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.800	0.75	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.998	1.56	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.304	1.23	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.546	0.90	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
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 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-003  
 Lab Sample ID 10366755003  
 Filename P161029B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.259
2		---	---	ND	---	0.259
3		---	---	ND	---	0.259
4		---	---	ND	---	0.259
5		---	---	ND	---	0.259
6		---	---	ND	---	0.259
7		---	---	ND	---	0.259
8		---	---	ND	---	0.259
9		---	---	ND	---	0.259
10		---	---	ND	---	0.259
11		---	---	ND	---	2.54
12	12/13	---	---	ND	---	0.519
13	12/13	---	---	ND	---	0.519
14		---	---	ND	---	0.259
15		---	---	ND	---	0.342
16		---	---	ND	---	0.259
17		---	---	ND	---	0.259
18	18/30	---	---	ND	---	0.519
19		---	---	ND	---	0.259
20	20/28	---	---	ND	---	1.34
21	21/33	---	---	ND	---	1.40
22		---	---	ND	---	0.985
23		---	---	ND	---	0.259
24		---	---	ND	---	0.259
25		---	---	ND	---	0.259
26	26/29	---	---	ND	---	0.519
27		---	---	ND	---	0.259
28	20/28	---	---	ND	---	1.34
29	26/29	---	---	ND	---	0.519
30	18/30	---	---	ND	---	0.519
31		---	---	ND	---	1.35
32		---	---	ND	---	0.259
33	21/33	---	---	ND	---	1.40
34		---	---	ND	---	0.259
35		---	---	ND	---	0.259
36		---	---	ND	---	0.259
37		---	---	ND	---	0.550
38		---	---	ND	---	0.259
39		---	---	ND	---	0.259
40	40/41/71	---	---	ND	---	1.56
41	40/41/71	---	---	ND	---	1.56
42		---	---	ND	---	0.519
43	43/73	---	---	ND	---	0.519
44	44/47/65	---	---	ND	---	1.56
45	45/51	---	---	ND	---	1.04
46		---	---	ND	---	0.519
47	44/47/65	---	---	ND	---	1.56
48		---	---	ND	---	0.519

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-003  
Lab Sample ID             10366755003  
Filename                    P161029B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.04
50	50/53	---	---	ND	---	1.04
51	45/51	---	---	ND	---	1.04
52		---	---	ND	---	1.60
53	50/53	---	---	ND	---	1.04
54		---	---	ND	---	0.519
55		---	---	ND	---	0.519
56		---	---	ND	---	0.519
57		---	---	ND	---	0.519
58		---	---	ND	---	0.519
59	59/62/75	---	---	ND	---	1.56
60		---	---	ND	---	0.519
61	61/70/74/76	---	---	ND	---	2.07
62	59/62/75	---	---	ND	---	1.56
63		---	---	ND	---	0.519
64		---	---	ND	---	0.519
65	44/47/65	---	---	ND	---	1.56
66		---	---	ND	---	0.871
67		---	---	ND	---	0.519
68		---	---	ND	---	0.519
69	49/69	---	---	ND	---	1.04
70	61/70/74/76	---	---	ND	---	2.07
71	40/41/71	---	---	ND	---	1.56
72		---	---	ND	---	0.519
73	43/73	---	---	ND	---	0.519
74	61/70/74/76	---	---	ND	---	2.07
75	59/62/75	---	---	ND	---	1.56
76	61/70/74/76	---	---	ND	---	2.07
77		---	---	ND	---	0.519
78		---	---	ND	---	0.519
79		---	---	ND	---	0.519
80		---	---	ND	---	0.519
81		---	---	ND	---	0.519
82		---	---	ND	---	0.519
83		---	---	ND	---	0.519
84		---	---	ND	---	0.519
85	85/116/117	---	---	ND	---	1.56
86	86/87/97/108/119/125	---	---	ND	---	3.11
87	86/87/97/108/119/125	---	---	ND	---	3.11
88	88/91	---	---	ND	---	1.04
89		---	---	ND	---	0.519
90	90/101/113	---	---	ND	---	1.56
91	88/91	---	---	ND	---	1.04
92		---	---	ND	---	0.519
93	93/98/100/102	---	---	ND	---	2.07
94		---	---	ND	---	0.519
95		---	---	ND	---	0.985
96		---	---	ND	---	0.519

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-003  
Lab Sample ID 10366755003  
Filename P161029B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.11
98	93/98/100/102	---	---	ND	---	2.07
99		---	---	ND	---	0.519
100	93/98/100/102	---	---	ND	---	2.07
101	90/101/113	---	---	ND	---	1.56
102	93/98/100/102	---	---	ND	---	2.07
103		---	---	ND	---	0.519
104		---	---	ND	---	0.519
105		---	---	ND	---	0.519
106		---	---	ND	---	0.519
107	107/124	---	---	ND	---	1.04
108	86/87/97/108/119/125	---	---	ND	---	3.11
109		---	---	ND	---	0.519
110	110/115	---	---	ND	---	1.04
111		---	---	ND	---	0.519
112		---	---	ND	---	0.519
113	90/101/113	---	---	ND	---	1.56
114		---	---	ND	---	0.519
115	110/115	---	---	ND	---	1.04
116	85/116/117	---	---	ND	---	1.56
117	85/116/117	---	---	ND	---	1.56
118		---	---	ND	---	0.664
119	86/87/97/108/119/125	---	---	ND	---	3.11
120		---	---	ND	---	0.519
121		---	---	ND	---	0.519
122		---	---	ND	---	0.519
123		---	---	ND	---	0.519
124	107/124	---	---	ND	---	1.04
125	86/87/97/108/119/125	---	---	ND	---	3.11
126		---	---	ND	---	0.519
127		---	---	ND	---	0.519
128	128/166	---	---	ND	---	1.04
129	129/138/163	---	---	ND	---	1.56
130		---	---	ND	---	0.519
131		---	---	ND	---	0.519
132		---	---	ND	---	0.519
133		---	---	ND	---	0.519
134	134/143	---	---	ND	---	1.04
135	135/151	---	---	ND	---	1.04
136		---	---	ND	---	0.519
137		---	---	ND	---	0.519
138	129/138/163	---	---	ND	---	1.56
139	139/140	---	---	ND	---	1.04
140	139/140	---	---	ND	---	1.04
141		---	---	ND	---	0.519
142		---	---	ND	---	0.519
143	134/143	---	---	ND	---	1.04
144		---	---	ND	---	0.519

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-003  
Lab Sample ID 10366755003  
Filename P161029B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.519
146		---	---	ND	---	0.519
147	147/149	---	---	ND	---	1.04
148		---	---	ND	---	0.519
149	147/149	---	---	ND	---	1.04
150		---	---	ND	---	0.519
151	135/151	---	---	ND	---	1.04
152		---	---	ND	---	0.519
153	153/168	---	---	ND	---	1.04
154		---	---	ND	---	0.519
155		---	---	ND	---	0.519
156	156/157	---	---	ND	---	1.04
157	156/157	---	---	ND	---	1.04
158		---	---	ND	---	0.519
159		---	---	ND	---	0.519
160		---	---	ND	---	0.519
161		---	---	ND	---	0.519
162		---	---	ND	---	0.519
163	129/138/163	---	---	ND	---	1.56
164		---	---	ND	---	0.519
165		---	---	ND	---	0.519
166	128/166	---	---	ND	---	1.04
167		---	---	ND	---	0.519
168	153/168	---	---	ND	---	1.04
169		---	---	ND	---	0.519
170		---	---	ND	---	0.519
171	171/173	---	---	ND	---	1.04
172		---	---	ND	---	0.519
173	171/173	---	---	ND	---	1.04
174		---	---	ND	---	0.519
175		---	---	ND	---	0.519
176		---	---	ND	---	0.519
177		---	---	ND	---	0.519
178		---	---	ND	---	0.519
179		---	---	ND	---	0.519
180	180/193	---	---	ND	---	1.04
181		---	---	ND	---	0.519
182		---	---	ND	---	0.519
183	183/185	---	---	ND	---	1.04
184		---	---	ND	---	0.519
185	183/185	---	---	ND	---	1.04
186		---	---	ND	---	0.519
187		---	---	ND	---	0.519
188		---	---	ND	---	0.519
189		---	---	ND	---	0.519
190		---	---	ND	---	0.519
191		---	---	ND	---	0.519
192		---	---	ND	---	0.519

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
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I = Interference  
ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1612528-003  
 Lab Sample ID        10366755003  
 Filename                P161029B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.04
194		---	---	ND	---	0.778
195		---	---	ND	---	0.778
196		---	---	ND	---	0.778
197	197/200	---	---	ND	---	1.56
198	198/199	---	---	ND	---	1.56
199	198/199	---	---	ND	---	1.56
200	197/200	---	---	ND	---	1.56
201		---	---	ND	---	0.778
202		---	---	ND	---	0.778
203		---	---	ND	---	0.778
204		---	---	ND	---	0.778
205		---	---	ND	---	0.778
206		---	---	ND	---	0.778
207		---	---	ND	---	0.778
208		---	---	ND	---	0.778
209		---	---	ND	---	0.778

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-003  
Lab Sample ID             10366755003  
Filename                    P161029B\_10

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1612528-004		
Lab Sample ID	10366755004		
Filename	P161029B_11		
Injected By	BAL		
Total Amount Extracted	995 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/13/2016 10:46
ICAL ID	P161029B02	Received	10/19/2016 09:30
CCal Filename(s)	P161029B_01	Extracted	10/25/2016 14:00
Method Blank ID	BLANK-52509	Analyzed	10/30/2016 08:31

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.849	3.41	2.0	0.669	33
13C-4-MoCB	3	11.472	3.05	2.0	0.704	35
13C-2,2'-DiCB	4	11.712	1.60	2.0	0.515	26
13C-4,4'-DiCB	15	18.551	1.54	2.0	0.871	44
13C-2,2',6-TrCB	19	15.388	1.02	2.0	0.642	32
13C-3,4,4'-TrCB	37	26.180	0.97	2.0	1.16	58
13C-2,2',6,6'-TeCB	54	18.803	0.73	2.0	0.706	35
13C-3,4,4',5'-TeCB	81	33.261	0.81	2.0	1.24	62
13C-3,3',4,4'-TeCB	77	33.864	0.82	2.0	1.25	63
13C-2,2',4,6,6'-PeCB	104	24.772	1.59	2.0	0.746	37
13C-2,3,3',4,4'-PeCB	105	37.441	1.55	2.0	1.14	57
13C-2,3,4,4',5'-PeCB	114	36.753	1.60	2.0	1.18	59
13C-2,3',4,4',5'-PeCB	118	36.200	1.54	2.0	1.21	60
13C-2,3',4,4',5'-PeCB	123	35.865	1.64	2.0	1.22	61
13C-3,3',4,4',5'-PeCB	126	40.660	1.58	2.0	1.05	52
13C-2,2',4,4',6,6'-HxCB	155	30.729	1.33	2.0	0.862	43
13C-HxCB (156/157)	156/157	43.717	1.28	4.0	1.90	48
13C-2,3',4,4',5,5'-HxCB	167	42.493	1.32	2.0	1.03	52
13C-3,3',4,4',5,5'-HxCB	169	47.137	1.30	2.0	0.764	38
13C-2,2',3,4',5,6,6'-HpCB	188	36.636	1.02	2.0	1.38	69
13C-2,3,3',4,4',5,5'-HpCB	189	49.690	1.12	2.0	1.07	54
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.174	0.92	2.0	1.38	69
13C-2,3,3',4,4',5,5',6-OxCB	205	52.384	0.88	2.0	0.938	47
13C-2,2',3,3',4,4',5,5',6-NoCB	206	54.195	0.82	2.0	0.874	44
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	49.087	0.80	2.0	1.19	60
13C--DeCB	209	55.746	0.75	2.0	0.961	48
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.838	1.00	2.0	1.64	82
13C-2,3,3',5,5'-PeCB	111	33.814	1.52	2.0	1.36	68
13C-2,2',3,3',5,5',6-HpCB	178	39.822	1.03	2.0	1.32	66
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.058	1.60	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.783	0.77	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.997	1.60	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.386	1.27	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.867	0.88	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
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ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-004  
Lab Sample ID 10366755004  
Filename P161029B\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.251
2		---	---	ND	---	0.251
3		---	---	ND	---	0.251
4		11.736	1.35	0.341	---	0.251
5		---	---	ND	---	0.251
6		---	---	ND	---	0.251
7		---	---	ND	---	0.251
8		15.064	1.57	0.587	---	0.251
9		---	---	ND	---	0.251
10		---	---	ND	---	0.251
11		---	---	ND	---	2.46
12	12/13	---	---	ND	---	0.502
13	12/13	---	---	ND	---	0.502
14		---	---	ND	---	0.251
15		18.575	1.59	1.26	---	0.332
16		18.455	0.94	0.675	---	0.251
17		17.940	1.03	0.669	---	0.251
18	18/30	17.485	1.04	1.38	---	0.502
19		15.412	1.10	0.333	---	0.251
20	20/28	21.871	1.06	4.04	---	1.30
21	21/33	22.106	1.00	1.42	---	1.36
22		22.542	1.01	1.34	---	0.955
23		---	---	ND	---	0.251
24		---	---	ND	---	0.251
25		---	---	ND	---	0.251
26	26/29	---	---	ND	---	0.502
27		---	---	ND	---	0.251
28	20/28	21.871	1.06	(4.04)	---	1.30
29	26/29	---	---	ND	---	0.502
30	18/30	17.485	1.04	(1.38)	---	0.502
31		21.536	1.04	2.52	---	1.31
32		19.038	1.01	0.872	---	0.251
33	21/33	22.106	1.00	(1.42)	---	1.36
34		---	---	ND	---	0.251
35		---	---	ND	---	0.251
36		---	---	ND	---	0.251
37		26.214	1.14	1.91	---	0.533
38		---	---	ND	---	0.251
39		---	---	ND	---	0.251
40	40/41/71	25.945	0.78	3.75	---	1.51
41	40/41/71	25.945	0.78	(3.75)	---	1.51
42		25.426	0.90 I	---	1.84	0.502
43	43/73	---	---	ND	---	0.502
44	44/47/65	24.856	0.78	7.44	---	1.51
45	45/51	21.921	0.80	1.18	---	1.00
46		---	---	ND	---	0.502
47	44/47/65	24.856	0.78	(7.44)	---	1.51
48		24.638	0.75	0.831	---	0.502

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-004  
Lab Sample ID 10366755004  
Filename P161029B\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	24.319	0.76	4.06	---	1.00
50	50/53	---	---	ND	---	1.00
51	45/51	21.921	0.80	(1.18)	---	1.00
52		23.799	0.77	11.1	---	1.55
53	50/53	---	---	ND	---	1.00
54		---	---	ND	---	0.502
55		---	---	ND	---	0.502
56		29.941	0.79	2.99	---	0.502
57		---	---	ND	---	0.502
58		---	---	ND	---	0.502
59	59/62/75	---	---	ND	---	1.51
60		30.192	0.76	1.11	---	0.502
61	61/70/74/76	28.885	0.76	10.8	---	2.01
62	59/62/75	---	---	ND	---	1.51
63		---	---	ND	---	0.502
64		26.197	0.77	3.49	---	0.502
65	44/47/65	24.856	0.78	(7.44)	---	1.51
66		29.253	0.76	6.12	---	0.844
67		---	---	ND	---	0.502
68		---	---	ND	---	0.502
69	49/69	24.319	0.76	(4.06)	---	1.00
70	61/70/74/76	28.885	0.76	(10.8)	---	2.01
71	40/41/71	25.945	0.78	(3.75)	---	1.51
72		---	---	ND	---	0.502
73	43/73	---	---	ND	---	0.502
74	61/70/74/76	28.885	0.76	(10.8)	---	2.01
75	59/62/75	---	---	ND	---	1.51
76	61/70/74/76	28.885	0.76	(10.8)	---	2.01
77		33.881	0.78	1.04	---	0.502
78		---	---	ND	---	0.502
79		---	---	ND	---	0.502
80		---	---	ND	---	0.502
81		---	---	ND	---	0.502
82		33.428	1.57	3.17	---	0.502
83		31.517	1.56	1.74	---	0.502
84		29.086	1.55	6.45	---	0.502
85	85/116/117	32.925	1.59	4.63	---	1.51
86	86/87/97/108/119/125	32.271	1.56	17.2	---	3.01
87	86/87/97/108/119/125	32.271	1.56	(17.2)	---	3.01
88	88/91	28.868	1.51	3.17	---	1.00
89		---	---	ND	---	0.502
90	90/101/113	31.031	1.59	25.8	---	1.51
91	88/91	28.868	1.51	(3.17)	---	1.00
92		30.427	1.57	5.23	---	0.502
93	93/98/100/102	---	---	ND	---	2.01
94		---	---	ND	---	0.502
95		27.946	1.59	20.1	---	0.955
96		---	---	ND	---	0.502

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-004  
Lab Sample ID 10366755004  
Filename P161029B\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	32.271	1.56	(17.2)	---	3.01
98	93/98/100/102	---	---	ND	---	2.01
99		31.634	1.65	10.5	---	0.502
100	93/98/100/102	---	---	ND	---	2.01
101	90/101/113	31.031	1.59	(25.8)	---	1.51
102	93/98/100/102	---	---	ND	---	2.01
103		---	---	ND	---	0.502
104		---	---	ND	---	0.502
105		37.458	1.60	9.71	---	0.502
106		---	---	ND	---	0.502
107	107/124	35.496	1.54	1.03	---	1.00
108	86/87/97/108/119/125	32.271	1.56	(17.2)	---	3.01
109		35.747	1.53	1.71	---	0.502
110	110/115	33.093	1.59	41.2	---	1.00
111		---	---	ND	---	0.502
112		---	---	ND	---	0.502
113	90/101/113	31.031	1.59	(25.8)	---	1.51
114		---	---	ND	---	0.502
115	110/115	33.093	1.59	(41.2)	---	1.00
116	85/116/117	32.925	1.59	(4.63)	---	1.51
117	85/116/117	32.925	1.59	(4.63)	---	1.51
118		36.217	1.56	24.9	---	0.643
119	86/87/97/108/119/125	32.271	1.56	(17.2)	---	3.01
120		---	---	ND	---	0.502
121		---	---	ND	---	0.502
122		---	---	ND	---	0.502
123		35.865	1.53	0.546	---	0.502
124	107/124	35.496	1.54	(1.03)	---	1.00
125	86/87/97/108/119/125	32.271	1.56	(17.2)	---	3.01
126		---	---	ND	---	0.502
127		---	---	ND	---	0.502
128	128/166	40.727	1.26	8.02	---	1.00
129	129/138/163	39.419	1.26	52.1	---	1.51
130		38.749	1.43	2.77	---	0.502
131		35.814	1.14	0.601	---	0.502
132		36.300	1.24	16.7	---	0.502
133		36.804	1.28	0.508	---	0.502
134	134/143	35.194	1.24	2.45	---	1.00
135	135/151	34.032	1.26	13.0	---	1.00
136		31.517	1.29	4.79	---	0.502
137		38.966	1.46	---	1.84	0.502
138	129/138/163	39.419	1.26	(52.1)	---	1.51
139	139/140	---	---	ND	---	1.00
140	139/140	---	---	ND	---	1.00
141		38.313	1.28	8.55	---	0.502
142		---	---	ND	---	0.502
143	134/143	35.194	1.24	(2.45)	---	1.00
144		34.619	1.24	1.77	---	0.502

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-004  
Lab Sample ID 10366755004  
Filename P161029B\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.502
146		37.458	1.27	5.92	---	0.502
147	147/149	34.976	1.24	34.5	---	1.00
148		---	---	ND	---	0.502
149	147/149	34.976	1.24	(34.5)	---	1.00
150		---	---	ND	---	0.502
151	135/151	34.032	1.26	(13.0)	---	1.00
152		---	---	ND	---	0.502
153	153/168	38.111	1.26	35.5	---	1.00
154		---	---	ND	---	0.502
155		---	---	ND	---	0.502
156	156/157	43.733	1.28	4.84	---	1.00
157	156/157	43.733	1.28	(4.84)	---	1.00
158		39.822	1.32	4.89	---	0.502
159		---	---	ND	---	0.502
160		---	---	ND	---	0.502
161		---	---	ND	---	0.502
162		---	---	ND	---	0.502
163	129/138/163	39.419	1.26	(52.1)	---	1.51
164		39.101	1.37	3.09	---	0.502
165		---	---	ND	---	0.502
166	128/166	40.727	1.26	(8.02)	---	1.00
167		42.543	1.23	1.86	---	0.502
168	153/168	38.111	1.26	(35.5)	---	1.00
169		---	---	ND	---	0.502
170		46.450	1.05	11.0	---	0.502
171	171/173	42.778	1.09	3.47	---	1.00
172		---	---	ND	---	0.502
173	171/173	42.778	1.09	(3.47)	---	1.00
174		41.654	1.05	11.7	---	0.502
175		40.492	1.14	0.513	---	0.502
176		37.944	1.07	1.40	---	0.502
177		42.124	1.05	6.61	---	0.502
178		39.838	1.07	2.26	---	0.502
179		37.038	1.05	4.44	---	0.502
180	180/193	45.125	1.03	25.6	---	1.00
181		---	---	ND	---	0.502
182		---	---	ND	---	0.502
183	183/185	41.403	1.05	8.17	---	1.00
184		---	---	ND	---	0.502
185	183/185	41.403	1.05	(8.17)	---	1.00
186		---	---	ND	---	0.502
187		40.777	1.08	13.8	---	0.502
188		---	---	ND	---	0.502
189		---	---	ND	---	0.502
190		47.020	1.19	1.84	---	0.502
191		---	---	ND	---	0.502
192		---	---	ND	---	0.502

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1612528-004  
 Lab Sample ID        10366755004  
 Filename                P161029B\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	45.125	1.03	(25.6)	---	1.00
194		51.889	0.86	6.72	---	0.754
195		49.432	0.89	2.38	---	0.754
196		47.808	0.94	3.54	---	0.754
197	197/200	---	---	ND	---	1.51
198	198/199	47.137	0.91	8.29	---	1.51
199	198/199	47.137	0.91	(8.29)	---	1.51
200	197/200	---	---	ND	---	1.51
201		43.146	0.90	1.02	---	0.754
202		42.208	0.92	1.68	---	0.754
203		48.026	0.95	5.05	---	0.754
204		---	---	ND	---	0.754
205		---	---	ND	---	0.754
206		54.195	0.82	3.90	---	0.754
207		---	---	ND	---	0.754
208		49.109	0.79	0.916	---	0.754
209		---	---	ND	---	0.754

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-004  
Lab Sample ID             10366755004  
Filename                    P161029B\_11

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	2.19
Total Trichloro Biphenyls	15.2
Total Tetrachloro Biphenyls	53.9
Total Pentachloro Biphenyls	177
Total Hexachloro Biphenyls	202
Total Heptachloro Biphenyls	90.8
Total Octachloro Biphenyls	28.7
Total Nonachloro Biphenyls	4.82
Decachloro Biphenyls	ND
Total PCBs	574

ND = Not Detected

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1612528-005		
Lab Sample ID	10366755005		
Filename	P161029B_12		
Injected By	BAL		
Total Amount Extracted	998 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/13/2016 11:05
ICAL ID	P161029B02	Received	10/19/2016 09:30
CCal Filename(s)	P161029B_01	Extracted	10/25/2016 14:00
Method Blank ID	BLANK-52509	Analyzed	10/30/2016 09:30

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.861	2.82	2.0	0.841	42
13C-4-MoCB	3	11.508	3.02	2.0	0.779	39
13C-2,2'-DiCB	4	11.748	1.58	2.0	0.611	31
13C-4,4'-DiCB	15	18.598	1.57	2.0	1.07	53
13C-2,2',6-TrCB	19	15.436	1.03	2.0	0.842	42
13C-3,4,4'-TrCB	37	26.213	1.12	2.0	1.56	78
13C-2,2',6,6'-TeCB	54	18.836	0.85	2.0	0.987	49
13C-3,4,4',5'-TeCB	81	33.243	0.82	2.0	1.59	80
13C-3,3',4,4'-TeCB	77	33.830	0.81	2.0	1.53	76
13C-2,2',4,6,6'-PeCB	104	24.788	1.61	2.0	0.962	48
13C-2,3,3',4,4'-PeCB	105	37.390	1.57	2.0	1.46	73
13C-2,3,4,4',5'-PeCB	114	36.736	1.54	2.0	1.47	74
13C-2,3',4,4',5'-PeCB	118	36.183	1.65	2.0	1.52	76
13C-2,3',4,4',5'-PeCB	123	35.831	1.54	2.0	1.56	78
13C-3,3',4,4',5'-PeCB	126	40.592	1.61	2.0	1.30	65
13C-2,2',4,4',6,6'-HxCB	155	30.745	1.29	2.0	1.09	54
13C-HxCB (156/157)	156/157	43.598	1.26	4.0	2.41	60
13C-2,3',4,4',5,5'-HxCB	167	42.408	1.22	2.0	1.30	65
13C-3,3',4,4',5,5'-HxCB	169	46.952	1.27	2.0	0.994	50
13C-2,2',3,4',5,6,6'-HpCB	188	36.619	1.01	2.0	1.48	74
13C-2,3,3',4,4',5,5'-HpCB	189	49.431	1.10	2.0	1.26	63
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.090	0.91	2.0	1.67	84
13C-2,3,3',4,4',5,5',6-OxCB	205	51.996	0.91	2.0	1.19	59
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.720	0.76	2.0	1.08	54
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.849	0.83	2.0	1.45	73
13C--DeCB	209	55.293	0.73	2.0	1.26	63
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.871	1.03	2.0	1.79	90
13C-2,3,3',5,5'-PeCB	111	33.797	1.60	2.0	1.56	78
13C-2,2',3,3',5,5',6-HpCB	178	39.737	1.04	2.0	1.53	77
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.082	1.58	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.799	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.014	1.52	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.335	1.30	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.521	0.87	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-005  
Lab Sample ID 10366755005  
Filename P161029B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.251
2		---	---	ND	---	0.251
3		---	---	ND	---	0.251
4		---	---	ND	---	0.251
5		---	---	ND	---	0.251
6		---	---	ND	---	0.251
7		---	---	ND	---	0.251
8		15.088	1.52	0.259	---	0.251
9		---	---	ND	---	0.251
10		---	---	ND	---	0.251
11		---	---	ND	---	2.46
12	12/13	---	---	ND	---	0.501
13	12/13	---	---	ND	---	0.501
14		---	---	ND	---	0.251
15		18.622	1.48	0.518	---	0.331
16		18.467	0.97	0.310	---	0.251
17		17.976	0.97	0.268	---	0.251
18	18/30	17.532	1.11	0.550	---	0.501
19		---	---	ND	---	0.251
20	20/28	21.904	0.98	1.67	---	1.29
21	21/33	---	---	ND	---	1.35
22		---	---	ND	---	0.952
23		---	---	ND	---	0.251
24		---	---	ND	---	0.251
25		---	---	ND	---	0.251
26	26/29	---	---	ND	---	0.501
27		---	---	ND	---	0.251
28	20/28	21.904	0.98	(1.67)	---	1.29
29	26/29	---	---	ND	---	0.501
30	18/30	17.532	1.11	(0.550)	---	0.501
31		---	---	ND	---	1.30
32		19.071	1.03	0.346	---	0.251
33	21/33	---	---	ND	---	1.35
34		---	---	ND	---	0.251
35		---	---	ND	---	0.251
36		---	---	ND	---	0.251
37		26.230	1.05	0.849	---	0.531
38		---	---	ND	---	0.251
39		---	---	ND	---	0.251
40	40/41/71	25.962	0.76	1.62	---	1.50
41	40/41/71	25.962	0.76	(1.62)	---	1.50
42		25.459	0.75	0.817	---	0.501
43	43/73	---	---	ND	---	0.501
44	44/47/65	24.872	0.77	3.14	---	1.50
45	45/51	---	---	ND	---	1.00
46		---	---	ND	---	0.501
47	44/47/65	24.872	0.77	(3.14)	---	1.50
48		---	---	ND	---	0.501

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-005  
Lab Sample ID 10366755005  
Filename P161029B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	24.352	0.75	1.61	---	1.00
50	50/53	---	---	ND	---	1.00
51	45/51	---	---	ND	---	1.00
52		23.833	0.78	4.33	---	1.54
53	50/53	---	---	ND	---	1.00
54		---	---	ND	---	0.501
55		---	---	ND	---	0.501
56		29.957	0.74	1.18	---	0.501
57		---	---	ND	---	0.501
58		---	---	ND	---	0.501
59	59/62/75	---	---	ND	---	1.50
60		---	---	ND	---	0.501
61	61/70/74/76	28.901	0.79	4.27	---	2.00
62	59/62/75	---	---	ND	---	1.50
63		---	---	ND	---	0.501
64		26.230	0.80	1.49	---	0.501
65	44/47/65	24.872	0.77	(3.14)	---	1.50
66		29.253	0.79	2.59	---	0.842
67		---	---	ND	---	0.501
68		---	---	ND	---	0.501
69	49/69	24.352	0.75	(1.61)	---	1.00
70	61/70/74/76	28.901	0.79	(4.27)	---	2.00
71	40/41/71	25.962	0.76	(1.62)	---	1.50
72		---	---	ND	---	0.501
73	43/73	---	---	ND	---	0.501
74	61/70/74/76	28.901	0.79	(4.27)	---	2.00
75	59/62/75	---	---	ND	---	1.50
76	61/70/74/76	28.901	0.79	(4.27)	---	2.00
77		---	---	ND	---	0.501
78		---	---	ND	---	0.501
79		---	---	ND	---	0.501
80		---	---	ND	---	0.501
81		---	---	ND	---	0.501
82		33.411	1.64	1.34	---	0.501
83		31.517	1.53	0.603	---	0.501
84		29.102	1.55	2.62	---	0.501
85	85/116/117	32.925	1.45	1.83	---	1.50
86	86/87/97/108/119/125	32.271	1.62	7.02	---	3.01
87	86/87/97/108/119/125	32.271	1.62	(7.02)	---	3.01
88	88/91	28.884	1.43	1.29	---	1.00
89		---	---	ND	---	0.501
90	90/101/113	31.030	1.58	10.3	---	1.50
91	88/91	28.884	1.43	(1.29)	---	1.00
92		30.427	1.65	2.10	---	0.501
93	93/98/100/102	---	---	ND	---	2.00
94		---	---	ND	---	0.501
95		27.962	1.58	8.04	---	0.952
96		---	---	ND	---	0.501

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-005  
Lab Sample ID 10366755005  
Filename P161029B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	32.271	1.62	(7.02)	---	3.01
98	93/98/100/102	---	---	ND	---	2.00
99		31.651	1.58	4.36	---	0.501
100	93/98/100/102	---	---	ND	---	2.00
101	90/101/113	31.030	1.58	(10.3)	---	1.50
102	93/98/100/102	---	---	ND	---	2.00
103		---	---	ND	---	0.501
104		---	---	ND	---	0.501
105		37.424	1.54	3.91	---	0.501
106		---	---	ND	---	0.501
107	107/124	---	---	ND	---	1.00
108	86/87/97/108/119/125	32.271	1.62	(7.02)	---	3.01
109		35.747	1.51	0.675	---	0.501
110	110/115	33.093	1.60	17.4	---	1.00
111		---	---	ND	---	0.501
112		---	---	ND	---	0.501
113	90/101/113	31.030	1.58	(10.3)	---	1.50
114		---	---	ND	---	0.501
115	110/115	33.093	1.60	(17.4)	---	1.00
116	85/116/117	32.925	1.45	(1.83)	---	1.50
117	85/116/117	32.925	1.45	(1.83)	---	1.50
118		36.200	1.58	10.1	---	0.641
119	86/87/97/108/119/125	32.271	1.62	(7.02)	---	3.01
120		---	---	ND	---	0.501
121		---	---	ND	---	0.501
122		---	---	ND	---	0.501
123		---	---	ND	---	0.501
124	107/124	---	---	ND	---	1.00
125	86/87/97/108/119/125	32.271	1.62	(7.02)	---	3.01
126		---	---	ND	---	0.501
127		---	---	ND	---	0.501
128	128/166	40.659	1.21	3.27	---	1.00
129	129/138/163	39.368	1.25	21.0	---	1.50
130		38.698	1.23	1.18	---	0.501
131		---	---	ND	---	0.501
132		36.267	1.27	6.60	---	0.501
133		---	---	ND	---	0.501
134	134/143	---	---	ND	---	1.00
135	135/151	34.015	1.32	5.16	---	1.00
136		31.517	1.24	1.86	---	0.501
137		38.916	1.24	0.823	---	0.501
138	129/138/163	39.368	1.25	(21.0)	---	1.50
139	139/140	---	---	ND	---	1.00
140	139/140	---	---	ND	---	1.00
141		38.278	1.20	3.31	---	0.501
142		---	---	ND	---	0.501
143	134/143	---	---	ND	---	1.00
144		34.602	1.29	0.698	---	0.501

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-005  
Lab Sample ID 10366755005  
Filename P161029B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.501
146		37.440	1.21	2.35	---	0.501
147	147/149	34.976	1.28	13.5	---	1.00
148		---	---	ND	---	0.501
149	147/149	34.976	1.28	(13.5)	---	1.00
150		---	---	ND	---	0.501
151	135/151	34.015	1.32	(5.16)	---	1.00
152		---	---	ND	---	0.501
153	153/168	38.077	1.24	13.9	---	1.00
154		---	---	ND	---	0.501
155		---	---	ND	---	0.501
156	156/157	43.615	1.30	2.01	---	1.00
157	156/157	43.615	1.30	(2.01)	---	1.00
158		39.771	1.24	1.88	---	0.501
159		---	---	ND	---	0.501
160		---	---	ND	---	0.501
161		---	---	ND	---	0.501
162		---	---	ND	---	0.501
163	129/138/163	39.368	1.25	(21.0)	---	1.50
164		39.033	1.23	1.25	---	0.501
165		---	---	ND	---	0.501
166	128/166	40.659	1.21	(3.27)	---	1.00
167		42.425	1.18	0.799	---	0.501
168	153/168	38.077	1.24	(13.9)	---	1.00
169		---	---	ND	---	0.501
170		46.264	1.04	4.51	---	0.501
171	171/173	42.693	1.03	1.47	---	1.00
172		44.319	1.06	0.785	---	0.501
173	171/173	42.693	1.03	(1.47)	---	1.00
174		41.570	0.99	4.78	---	0.501
175		---	---	ND	---	0.501
176		37.910	1.10	0.565	---	0.501
177		42.022	1.03	2.59	---	0.501
178		39.787	1.03	0.922	---	0.501
179		37.004	1.02	1.85	---	0.501
180	180/193	44.973	1.03	10.5	---	1.00
181		---	---	ND	---	0.501
182		---	---	ND	---	0.501
183	183/185	41.335	1.04	3.25	---	1.00
184		---	---	ND	---	0.501
185	183/185	41.335	1.04	(3.25)	---	1.00
186		---	---	ND	---	0.501
187		40.709	1.06	5.72	---	0.501
188		---	---	ND	---	0.501
189		---	---	ND	---	0.501
190		46.834	0.98	0.752	---	0.501
191		---	---	ND	---	0.501
192		---	---	ND	---	0.501

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-005  
 Lab Sample ID 10366755005  
 Filename P161029B\_12

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	44.973	1.03	(10.5)	---	1.00
194		51.521	0.93	2.72	---	0.752
195		49.172	0.90	0.889	---	0.752
196		47.623	0.93	1.35	---	0.752
197	197/200	---	---	ND	---	1.50
198	198/199	46.935	0.87	3.22	---	1.50
199	198/199	46.935	0.87	(3.22)	---	1.50
200	197/200	---	---	ND	---	1.50
201		---	---	ND	---	0.752
202		---	---	ND	---	0.752
203		47.807	0.97	1.98	---	0.752
204		---	---	ND	---	0.752
205		---	---	ND	---	0.752
206		53.741	0.80	1.67	---	0.752
207		---	---	ND	---	0.752
208		---	---	ND	---	0.752
209		---	---	ND	---	0.752

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-005  
Lab Sample ID             10366755005  
Filename                    P161029B\_12

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	0.776
Total Trichloro Biphenyls	3.99
Total Tetrachloro Biphenyls	21.0
Total Pentachloro Biphenyls	71.6
Total Hexachloro Biphenyls	79.6
Total Heptachloro Biphenyls	37.7
Total Octachloro Biphenyls	10.2
Total Nonachloro Biphenyls	1.67
Decachloro Biphenyls	ND
Total PCBs	227

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1612528-006		
Lab Sample ID	10366755006		
Filename	P161029B_13		
Injected By	BAL		
Total Amount Extracted	968 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/13/2016 11:25
ICAL ID	P161029B02	Received	10/19/2016 09:30
CCal Filename(s)	P161029B_01	Extracted	10/25/2016 14:00
Method Blank ID	BLANK-52509	Analyzed	10/30/2016 10:29

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.873	2.86	2.0	1.05	52
13C-4-MoCB	3	11.508	3.10	2.0	0.997	50
13C-2,2'-DiCB	4	11.760	1.59	2.0	0.730	37
13C-4,4'-DiCB	15	18.586	1.61	2.0	1.24	62
13C-2,2',6-TrCB	19	15.424	1.12	2.0	0.951	48
13C-3,4,4'-TrCB	37	26.197	1.10	2.0	1.73	87
13C-2,2',6,6'-TeCB	54	18.819	0.85	2.0	1.16	58
13C-3,4,4',5'-TeCB	81	33.244	0.77	2.0	1.95	98
13C-3,3',4,4'-TeCB	77	33.831	0.77	2.0	1.89	94
13C-2,2',4,6,6'-PeCB	104	24.788	1.55	2.0	1.10	55
13C-2,3,3',4,4'-PeCB	105	37.375	1.58	2.0	1.71	85
13C-2,3,4,4',5'-PeCB	114	36.721	1.66	2.0	1.81	90
13C-2,3',4,4',5'-PeCB	118	36.151	1.55	2.0	1.79	89
13C-2,3',4,4',5'-PeCB	123	35.815	1.59	2.0	1.80	90
13C-3,3',4,4',5'-PeCB	126	40.577	1.60	2.0	1.59	80
13C-2,2',4,4',6,6'-HxCB	155	30.729	1.23	2.0	1.35	68
13C-HxCB (156/157)	156/157	43.584	1.27	4.0	3.03	76
13C-2,3',4,4',5,5'-HxCB	167	42.393	1.30	2.0	1.66	83
13C-3,3',4,4',5,5'-HxCB	169	46.904	1.28	2.0	1.24	62
13C-2,2',3,4',5,6,6'-HpCB	188	36.603	1.04	2.0	1.92	96
13C-2,3,3',4,4',5,5'-HpCB	189	49.412	1.05	2.0	1.60	80
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.058	0.89	2.0	2.09	105
13C-2,3,3',4,4',5,5',6-OxCB	205	51.955	0.95	2.0	1.52	76
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.679	0.79	2.0	1.41	70
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.808	0.77	2.0	1.82	91
13C--DeCB	209	55.252	0.70	2.0	1.62	81
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.871	1.12	2.0	1.73	87
13C-2,3,3',5,5'-PeCB	111	33.781	1.62	2.0	1.57	78
13C-2,2',3,3',5,5',6-HpCB	178	39.739	1.02	2.0	1.56	78
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.082	1.56	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.799	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	30.998	1.62	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.303	1.23	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.481	0.93	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-006  
Lab Sample ID 10366755006  
Filename P161029B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.258
2		---	---	ND	---	0.258
3		---	---	ND	---	0.258
4		---	---	ND	---	0.258
5		---	---	ND	---	0.258
6		---	---	ND	---	0.258
7		---	---	ND	---	0.258
8		---	---	ND	---	0.258
9		---	---	ND	---	0.258
10		---	---	ND	---	0.258
11		---	---	ND	---	2.53
12	12/13	---	---	ND	---	0.517
13	12/13	---	---	ND	---	0.517
14		---	---	ND	---	0.258
15		---	---	ND	---	0.341
16		---	---	ND	---	0.258
17		---	---	ND	---	0.258
18	18/30	---	---	ND	---	0.517
19		---	---	ND	---	0.258
20	20/28	---	---	ND	---	1.33
21	21/33	---	---	ND	---	1.39
22		---	---	ND	---	0.982
23		---	---	ND	---	0.258
24		---	---	ND	---	0.258
25		---	---	ND	---	0.258
26	26/29	---	---	ND	---	0.517
27		---	---	ND	---	0.258
28	20/28	---	---	ND	---	1.33
29	26/29	---	---	ND	---	0.517
30	18/30	---	---	ND	---	0.517
31		---	---	ND	---	1.34
32		---	---	ND	---	0.258
33	21/33	---	---	ND	---	1.39
34		---	---	ND	---	0.258
35		---	---	ND	---	0.258
36		---	---	ND	---	0.258
37		---	---	ND	---	0.548
38		---	---	ND	---	0.258
39		---	---	ND	---	0.258
40	40/41/71	---	---	ND	---	1.55
41	40/41/71	---	---	ND	---	1.55
42		---	---	ND	---	0.517
43	43/73	---	---	ND	---	0.517
44	44/47/65	---	---	ND	---	1.55
45	45/51	---	---	ND	---	1.03
46		---	---	ND	---	0.517
47	44/47/65	---	---	ND	---	1.55
48		---	---	ND	---	0.517

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-006  
Lab Sample ID             10366755006  
Filename                    P161029B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.03
50	50/53	---	---	ND	---	1.03
51	45/51	---	---	ND	---	1.03
52		---	---	ND	---	1.59
53	50/53	---	---	ND	---	1.03
54		---	---	ND	---	0.517
55		---	---	ND	---	0.517
56		---	---	ND	---	0.517
57		---	---	ND	---	0.517
58		---	---	ND	---	0.517
59	59/62/75	---	---	ND	---	1.55
60		---	---	ND	---	0.517
61	61/70/74/76	---	---	ND	---	2.07
62	59/62/75	---	---	ND	---	1.55
63		---	---	ND	---	0.517
64		---	---	ND	---	0.517
65	44/47/65	---	---	ND	---	1.55
66		---	---	ND	---	0.868
67		---	---	ND	---	0.517
68		---	---	ND	---	0.517
69	49/69	---	---	ND	---	1.03
70	61/70/74/76	---	---	ND	---	2.07
71	40/41/71	---	---	ND	---	1.55
72		---	---	ND	---	0.517
73	43/73	---	---	ND	---	0.517
74	61/70/74/76	---	---	ND	---	2.07
75	59/62/75	---	---	ND	---	1.55
76	61/70/74/76	---	---	ND	---	2.07
77		---	---	ND	---	0.517
78		---	---	ND	---	0.517
79		---	---	ND	---	0.517
80		---	---	ND	---	0.517
81		---	---	ND	---	0.517
82		---	---	ND	---	0.517
83		---	---	ND	---	0.517
84		---	---	ND	---	0.517
85	85/116/117	---	---	ND	---	1.55
86	86/87/97/108/119/125	---	---	ND	---	3.10
87	86/87/97/108/119/125	---	---	ND	---	3.10
88	88/91	---	---	ND	---	1.03
89		---	---	ND	---	0.517
90	90/101/113	---	---	ND	---	1.55
91	88/91	---	---	ND	---	1.03
92		---	---	ND	---	0.517
93	93/98/100/102	---	---	ND	---	2.07
94		---	---	ND	---	0.517
95		---	---	ND	---	0.982
96		---	---	ND	---	0.517

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-006  
Lab Sample ID 10366755006  
Filename P161029B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.10
98	93/98/100/102	---	---	ND	---	2.07
99		---	---	ND	---	0.517
100	93/98/100/102	---	---	ND	---	2.07
101	90/101/113	---	---	ND	---	1.55
102	93/98/100/102	---	---	ND	---	2.07
103		---	---	ND	---	0.517
104		---	---	ND	---	0.517
105		---	---	ND	---	0.517
106		---	---	ND	---	0.517
107	107/124	---	---	ND	---	1.03
108	86/87/97/108/119/125	---	---	ND	---	3.10
109		---	---	ND	---	0.517
110	110/115	33.077	1.58	1.13	---	1.03
111		---	---	ND	---	0.517
112		---	---	ND	---	0.517
113	90/101/113	---	---	ND	---	1.55
114		---	---	ND	---	0.517
115	110/115	33.077	1.58	(1.13)	---	1.03
116	85/116/117	---	---	ND	---	1.55
117	85/116/117	---	---	ND	---	1.55
118		---	---	ND	---	0.661
119	86/87/97/108/119/125	---	---	ND	---	3.10
120		---	---	ND	---	0.517
121		---	---	ND	---	0.517
122		---	---	ND	---	0.517
123		---	---	ND	---	0.517
124	107/124	---	---	ND	---	1.03
125	86/87/97/108/119/125	---	---	ND	---	3.10
126		---	---	ND	---	0.517
127		---	---	ND	---	0.517
128	128/166	---	---	ND	---	1.03
129	129/138/163	39.336	1.18	1.68	---	1.55
130		---	---	ND	---	0.517
131		---	---	ND	---	0.517
132		36.251	1.21	0.596	---	0.517
133		---	---	ND	---	0.517
134	134/143	---	---	ND	---	1.03
135	135/151	---	---	ND	---	1.03
136		---	---	ND	---	0.517
137		---	---	ND	---	0.517
138	129/138/163	39.336	1.18	(1.68)	---	1.55
139	139/140	---	---	ND	---	1.03
140	139/140	---	---	ND	---	1.03
141		---	---	ND	---	0.517
142		---	---	ND	---	0.517
143	134/143	---	---	ND	---	1.03
144		---	---	ND	---	0.517

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-006  
 Lab Sample ID 10366755006  
 Filename P161029B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.517
146		---	---	ND	---	0.517
147	147/149	---	---	ND	---	1.03
148		---	---	ND	---	0.517
149	147/149	---	---	ND	---	1.03
150		---	---	ND	---	0.517
151	135/151	---	---	ND	---	1.03
152		---	---	ND	---	0.517
153	153/168	---	---	ND	---	1.03
154		---	---	ND	---	0.517
155		---	---	ND	---	0.517
156	156/157	---	---	ND	---	1.03
157	156/157	---	---	ND	---	1.03
158		---	---	ND	---	0.517
159		---	---	ND	---	0.517
160		---	---	ND	---	0.517
161		---	---	ND	---	0.517
162		---	---	ND	---	0.517
163	129/138/163	39.336	1.18	(1.68)	---	1.55
164		---	---	ND	---	0.517
165		---	---	ND	---	0.517
166	128/166	---	---	ND	---	1.03
167		---	---	ND	---	0.517
168	153/168	---	---	ND	---	1.03
169		---	---	ND	---	0.517
170		---	---	ND	---	0.517
171	171/173	---	---	ND	---	1.03
172		---	---	ND	---	0.517
173	171/173	---	---	ND	---	1.03
174		---	---	ND	---	0.517
175		---	---	ND	---	0.517
176		---	---	ND	---	0.517
177		---	---	ND	---	0.517
178		---	---	ND	---	0.517
179		---	---	ND	---	0.517
180	180/193	---	---	ND	---	1.03
181		---	---	ND	---	0.517
182		---	---	ND	---	0.517
183	183/185	---	---	ND	---	1.03
184		---	---	ND	---	0.517
185	183/185	---	---	ND	---	1.03
186		---	---	ND	---	0.517
187		---	---	ND	---	0.517
188		---	---	ND	---	0.517
189		---	---	ND	---	0.517
190		---	---	ND	---	0.517
191		---	---	ND	---	0.517
192		---	---	ND	---	0.517

Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1612528-006  
 Lab Sample ID        10366755006  
 Filename                P161029B\_13

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.03
194		---	---	ND	---	0.775
195		---	---	ND	---	0.775
196		---	---	ND	---	0.775
197	197/200	---	---	ND	---	1.55
198	198/199	---	---	ND	---	1.55
199	198/199	---	---	ND	---	1.55
200	197/200	---	---	ND	---	1.55
201		---	---	ND	---	0.775
202		---	---	ND	---	0.775
203		---	---	ND	---	0.775
204		---	---	ND	---	0.775
205		---	---	ND	---	0.775
206		---	---	ND	---	0.775
207		---	---	ND	---	0.775
208		---	---	ND	---	0.775
209		---	---	ND	---	0.775

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-006  
Lab Sample ID             10366755006  
Filename                    P161029B\_13

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	1.13
Total Hexachloro Biphenyls	2.27
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	3.40

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1612528-007		
Lab Sample ID	10366755007		
Filename	P161030B_07		
Injected By	BAL		
Total Amount Extracted	919 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/13/2016 12:51
ICAL ID	P161030B02	Received	10/19/2016 09:30
CCal Filename(s)	P161030B_01	Extracted	10/25/2016 14:00
Method Blank ID	BLANK-52509	Analyzed	10/31/2016 08:08

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.908	2.74	2.0	0.967	48
13C-4-MoCB	3	11.544	3.24	2.0	0.926	46
13C-2,2'-DiCB	4	11.796	1.55	2.0	0.712	36
13C-4,4'-DiCB	15	18.635	1.61	2.0	0.911	46
13C-2,2',6-TrCB	19	15.436	1.16	2.0	0.915	46
13C-3,4,4'-TrCB	37	26.240	1.07	2.0	1.44	72
13C-2,2',6,6'-TeCB	54	18.879	0.84	2.0	1.05	53
13C-3,4,4',5'-TeCB	81	33.305	0.76	2.0	1.64	82
13C-3,3',4,4'-TeCB	77	33.891	0.78	2.0	1.60	80
13C-2,2',4,6,6'-PeCB	104	24.848	1.66	2.0	1.09	55
13C-2,3,3',4,4'-PeCB	105	37.435	1.61	2.0	1.48	74
13C-2,3,4,4',5'-PeCB	114	36.781	1.59	2.0	1.56	78
13C-2,3',4,4',5'-PeCB	118	36.211	1.65	2.0	1.60	80
13C-2,3',4,4',5'-PeCB	123	35.875	1.63	2.0	1.59	79
13C-3,3',4,4',5'-PeCB	126	40.620	1.57	2.0	1.41	71
13C-2,2',4,4',6,6'-HxCB	155	30.789	1.27	2.0	1.27	64
13C-HxCB (156/157)	156/157	43.644	1.27	4.0	2.64	66
13C-2,3',4,4',5,5'-HxCB	167	42.453	1.25	2.0	1.41	71
13C-3,3',4,4',5,5'-HxCB	169	46.964	1.29	2.0	1.07	54
13C-2,2',3,4',5,6,6'-HpCB	188	36.663	1.09	2.0	1.74	87
13C-2,3,3',4,4',5,5'-HpCB	189	49.448	1.05	2.0	1.43	72
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.118	0.88	2.0	1.91	95
13C-2,3,3',4,4',5,5',6-OxCB	205	52.013	0.83	2.0	1.39	70
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.737	0.76	2.0	1.25	63
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	48.888	0.79	2.0	1.62	81
13C--DeCB	209	55.332	0.71	2.0	1.47	74
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.931	1.05	2.0	1.71	86
13C-2,3,3',5,5'-PeCB	111	33.841	1.57	2.0	1.63	82
13C-2,2',3,3',5,5',6-HpCB	178	39.799	1.06	2.0	1.68	84
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.130	1.58	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.843	0.81	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.041	1.54	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.363	1.23	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.517	0.91	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-007  
 Lab Sample ID 10366755007  
 Filename P161030B\_07

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.272
2		---	---	ND	---	0.272
3		---	---	ND	---	0.272
4		---	---	ND	---	0.272
5		---	---	ND	---	0.272
6		---	---	ND	---	0.272
7		---	---	ND	---	0.272
8		---	---	ND	---	0.272
9		---	---	ND	---	0.272
10		---	---	ND	---	0.272
11		---	---	ND	---	2.67
12	12/13	---	---	ND	---	0.544
13	12/13	---	---	ND	---	0.544
14		---	---	ND	---	0.272
15		---	---	ND	---	0.359
16		---	---	ND	---	0.272
17		---	---	ND	---	0.272
18	18/30	---	---	ND	---	0.544
19		---	---	ND	---	0.272
20	20/28	---	---	ND	---	1.40
21	21/33	---	---	ND	---	1.47
22		---	---	ND	---	1.03
23		---	---	ND	---	0.272
24		---	---	ND	---	0.272
25		---	---	ND	---	0.272
26	26/29	---	---	ND	---	0.544
27		---	---	ND	---	0.272
28	20/28	---	---	ND	---	1.40
29	26/29	---	---	ND	---	0.544
30	18/30	---	---	ND	---	0.544
31		---	---	ND	---	1.41
32		---	---	ND	---	0.272
33	21/33	---	---	ND	---	1.47
34		---	---	ND	---	0.272
35		---	---	ND	---	0.272
36		---	---	ND	---	0.272
37		---	---	ND	---	0.577
38		---	---	ND	---	0.272
39		---	---	ND	---	0.272
40	40/41/71	---	---	ND	---	1.63
41	40/41/71	---	---	ND	---	1.63
42		---	---	ND	---	0.544
43	43/73	---	---	ND	---	0.544
44	44/47/65	---	---	ND	---	1.63
45	45/51	---	---	ND	---	1.09
46		---	---	ND	---	0.544
47	44/47/65	---	---	ND	---	1.63
48		---	---	ND	---	0.544

Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-007  
Lab Sample ID 10366755007  
Filename P161030B\_07

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.09
50	50/53	---	---	ND	---	1.09
51	45/51	---	---	ND	---	1.09
52		---	---	ND	---	1.68
53	50/53	---	---	ND	---	1.09
54		---	---	ND	---	0.544
55		---	---	ND	---	0.544
56		---	---	ND	---	0.544
57		---	---	ND	---	0.544
58		---	---	ND	---	0.544
59	59/62/75	---	---	ND	---	1.63
60		---	---	ND	---	0.544
61	61/70/74/76	---	---	ND	---	2.18
62	59/62/75	---	---	ND	---	1.63
63		---	---	ND	---	0.544
64		---	---	ND	---	0.544
65	44/47/65	---	---	ND	---	1.63
66		---	---	ND	---	0.914
67		---	---	ND	---	0.544
68		---	---	ND	---	0.544
69	49/69	---	---	ND	---	1.09
70	61/70/74/76	---	---	ND	---	2.18
71	40/41/71	---	---	ND	---	1.63
72		---	---	ND	---	0.544
73	43/73	---	---	ND	---	0.544
74	61/70/74/76	---	---	ND	---	2.18
75	59/62/75	---	---	ND	---	1.63
76	61/70/74/76	---	---	ND	---	2.18
77		---	---	ND	---	0.544
78		---	---	ND	---	0.544
79		---	---	ND	---	0.544
80		---	---	ND	---	0.544
81		---	---	ND	---	0.544
82		---	---	ND	---	0.544
83		---	---	ND	---	0.544
84		---	---	ND	---	0.544
85	85/116/117	---	---	ND	---	1.63
86	86/87/97/108/119/125	---	---	ND	---	3.26
87	86/87/97/108/119/125	---	---	ND	---	3.26
88	88/91	---	---	ND	---	1.09
89		---	---	ND	---	0.544
90	90/101/113	---	---	ND	---	1.63
91	88/91	---	---	ND	---	1.09
92		---	---	ND	---	0.544
93	93/98/100/102	---	---	ND	---	2.18
94		---	---	ND	---	0.544
95		---	---	ND	---	1.03
96		---	---	ND	---	0.544

Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-007  
Lab Sample ID 10366755007  
Filename P161030B\_07

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.26
98	93/98/100/102	---	---	ND	---	2.18
99		---	---	ND	---	0.544
100	93/98/100/102	---	---	ND	---	2.18
101	90/101/113	---	---	ND	---	1.63
102	93/98/100/102	---	---	ND	---	2.18
103		---	---	ND	---	0.544
104		---	---	ND	---	0.544
105		---	---	ND	---	0.544
106		---	---	ND	---	0.544
107	107/124	---	---	ND	---	1.09
108	86/87/97/108/119/125	---	---	ND	---	3.26
109		---	---	ND	---	0.544
110	110/115	---	---	ND	---	1.09
111		---	---	ND	---	0.544
112		---	---	ND	---	0.544
113	90/101/113	---	---	ND	---	1.63
114		---	---	ND	---	0.544
115	110/115	---	---	ND	---	1.09
116	85/116/117	---	---	ND	---	1.63
117	85/116/117	---	---	ND	---	1.63
118		---	---	ND	---	0.696
119	86/87/97/108/119/125	---	---	ND	---	3.26
120		---	---	ND	---	0.544
121		---	---	ND	---	0.544
122		---	---	ND	---	0.544
123		---	---	ND	---	0.544
124	107/124	---	---	ND	---	1.09
125	86/87/97/108/119/125	---	---	ND	---	3.26
126		---	---	ND	---	0.544
127		---	---	ND	---	0.544
128	128/166	---	---	ND	---	1.09
129	129/138/163	---	---	ND	---	1.63
130		---	---	ND	---	0.544
131		---	---	ND	---	0.544
132		---	---	ND	---	0.544
133		---	---	ND	---	0.544
134	134/143	---	---	ND	---	1.09
135	135/151	---	---	ND	---	1.09
136		---	---	ND	---	0.544
137		---	---	ND	---	0.544
138	129/138/163	---	---	ND	---	1.63
139	139/140	---	---	ND	---	1.09
140	139/140	---	---	ND	---	1.09
141		---	---	ND	---	0.544
142		---	---	ND	---	0.544
143	134/143	---	---	ND	---	1.09
144		---	---	ND	---	0.544

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-007  
Lab Sample ID 10366755007  
Filename P161030B\_07

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.544
146		---	---	ND	---	0.544
147	147/149	---	---	ND	---	1.09
148		---	---	ND	---	0.544
149	147/149	---	---	ND	---	1.09
150		---	---	ND	---	0.544
151	135/151	---	---	ND	---	1.09
152		---	---	ND	---	0.544
153	153/168	---	---	ND	---	1.09
154		---	---	ND	---	0.544
155		---	---	ND	---	0.544
156	156/157	---	---	ND	---	1.09
157	156/157	---	---	ND	---	1.09
158		---	---	ND	---	0.544
159		---	---	ND	---	0.544
160		---	---	ND	---	0.544
161		---	---	ND	---	0.544
162		---	---	ND	---	0.544
163	129/138/163	---	---	ND	---	1.63
164		---	---	ND	---	0.544
165		---	---	ND	---	0.544
166	128/166	---	---	ND	---	1.09
167		---	---	ND	---	0.544
168	153/168	---	---	ND	---	1.09
169		---	---	ND	---	0.544
170		---	---	ND	---	0.544
171	171/173	---	---	ND	---	1.09
172		---	---	ND	---	0.544
173	171/173	---	---	ND	---	1.09
174		---	---	ND	---	0.544
175		---	---	ND	---	0.544
176		---	---	ND	---	0.544
177		---	---	ND	---	0.544
178		---	---	ND	---	0.544
179		---	---	ND	---	0.544
180	180/193	---	---	ND	---	1.09
181		---	---	ND	---	0.544
182		---	---	ND	---	0.544
183	183/185	---	---	ND	---	1.09
184		---	---	ND	---	0.544
185	183/185	---	---	ND	---	1.09
186		---	---	ND	---	0.544
187		---	---	ND	---	0.544
188		---	---	ND	---	0.544
189		---	---	ND	---	0.544
190		---	---	ND	---	0.544
191		---	---	ND	---	0.544
192		---	---	ND	---	0.544

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1612528-007  
 Lab Sample ID        10366755007  
 Filename                P161030B\_07

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.09
194		---	---	ND	---	0.816
195		---	---	ND	---	0.816
196		---	---	ND	---	0.816
197	197/200	---	---	ND	---	1.63
198	198/199	---	---	ND	---	1.63
199	198/199	---	---	ND	---	1.63
200	197/200	---	---	ND	---	1.63
201		---	---	ND	---	0.816
202		---	---	ND	---	0.816
203		---	---	ND	---	0.816
204		---	---	ND	---	0.816
205		---	---	ND	---	0.816
206		---	---	ND	---	0.816
207		---	---	ND	---	0.816
208		---	---	ND	---	0.816
209		---	---	ND	---	0.816

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-007  
Lab Sample ID             10366755007  
Filename                    P161030B\_07

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1612528-008		
Lab Sample ID	10366755008		
Filename	P161030B_08		
Injected By	BAL		
Total Amount Extracted	1020 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/13/2016 13:16
ICAL ID	P161030B02	Received	10/19/2016 09:30
CCal Filename(s)	P161030B_01	Extracted	10/25/2016 14:00
Method Blank ID	BLANK-52509	Analyzed	10/31/2016 09:07

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.908	2.70	2.0	0.980	49
13C-4-MoCB	3	11.544	2.74	2.0	0.944	47
13C-2,2'-DiCB	4	11.784	1.53	2.0	0.709	35
13C-4,4'-DiCB	15	18.635	1.56	2.0	0.962	48
13C-2,2',6-TrCB	19	15.412	0.99	2.0	0.879	44
13C-3,4,4'-TrCB	37	26.257	1.07	2.0	1.53	77
13C-2,2',6,6'-TeCB	54	18.862	0.77	2.0	1.09	54
13C-3,4,4',5'-TeCB	81	33.304	0.73	2.0	1.68	84
13C-3,3',4,4'-TeCB	77	33.891	0.74	2.0	1.61	80
13C-2,2',4,6,6'-PeCB	104	24.832	1.61	2.0	1.08	54
13C-2,3,3',4,4'-PeCB	105	37.435	1.54	2.0	1.50	75
13C-2,3,4,4',5'-PeCB	114	36.780	1.62	2.0	1.59	79
13C-2,3',4,4',5'-PeCB	118	36.210	1.55	2.0	1.62	81
13C-2,3',4,4',5'-PeCB	123	35.875	1.53	2.0	1.65	83
13C-3,3',4,4',5'-PeCB	126	40.637	1.61	2.0	1.43	71
13C-2,2',4,4',6,6'-HxCB	155	30.789	1.26	2.0	1.29	64
13C-HxCB (156/157)	156/157	43.660	1.25	4.0	2.72	68
13C-2,3',4,4',5,5'-HxCB	167	42.453	1.27	2.0	1.45	73
13C-3,3',4,4',5,5'-HxCB	169	46.980	1.22	2.0	1.12	56
13C-2,2',3,4',5,6,6'-HpCB	188	36.663	1.07	2.0	1.83	91
13C-2,3,3',4,4',5,5'-HpCB	189	49.448	1.01	2.0	1.47	73
13C-2,2',3,3',5,5',6,6'-OcCB	202	42.134	0.92	2.0	2.01	100
13C-2,3,3',4,4',5,5',6-OcCB	205	52.034	0.87	2.0	1.42	71
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.737	0.78	2.0	1.33	66
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.888	0.79	2.0	1.71	85
13C--DeCB	209	55.331	0.73	2.0	1.55	78
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.914	1.05	2.0	1.53	76
13C-2,3,3',5,5'-PeCB	111	33.841	1.59	2.0	1.45	72
13C-2,2',3,3',5,5',6-HpCB	178	39.782	1.01	2.0	1.53	76
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.118	1.61	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.843	0.81	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.058	1.59	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.363	1.24	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OcCB	194	51.538	0.85	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-008  
 Lab Sample ID 10366755008  
 Filename P161030B\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.245
2		---	---	ND	---	0.245
3		---	---	ND	---	0.245
4		---	---	ND	---	0.245
5		---	---	ND	---	0.245
6		---	---	ND	---	0.245
7		---	---	ND	---	0.245
8		---	---	ND	---	0.245
9		---	---	ND	---	0.245
10		---	---	ND	---	0.245
11		---	---	ND	---	2.40
12	12/13	---	---	ND	---	0.490
13	12/13	---	---	ND	---	0.490
14		---	---	ND	---	0.245
15		---	---	ND	---	0.323
16		---	---	ND	---	0.245
17		---	---	ND	---	0.245
18	18/30	---	---	ND	---	0.490
19		---	---	ND	---	0.245
20	20/28	---	---	ND	---	1.26
21	21/33	---	---	ND	---	1.32
22		---	---	ND	---	0.930
23		---	---	ND	---	0.245
24		---	---	ND	---	0.245
25		---	---	ND	---	0.245
26	26/29	---	---	ND	---	0.490
27		---	---	ND	---	0.245
28	20/28	---	---	ND	---	1.26
29	26/29	---	---	ND	---	0.490
30	18/30	---	---	ND	---	0.490
31		---	---	ND	---	1.27
32		---	---	ND	---	0.245
33	21/33	---	---	ND	---	1.32
34		---	---	ND	---	0.245
35		---	---	ND	---	0.245
36		---	---	ND	---	0.245
37		---	---	ND	---	0.519
38		---	---	ND	---	0.245
39		---	---	ND	---	0.245
40	40/41/71	---	---	ND	---	1.47
41	40/41/71	---	---	ND	---	1.47
42		---	---	ND	---	0.490
43	43/73	---	---	ND	---	0.490
44	44/47/65	---	---	ND	---	1.47
45	45/51	---	---	ND	---	0.979
46		---	---	ND	---	0.490
47	44/47/65	---	---	ND	---	1.47
48		---	---	ND	---	0.490

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-008  
 Lab Sample ID 10366755008  
 Filename P161030B\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.979
50	50/53	---	---	ND	---	0.979
51	45/51	---	---	ND	---	0.979
52		---	---	ND	---	1.51
53	50/53	---	---	ND	---	0.979
54		---	---	ND	---	0.490
55		---	---	ND	---	0.490
56		---	---	ND	---	0.490
57		---	---	ND	---	0.490
58		---	---	ND	---	0.490
59	59/62/75	---	---	ND	---	1.47
60		---	---	ND	---	0.490
61	61/70/74/76	---	---	ND	---	1.96
62	59/62/75	---	---	ND	---	1.47
63		---	---	ND	---	0.490
64		---	---	ND	---	0.490
65	44/47/65	---	---	ND	---	1.47
66		---	---	ND	---	0.823
67		---	---	ND	---	0.490
68		---	---	ND	---	0.490
69	49/69	---	---	ND	---	0.979
70	61/70/74/76	---	---	ND	---	1.96
71	40/41/71	---	---	ND	---	1.47
72		---	---	ND	---	0.490
73	43/73	---	---	ND	---	0.490
74	61/70/74/76	---	---	ND	---	1.96
75	59/62/75	---	---	ND	---	1.47
76	61/70/74/76	---	---	ND	---	1.96
77		---	---	ND	---	0.490
78		---	---	ND	---	0.490
79		---	---	ND	---	0.490
80		---	---	ND	---	0.490
81		---	---	ND	---	0.490
82		---	---	ND	---	0.490
83		---	---	ND	---	0.490
84		---	---	ND	---	0.490
85	85/116/117	---	---	ND	---	1.47
86	86/87/97/108/119/125	---	---	ND	---	2.94
87	86/87/97/108/119/125	---	---	ND	---	2.94
88	88/91	---	---	ND	---	0.979
89		---	---	ND	---	0.490
90	90/101/113	---	---	ND	---	1.47
91	88/91	---	---	ND	---	0.979
92		---	---	ND	---	0.490
93	93/98/100/102	---	---	ND	---	1.96
94		---	---	ND	---	0.490
95		---	---	ND	---	0.930
96		---	---	ND	---	0.490

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-008  
Lab Sample ID 10366755008  
Filename P161030B\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.94
98	93/98/100/102	---	---	ND	---	1.96
99		---	---	ND	---	0.490
100	93/98/100/102	---	---	ND	---	1.96
101	90/101/113	---	---	ND	---	1.47
102	93/98/100/102	---	---	ND	---	1.96
103		---	---	ND	---	0.490
104		---	---	ND	---	0.490
105		37.468	1.51	0.558	---	0.490
106		---	---	ND	---	0.490
107	107/124	---	---	ND	---	0.979
108	86/87/97/108/119/125	---	---	ND	---	2.94
109		---	---	ND	---	0.490
110	110/115	33.137	1.53	1.27	---	0.979
111		---	---	ND	---	0.490
112		---	---	ND	---	0.490
113	90/101/113	---	---	ND	---	1.47
114		---	---	ND	---	0.490
115	110/115	33.137	1.53	(1.27)	---	0.979
116	85/116/117	---	---	ND	---	1.47
117	85/116/117	---	---	ND	---	1.47
118		36.227	1.52	1.23	---	0.627
119	86/87/97/108/119/125	---	---	ND	---	2.94
120		---	---	ND	---	0.490
121		---	---	ND	---	0.490
122		---	---	ND	---	0.490
123		---	---	ND	---	0.490
124	107/124	---	---	ND	---	0.979
125	86/87/97/108/119/125	---	---	ND	---	2.94
126		---	---	ND	---	0.490
127		---	---	ND	---	0.490
128	128/166	---	---	ND	---	0.979
129	129/138/163	39.396	1.24	1.74	---	1.47
130		---	---	ND	---	0.490
131		---	---	ND	---	0.490
132		36.311	1.19	0.507	---	0.490
133		---	---	ND	---	0.490
134	134/143	---	---	ND	---	0.979
135	135/151	---	---	ND	---	0.979
136		---	---	ND	---	0.490
137		---	---	ND	---	0.490
138	129/138/163	39.396	1.24	(1.74)	---	1.47
139	139/140	---	---	ND	---	0.979
140	139/140	---	---	ND	---	0.979
141		---	---	ND	---	0.490
142		---	---	ND	---	0.490
143	134/143	---	---	ND	---	0.979
144		---	---	ND	---	0.490

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-008  
 Lab Sample ID 10366755008  
 Filename P161030B\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.490
146		---	---	ND	---	0.490
147	147/149	---	---	ND	---	0.979
148		---	---	ND	---	0.490
149	147/149	---	---	ND	---	0.979
150		---	---	ND	---	0.490
151	135/151	---	---	ND	---	0.979
152		---	---	ND	---	0.490
153	153/168	38.105	1.24	1.15	---	0.979
154		---	---	ND	---	0.490
155		---	---	ND	---	0.490
156	156/157	---	---	ND	---	0.979
157	156/157	---	---	ND	---	0.979
158		---	---	ND	---	0.490
159		---	---	ND	---	0.490
160		---	---	ND	---	0.490
161		---	---	ND	---	0.490
162		---	---	ND	---	0.490
163	129/138/163	39.396	1.24	(1.74)	---	1.47
164		---	---	ND	---	0.490
165		---	---	ND	---	0.490
166	128/166	---	---	ND	---	0.979
167		---	---	ND	---	0.490
168	153/168	38.105	1.24	(1.15)	---	0.979
169		---	---	ND	---	0.490
170		---	---	ND	---	0.490
171	171/173	---	---	ND	---	0.979
172		---	---	ND	---	0.490
173	171/173	---	---	ND	---	0.979
174		---	---	ND	---	0.490
175		---	---	ND	---	0.490
176		---	---	ND	---	0.490
177		---	---	ND	---	0.490
178		---	---	ND	---	0.490
179		---	---	ND	---	0.490
180	180/193	---	---	ND	---	0.979
181		---	---	ND	---	0.490
182		---	---	ND	---	0.490
183	183/185	---	---	ND	---	0.979
184		---	---	ND	---	0.490
185	183/185	---	---	ND	---	0.979
186		---	---	ND	---	0.490
187		---	---	ND	---	0.490
188		---	---	ND	---	0.490
189		---	---	ND	---	0.490
190		---	---	ND	---	0.490
191		---	---	ND	---	0.490
192		---	---	ND	---	0.490

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1612528-008  
 Lab Sample ID        10366755008  
 Filename                P161030B\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.979
194		---	---	ND	---	0.735
195		---	---	ND	---	0.735
196		---	---	ND	---	0.735
197	197/200	---	---	ND	---	1.47
198	198/199	---	---	ND	---	1.47
199	198/199	---	---	ND	---	1.47
200	197/200	---	---	ND	---	1.47
201		---	---	ND	---	0.735
202		---	---	ND	---	0.735
203		---	---	ND	---	0.735
204		---	---	ND	---	0.735
205		---	---	ND	---	0.735
206		---	---	ND	---	0.735
207		---	---	ND	---	0.735
208		---	---	ND	---	0.735
209		---	---	ND	---	0.735

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-008  
Lab Sample ID             10366755008  
Filename                    P161030B\_08

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	3.06
Total Hexachloro Biphenyls	3.40
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	6.46

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1612528-009		
Lab Sample ID	10366755009		
Filename	P161030B_09		
Injected By	BAL		
Total Amount Extracted	1010 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/13/2016 13:40
ICAL ID	P161030B02	Received	10/19/2016 09:30
CCal Filename(s)	P161030B_01	Extracted	10/25/2016 14:00
Method Blank ID	BLANK-52509	Analyzed	10/31/2016 10:06

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.908	3.02	2.0	1.11	56
13C-4-MoCB	3	11.556	2.84	2.0	1.14	57
13C-2,2'-DiCB	4	11.808	1.57	2.0	0.894	45
13C-4,4'-DiCB	15	18.634	1.48	2.0	1.17	58
13C-2,2',6-TrCB	19	15.460	1.06	2.0	1.12	56
13C-3,4,4'-TrCB	37	26.257	1.11	2.0	1.69	84
13C-2,2',6,6'-TeCB	54	18.879	0.80	2.0	1.31	65
13C-3,4,4',5'-TeCB	81	33.305	0.79	2.0	1.88	94
13C-3,3',4,4'-TeCB	77	33.892	0.85	2.0	1.77	88
13C-2,2',4,6,6'-PeCB	104	24.848	1.61	2.0	1.32	66
13C-2,3,3',4,4'-PeCB	105	37.452	1.54	2.0	1.70	85
13C-2,3,4,4',5'-PeCB	114	36.781	1.63	2.0	1.82	91
13C-2,3',4,4',5'-PeCB	118	36.228	1.64	2.0	1.87	94
13C-2,3',4,4',5'-PeCB	123	35.892	1.58	2.0	1.88	94
13C-3,3',4,4',5'-PeCB	126	40.638	1.56	2.0	1.63	81
13C-2,2',4,4',6,6'-HxCB	155	30.789	1.29	2.0	1.55	78
13C-HxCB (156/157)	156/157	43.644	1.25	4.0	3.12	78
13C-2,3',4,4',5,5'-HxCB	167	42.471	1.26	2.0	1.65	82
13C-3,3',4,4',5,5'-HxCB	169	46.981	1.22	2.0	1.25	63
13C-2,2',3,4',5,6,6'-HpCB	188	36.680	1.06	2.0	2.21	111
13C-2,3,3',4,4',5,5'-HpCB	189	49.470	1.06	2.0	1.68	84
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.135	0.91	2.0	2.37	119
13C-2,3,3',4,4',5,5',6-OxCB	205	52.035	0.96	2.0	1.65	82
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.759	0.78	2.0	1.50	75
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	48.910	0.77	2.0	1.92	96
13C--DeCB	209	55.332	0.72	2.0	1.81	91
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.931	1.08	2.0	1.71	86
13C-2,3,3',5,5'-PeCB	111	33.858	1.58	2.0	1.65	83
13C-2,2',3,3',5,5',6-HpCB	178	39.799	1.08	2.0	1.74	87
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.130	1.62	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.859	0.82	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.058	1.63	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.380	1.25	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.560	0.91	2.0	NA	NA

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-009  
 Lab Sample ID 10366755009  
 Filename P161030B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.246
2		---	---	ND	---	0.246
3		---	---	ND	---	0.246
4		---	---	ND	---	0.246
5		---	---	ND	---	0.246
6		---	---	ND	---	0.246
7		---	---	ND	---	0.246
8		---	---	ND	---	0.246
9		---	---	ND	---	0.246
10		---	---	ND	---	0.246
11		---	---	ND	---	2.42
12	12/13	---	---	ND	---	0.493
13	12/13	---	---	ND	---	0.493
14		---	---	ND	---	0.246
15		---	---	ND	---	0.325
16		---	---	ND	---	0.246
17		---	---	ND	---	0.246
18	18/30	---	---	ND	---	0.493
19		---	---	ND	---	0.246
20	20/28	---	---	ND	---	1.27
21	21/33	---	---	ND	---	1.33
22		---	---	ND	---	0.936
23		---	---	ND	---	0.246
24		---	---	ND	---	0.246
25		---	---	ND	---	0.246
26	26/29	---	---	ND	---	0.493
27		---	---	ND	---	0.246
28	20/28	---	---	ND	---	1.27
29	26/29	---	---	ND	---	0.493
30	18/30	---	---	ND	---	0.493
31		---	---	ND	---	1.28
32		---	---	ND	---	0.246
33	21/33	---	---	ND	---	1.33
34		---	---	ND	---	0.246
35		---	---	ND	---	0.246
36		---	---	ND	---	0.246
37		---	---	ND	---	0.522
38		---	---	ND	---	0.246
39		---	---	ND	---	0.246
40	40/41/71	---	---	ND	---	1.48
41	40/41/71	---	---	ND	---	1.48
42		---	---	ND	---	0.493
43	43/73	---	---	ND	---	0.493
44	44/47/65	---	---	ND	---	1.48
45	45/51	---	---	ND	---	0.986
46		---	---	ND	---	0.493
47	44/47/65	---	---	ND	---	1.48
48		---	---	ND	---	0.493

Conc = Concentration  
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 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-009  
 Lab Sample ID 10366755009  
 Filename P161030B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.986
50	50/53	---	---	ND	---	0.986
51	45/51	---	---	ND	---	0.986
52		---	---	ND	---	1.52
53	50/53	---	---	ND	---	0.986
54		---	---	ND	---	0.493
55		---	---	ND	---	0.493
56		---	---	ND	---	0.493
57		---	---	ND	---	0.493
58		---	---	ND	---	0.493
59	59/62/75	---	---	ND	---	1.48
60		---	---	ND	---	0.493
61	61/70/74/76	---	---	ND	---	1.97
62	59/62/75	---	---	ND	---	1.48
63		---	---	ND	---	0.493
64		---	---	ND	---	0.493
65	44/47/65	---	---	ND	---	1.48
66		---	---	ND	---	0.828
67		---	---	ND	---	0.493
68		---	---	ND	---	0.493
69	49/69	---	---	ND	---	0.986
70	61/70/74/76	---	---	ND	---	1.97
71	40/41/71	---	---	ND	---	1.48
72		---	---	ND	---	0.493
73	43/73	---	---	ND	---	0.493
74	61/70/74/76	---	---	ND	---	1.97
75	59/62/75	---	---	ND	---	1.48
76	61/70/74/76	---	---	ND	---	1.97
77		---	---	ND	---	0.493
78		---	---	ND	---	0.493
79		---	---	ND	---	0.493
80		---	---	ND	---	0.493
81		---	---	ND	---	0.493
82		---	---	ND	---	0.493
83		---	---	ND	---	0.493
84		---	---	ND	---	0.493
85	85/116/117	---	---	ND	---	1.48
86	86/87/97/108/119/125	---	---	ND	---	2.96
87	86/87/97/108/119/125	---	---	ND	---	2.96
88	88/91	---	---	ND	---	0.986
89		---	---	ND	---	0.493
90	90/101/113	31.091	1.50	1.81	---	1.48
91	88/91	---	---	ND	---	0.986
92		---	---	ND	---	0.493
93	93/98/100/102	---	---	ND	---	1.97
94		---	---	ND	---	0.493
95		28.023	1.55	1.12	---	0.936
96		---	---	ND	---	0.493

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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 NC = Not Calculated  
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 RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-009  
Lab Sample ID 10366755009  
Filename P161030B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.96
98	93/98/100/102	---	---	ND	---	1.97
99		31.695	1.60	0.734	---	0.493
100	93/98/100/102	---	---	ND	---	1.97
101	90/101/113	31.091	1.50	(1.81)	---	1.48
102	93/98/100/102	---	---	ND	---	1.97
103		---	---	ND	---	0.493
104		---	---	ND	---	0.493
105		37.468	1.58	1.20	---	0.493
106		---	---	ND	---	0.493
107	107/124	---	---	ND	---	0.986
108	86/87/97/108/119/125	---	---	ND	---	2.96
109		---	---	ND	---	0.493
110	110/115	33.137	1.60	2.86	---	0.986
111		---	---	ND	---	0.493
112		---	---	ND	---	0.493
113	90/101/113	31.091	1.50	(1.81)	---	1.48
114		---	---	ND	---	0.493
115	110/115	33.137	1.60	(2.86)	---	0.986
116	85/116/117	---	---	ND	---	1.48
117	85/116/117	---	---	ND	---	1.48
118		36.244	1.61	2.52	---	0.631
119	86/87/97/108/119/125	---	---	ND	---	2.96
120		---	---	ND	---	0.493
121		---	---	ND	---	0.493
122		---	---	ND	---	0.493
123		---	---	ND	---	0.493
124	107/124	---	---	ND	---	0.986
125	86/87/97/108/119/125	---	---	ND	---	2.96
126		---	---	ND	---	0.493
127		---	---	ND	---	0.493
128	128/166	---	---	ND	---	0.986
129	129/138/163	39.414	1.21	3.16	---	1.48
130		---	---	ND	---	0.493
131		---	---	ND	---	0.493
132		36.312	1.18	0.943	---	0.493
133		---	---	ND	---	0.493
134	134/143	---	---	ND	---	0.986
135	135/151	---	---	ND	---	0.986
136		---	---	ND	---	0.493
137		---	---	ND	---	0.493
138	129/138/163	39.414	1.21	(3.16)	---	1.48
139	139/140	---	---	ND	---	0.986
140	139/140	---	---	ND	---	0.986
141		---	---	ND	---	0.493
142		---	---	ND	---	0.493
143	134/143	---	---	ND	---	0.986
144		---	---	ND	---	0.493

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-009  
Lab Sample ID 10366755009  
Filename P161030B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.493
146		---	---	ND	---	0.493
147	147/149	35.020	1.23	1.45	---	0.986
148		---	---	ND	---	0.493
149	147/149	35.020	1.23	(1.45)	---	0.986
150		---	---	ND	---	0.493
151	135/151	---	---	ND	---	0.986
152		---	---	ND	---	0.493
153	153/168	38.123	1.26	1.82	---	0.986
154		---	---	ND	---	0.493
155		---	---	ND	---	0.493
156	156/157	---	---	ND	---	0.986
157	156/157	---	---	ND	---	0.986
158		---	---	ND	---	0.493
159		---	---	ND	---	0.493
160		---	---	ND	---	0.493
161		---	---	ND	---	0.493
162		---	---	ND	---	0.493
163	129/138/163	39.414	1.21	(3.16)	---	1.48
164		---	---	ND	---	0.493
165		---	---	ND	---	0.493
166	128/166	---	---	ND	---	0.986
167		---	---	ND	---	0.493
168	153/168	38.123	1.26	(1.82)	---	0.986
169		---	---	ND	---	0.493
170		---	---	ND	---	0.493
171	171/173	---	---	ND	---	0.986
172		---	---	ND	---	0.493
173	171/173	---	---	ND	---	0.986
174		---	---	ND	---	0.493
175		---	---	ND	---	0.493
176		---	---	ND	---	0.493
177		---	---	ND	---	0.493
178		---	---	ND	---	0.493
179		---	---	ND	---	0.493
180	180/193	---	---	ND	---	0.986
181		---	---	ND	---	0.493
182		---	---	ND	---	0.493
183	183/185	---	---	ND	---	0.986
184		---	---	ND	---	0.493
185	183/185	---	---	ND	---	0.986
186		---	---	ND	---	0.493
187		---	---	ND	---	0.493
188		---	---	ND	---	0.493
189		---	---	ND	---	0.493
190		---	---	ND	---	0.493
191		---	---	ND	---	0.493
192		---	---	ND	---	0.493

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-009  
 Lab Sample ID 10366755009  
 Filename P161030B\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.986
194		---	---	ND	---	0.739
195		---	---	ND	---	0.739
196		---	---	ND	---	0.739
197	197/200	---	---	ND	---	1.48
198	198/199	---	---	ND	---	1.48
199	198/199	---	---	ND	---	1.48
200	197/200	---	---	ND	---	1.48
201		---	---	ND	---	0.739
202		---	---	ND	---	0.739
203		---	---	ND	---	0.739
204		---	---	ND	---	0.739
205		---	---	ND	---	0.739
206		---	---	ND	---	0.739
207		---	---	ND	---	0.739
208		---	---	ND	---	0.739
209		---	---	ND	---	0.739

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 EML =Method Specified Reporting Limit (1668A)  
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 A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-009  
Lab Sample ID             10366755009  
Filename                    P161030B\_09

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	10.2
Total Hexachloro Biphenyls	7.38
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	17.6

ND = Not Detected

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1612528-010		
Lab Sample ID	10366755010		
Filename	P161030B_10		
Injected By	BAL		
Total Amount Extracted	1010 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/13/2016 13:32
ICAL ID	P161030B02	Received	10/19/2016 09:30
CCal Filename(s)	P161030B_01	Extracted	10/25/2016 14:00
Method Blank ID	BLANK-52509	Analyzed	10/31/2016 11:04

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.909	2.87	2.0	1.22	61
13C-4-MoCB	3	11.545	3.11	2.0	1.20	60
13C-2,2'-DiCB	4	11.796	1.56	2.0	0.923	46
13C-4,4'-DiCB	15	18.636	1.54	2.0	1.06	53
13C-2,2',6-TrCB	19	15.413	1.08	2.0	1.12	56
13C-3,4,4'-TrCB	37	26.259	1.11	2.0	1.69	85
13C-2,2',6,6'-TeCB	54	18.881	0.77	2.0	1.32	66
13C-3,4,4',5'-TeCB	81	33.324	0.80	2.0	1.80	90
13C-3,3',4,4'-TeCB	77	33.911	0.76	2.0	1.74	87
13C-2,2',4,6,6'-PeCB	104	24.834	1.57	2.0	1.23	62
13C-2,3,3',4,4'-PeCB	105	37.438	1.61	2.0	1.73	87
13C-2,3,4,4',5'-PeCB	114	36.784	1.62	2.0	1.70	85
13C-2,3',4,4',5'-PeCB	118	36.214	1.52	2.0	1.89	94
13C-2,3',4,4',5'-PeCB	123	35.878	1.57	2.0	1.83	92
13C-3,3',4,4',5'-PeCB	126	40.640	1.69	2.0	1.54	77
13C-2,2',4,4',6,6'-HxCB	155	30.792	1.33	2.0	1.52	76
13C-HxCB (156/157)	156/157	43.646	1.29	4.0	2.99	75
13C-2,3',4,4',5,5'-HxCB	167	42.456	1.25	2.0	1.62	81
13C-3,3',4,4',5,5'-HxCB	169	46.966	1.31	2.0	1.11	56
13C-2,2',3,4',5,6,6'-HpCB	188	36.666	1.05	2.0	2.16	108
13C-2,3,3',4,4',5,5'-HpCB	189	49.450	1.01	2.0	1.60	80
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.137	0.91	2.0	2.32	116
13C-2,3,3',4,4',5,5',6-OxCB	205	52.036	0.90	2.0	1.62	81
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.738	0.84	2.0	1.55	77
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	48.889	0.81	2.0	2.05	102
13C--DeCB	209	55.333	0.68	2.0	1.81	91
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	21.933	1.06	2.0	1.75	87
13C-2,3,3',5,5'-PeCB	111	33.844	1.65	2.0	1.57	79
13C-2,2',3,3',5,5',6-HpCB	178	39.785	1.09	2.0	1.69	84
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.119	1.55	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	23.844	0.81	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.060	1.71	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.366	1.34	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.519	0.86	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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 R = Recovery outside of Method 1668A control limits  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-010  
 Lab Sample ID 10366755010  
 Filename P161030B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.248
2		---	---	ND	---	0.248
3		---	---	ND	---	0.248
4		---	---	ND	---	0.248
5		---	---	ND	---	0.248
6		---	---	ND	---	0.248
7		---	---	ND	---	0.248
8		---	---	ND	---	0.248
9		---	---	ND	---	0.248
10		---	---	ND	---	0.248
11		---	---	ND	---	2.43
12	12/13	---	---	ND	---	0.496
13	12/13	---	---	ND	---	0.496
14		---	---	ND	---	0.248
15		---	---	ND	---	0.327
16		---	---	ND	---	0.248
17		---	---	ND	---	0.248
18	18/30	---	---	ND	---	0.496
19		---	---	ND	---	0.248
20	20/28	---	---	ND	---	1.28
21	21/33	---	---	ND	---	1.34
22		---	---	ND	---	0.942
23		---	---	ND	---	0.248
24		---	---	ND	---	0.248
25		---	---	ND	---	0.248
26	26/29	---	---	ND	---	0.496
27		---	---	ND	---	0.248
28	20/28	---	---	ND	---	1.28
29	26/29	---	---	ND	---	0.496
30	18/30	---	---	ND	---	0.496
31		---	---	ND	---	1.29
32		---	---	ND	---	0.248
33	21/33	---	---	ND	---	1.34
34		---	---	ND	---	0.248
35		---	---	ND	---	0.248
36		---	---	ND	---	0.248
37		---	---	ND	---	0.526
38		---	---	ND	---	0.248
39		---	---	ND	---	0.248
40	40/41/71	---	---	ND	---	1.49
41	40/41/71	---	---	ND	---	1.49
42		---	---	ND	---	0.496
43	43/73	---	---	ND	---	0.496
44	44/47/65	---	---	ND	---	1.49
45	45/51	---	---	ND	---	0.992
46		---	---	ND	---	0.496
47	44/47/65	---	---	ND	---	1.49
48		---	---	ND	---	0.496

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-010  
Lab Sample ID 10366755010  
Filename P161030B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.992
50	50/53	---	---	ND	---	0.992
51	45/51	---	---	ND	---	0.992
52		---	---	ND	---	1.53
53	50/53	---	---	ND	---	0.992
54		---	---	ND	---	0.496
55		---	---	ND	---	0.496
56		---	---	ND	---	0.496
57		---	---	ND	---	0.496
58		---	---	ND	---	0.496
59	59/62/75	---	---	ND	---	1.49
60		---	---	ND	---	0.496
61	61/70/74/76	---	---	ND	---	1.98
62	59/62/75	---	---	ND	---	1.49
63		---	---	ND	---	0.496
64		---	---	ND	---	0.496
65	44/47/65	---	---	ND	---	1.49
66		---	---	ND	---	0.833
67		---	---	ND	---	0.496
68		---	---	ND	---	0.496
69	49/69	---	---	ND	---	0.992
70	61/70/74/76	---	---	ND	---	1.98
71	40/41/71	---	---	ND	---	1.49
72		---	---	ND	---	0.496
73	43/73	---	---	ND	---	0.496
74	61/70/74/76	---	---	ND	---	1.98
75	59/62/75	---	---	ND	---	1.49
76	61/70/74/76	---	---	ND	---	1.98
77		---	---	ND	---	0.496
78		---	---	ND	---	0.496
79		---	---	ND	---	0.496
80		---	---	ND	---	0.496
81		---	---	ND	---	0.496
82		---	---	ND	---	0.496
83		---	---	ND	---	0.496
84		---	---	ND	---	0.496
85	85/116/117	---	---	ND	---	1.49
86	86/87/97/108/119/125	---	---	ND	---	2.97
87	86/87/97/108/119/125	---	---	ND	---	2.97
88	88/91	---	---	ND	---	0.992
89		---	---	ND	---	0.496
90	90/101/113	---	---	ND	---	1.49
91	88/91	---	---	ND	---	0.992
92		---	---	ND	---	0.496
93	93/98/100/102	---	---	ND	---	1.98
94		---	---	ND	---	0.496
95		---	---	ND	---	0.942
96		---	---	ND	---	0.496

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-010  
Lab Sample ID 10366755010  
Filename P161030B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.97
98	93/98/100/102	---	---	ND	---	1.98
99		---	---	ND	---	0.496
100	93/98/100/102	---	---	ND	---	1.98
101	90/101/113	---	---	ND	---	1.49
102	93/98/100/102	---	---	ND	---	1.98
103		---	---	ND	---	0.496
104		---	---	ND	---	0.496
105		---	---	ND	---	0.496
106		---	---	ND	---	0.496
107	107/124	---	---	ND	---	0.992
108	86/87/97/108/119/125	---	---	ND	---	2.97
109		---	---	ND	---	0.496
110	110/115	---	---	ND	---	0.992
111		---	---	ND	---	0.496
112		---	---	ND	---	0.496
113	90/101/113	---	---	ND	---	1.49
114		---	---	ND	---	0.496
115	110/115	---	---	ND	---	0.992
116	85/116/117	---	---	ND	---	1.49
117	85/116/117	---	---	ND	---	1.49
118		---	---	ND	---	0.635
119	86/87/97/108/119/125	---	---	ND	---	2.97
120		---	---	ND	---	0.496
121		---	---	ND	---	0.496
122		---	---	ND	---	0.496
123		---	---	ND	---	0.496
124	107/124	---	---	ND	---	0.992
125	86/87/97/108/119/125	---	---	ND	---	2.97
126		---	---	ND	---	0.496
127		---	---	ND	---	0.496
128	128/166	---	---	ND	---	0.992
129	129/138/163	---	---	ND	---	1.49
130		---	---	ND	---	0.496
131		---	---	ND	---	0.496
132		---	---	ND	---	0.496
133		---	---	ND	---	0.496
134	134/143	---	---	ND	---	0.992
135	135/151	---	---	ND	---	0.992
136		---	---	ND	---	0.496
137		---	---	ND	---	0.496
138	129/138/163	---	---	ND	---	1.49
139	139/140	---	---	ND	---	0.992
140	139/140	---	---	ND	---	0.992
141		---	---	ND	---	0.496
142		---	---	ND	---	0.496
143	134/143	---	---	ND	---	0.992
144		---	---	ND	---	0.496

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
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RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-010  
Lab Sample ID 10366755010  
Filename P161030B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.496
146		---	---	ND	---	0.496
147	147/149	---	---	ND	---	0.992
148		---	---	ND	---	0.496
149	147/149	---	---	ND	---	0.992
150		---	---	ND	---	0.496
151	135/151	---	---	ND	---	0.992
152		---	---	ND	---	0.496
153	153/168	---	---	ND	---	0.992
154		---	---	ND	---	0.496
155		---	---	ND	---	0.496
156	156/157	---	---	ND	---	0.992
157	156/157	---	---	ND	---	0.992
158		---	---	ND	---	0.496
159		---	---	ND	---	0.496
160		---	---	ND	---	0.496
161		---	---	ND	---	0.496
162		---	---	ND	---	0.496
163	129/138/163	---	---	ND	---	1.49
164		---	---	ND	---	0.496
165		---	---	ND	---	0.496
166	128/166	---	---	ND	---	0.992
167		---	---	ND	---	0.496
168	153/168	---	---	ND	---	0.992
169		---	---	ND	---	0.496
170		---	---	ND	---	0.496
171	171/173	---	---	ND	---	0.992
172		---	---	ND	---	0.496
173	171/173	---	---	ND	---	0.992
174		---	---	ND	---	0.496
175		---	---	ND	---	0.496
176		---	---	ND	---	0.496
177		---	---	ND	---	0.496
178		---	---	ND	---	0.496
179		---	---	ND	---	0.496
180	180/193	---	---	ND	---	0.992
181		---	---	ND	---	0.496
182		---	---	ND	---	0.496
183	183/185	---	---	ND	---	0.992
184		---	---	ND	---	0.496
185	183/185	---	---	ND	---	0.992
186		---	---	ND	---	0.496
187		---	---	ND	---	0.496
188		---	---	ND	---	0.496
189		---	---	ND	---	0.496
190		---	---	ND	---	0.496
191		---	---	ND	---	0.496
192		---	---	ND	---	0.496

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1612528-010  
 Lab Sample ID        10366755010  
 Filename                P161030B\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.992
194		---	---	ND	---	0.744
195		---	---	ND	---	0.744
196		---	---	ND	---	0.744
197	197/200	---	---	ND	---	1.49
198	198/199	---	---	ND	---	1.49
199	198/199	---	---	ND	---	1.49
200	197/200	---	---	ND	---	1.49
201		---	---	ND	---	0.744
202		---	---	ND	---	0.744
203		---	---	ND	---	0.744
204		---	---	ND	---	0.744
205		---	---	ND	---	0.744
206		---	---	ND	---	0.744
207		---	---	ND	---	0.744
208		---	---	ND	---	0.744
209		---	---	ND	---	0.744

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-010  
Lab Sample ID             10366755010  
Filename                    P161030B\_10

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1612528-011		
Lab Sample ID	10366755011		
Filename	P161030B_11		
Injected By	BAL		
Total Amount Extracted	1010 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	10/13/2016
ICAL ID	P161030B02	Received	10/19/2016 09:30
CCal Filename(s)	P161030B_01	Extracted	10/25/2016 14:00
Method Blank ID	BLANK-52509	Analyzed	10/31/2016 12:03

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery	
<b>Labeled Analytes</b>							
13C-2-MoCB	1	8.920	2.72	2.0	0.320	16	R
13C-4-MoCB	3	11.569	2.73	2.0	0.634	32	
13C-2,2'-DiCB	4	11.808	1.56	2.0	0.501	25	
13C-4,4'-DiCB	15	18.648	1.60	2.0	1.03	51	
13C-2,2',6-TrCB	19	15.461	1.08	2.0	0.874	44	
13C-3,4,4'-TrCB	37	26.276	1.01	2.0	1.68	84	
13C-2,2',6,6'-TeCB	54	18.898	0.80	2.0	1.21	60	
13C-3,4,4',5'-TeCB	81	33.307	0.77	2.0	1.91	95	
13C-3,3',4,4'-TeCB	77	33.894	0.75	2.0	1.87	93	
13C-2,2',4,6,6'-PeCB	104	24.850	1.55	2.0	1.22	61	
13C-2,3,3',4,4'-PeCB	105	37.454	1.64	2.0	1.76	88	
13C-2,3,4,4',5'-PeCB	114	36.783	1.67	2.0	1.85	92	
13C-2,3',4,4',5'-PeCB	118	36.230	1.65	2.0	1.85	92	
13C-2,3',4,4',5'-PeCB	123	35.895	1.57	2.0	1.85	93	
13C-3,3',4,4',5'-PeCB	126	40.657	1.55	2.0	1.64	82	
13C-2,2',4,4',6,6'-HxCB	155	30.808	1.29	2.0	1.49	74	
13C-HxCB (156/157)	156/157	43.664	1.31	4.0	3.01	75	
13C-2,3',4,4',5,5'-HxCB	167	42.473	1.25	2.0	1.68	84	
13C-3,3',4,4',5,5'-HxCB	169	46.984	1.20	2.0	1.21	61	
13C-2,2',3,4',5,6,6'-HpCB	188	36.683	1.05	2.0	2.21	110	
13C-2,3,3',4,4',5,5'-HpCB	189	49.472	1.03	2.0	1.67	83	
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.138	0.88	2.0	2.36	118	
13C-2,3,3',4,4',5,5',6-OxCB	205	52.059	0.93	2.0	1.66	83	
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.762	0.80	2.0	1.56	78	
13C-2,2',3,3',4,4',5,5',6-NoCB	208	48.890	0.78	2.0	1.98	99	
13C--DeCB	209	55.335	0.69	2.0	1.75	88	
<b>Cleanup Standards</b>							
13C-2,4,4'-TrCB	28	21.933	1.03	2.0	1.68	84	
13C-2,3,3',5,5'-PeCB	111	33.860	1.56	2.0	1.64	82	
13C-2,2',3,3',5,5',6-HpCB	178	39.818	1.07	2.0	1.68	84	
<b>Recovery Standards</b>							
13C-2,5-DiCB	9	14.143	1.52	2.0	NA	NA	
13C-2,2',5,5'-TeCB	52	23.861	0.79	2.0	NA	NA	
13C-2,2',4,5,5'-PeCB	101	31.077	1.55	2.0	NA	NA	
13C-2,2',3,4,4',5'-HxCB	138	39.382	1.29	2.0	NA	NA	
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.563	0.88	2.0	NA	NA	

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
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 RT = Retention Time  
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 ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-011  
 Lab Sample ID 10366755011  
 Filename P161030B\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.248
2		---	---	ND	---	0.248
3		---	---	ND	---	0.248
4		---	---	ND	---	0.248
5		---	---	ND	---	0.248
6		---	---	ND	---	0.248
7		---	---	ND	---	0.248
8		---	---	ND	---	0.248
9		---	---	ND	---	0.248
10		---	---	ND	---	0.248
11		---	---	ND	---	2.43
12	12/13	---	---	ND	---	0.495
13	12/13	---	---	ND	---	0.495
14		---	---	ND	---	0.248
15		---	---	ND	---	0.327
16		---	---	ND	---	0.248
17		---	---	ND	---	0.248
18	18/30	---	---	ND	---	0.495
19		---	---	ND	---	0.248
20	20/28	---	---	ND	---	1.28
21	21/33	---	---	ND	---	1.34
22		---	---	ND	---	0.941
23		---	---	ND	---	0.248
24		---	---	ND	---	0.248
25		---	---	ND	---	0.248
26	26/29	---	---	ND	---	0.495
27		---	---	ND	---	0.248
28	20/28	---	---	ND	---	1.28
29	26/29	---	---	ND	---	0.495
30	18/30	---	---	ND	---	0.495
31		---	---	ND	---	1.29
32		---	---	ND	---	0.248
33	21/33	---	---	ND	---	1.34
34		---	---	ND	---	0.248
35		---	---	ND	---	0.248
36		---	---	ND	---	0.248
37		---	---	ND	---	0.525
38		---	---	ND	---	0.248
39		---	---	ND	---	0.248
40	40/41/71	---	---	ND	---	1.49
41	40/41/71	---	---	ND	---	1.49
42		---	---	ND	---	0.495
43	43/73	---	---	ND	---	0.495
44	44/47/65	---	---	ND	---	1.49
45	45/51	---	---	ND	---	0.990
46		---	---	ND	---	0.495
47	44/47/65	---	---	ND	---	1.49
48		---	---	ND	---	0.495

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-011  
Lab Sample ID 10366755011  
Filename P161030B\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.990
50	50/53	---	---	ND	---	0.990
51	45/51	---	---	ND	---	0.990
52		---	---	ND	---	1.53
53	50/53	---	---	ND	---	0.990
54		---	---	ND	---	0.495
55		---	---	ND	---	0.495
56		---	---	ND	---	0.495
57		---	---	ND	---	0.495
58		---	---	ND	---	0.495
59	59/62/75	---	---	ND	---	1.49
60		---	---	ND	---	0.495
61	61/70/74/76	---	---	ND	---	1.98
62	59/62/75	---	---	ND	---	1.49
63		---	---	ND	---	0.495
64		---	---	ND	---	0.495
65	44/47/65	---	---	ND	---	1.49
66		---	---	ND	---	0.832
67		---	---	ND	---	0.495
68		---	---	ND	---	0.495
69	49/69	---	---	ND	---	0.990
70	61/70/74/76	---	---	ND	---	1.98
71	40/41/71	---	---	ND	---	1.49
72		---	---	ND	---	0.495
73	43/73	---	---	ND	---	0.495
74	61/70/74/76	---	---	ND	---	1.98
75	59/62/75	---	---	ND	---	1.49
76	61/70/74/76	---	---	ND	---	1.98
77		---	---	ND	---	0.495
78		---	---	ND	---	0.495
79		---	---	ND	---	0.495
80		---	---	ND	---	0.495
81		---	---	ND	---	0.495
82		---	---	ND	---	0.495
83		---	---	ND	---	0.495
84		---	---	ND	---	0.495
85	85/116/117	---	---	ND	---	1.49
86	86/87/97/108/119/125	---	---	ND	---	2.97
87	86/87/97/108/119/125	---	---	ND	---	2.97
88	88/91	---	---	ND	---	0.990
89		---	---	ND	---	0.495
90	90/101/113	31.094	1.61	1.86	---	1.49
91	88/91	---	---	ND	---	0.990
92		---	---	ND	---	0.495
93	93/98/100/102	---	---	ND	---	1.98
94		---	---	ND	---	0.495
95		28.025	1.58	1.13	---	0.941
96		---	---	ND	---	0.495

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1612528-011  
 Lab Sample ID 10366755011  
 Filename P161030B\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.97
98	93/98/100/102	---	---	ND	---	1.98
99		31.714	1.57	0.806	---	0.495
100	93/98/100/102	---	---	ND	---	1.98
101	90/101/113	31.094	1.61	(1.86)	---	1.49
102	93/98/100/102	---	---	ND	---	1.98
103		---	---	ND	---	0.495
104		---	---	ND	---	0.495
105		37.487	1.58	1.22	---	0.495
106		---	---	ND	---	0.495
107	107/124	---	---	ND	---	0.990
108	86/87/97/108/119/125	---	---	ND	---	2.97
109		---	---	ND	---	0.495
110	110/115	33.156	1.62	2.91	---	0.990
111		---	---	ND	---	0.495
112		---	---	ND	---	0.495
113	90/101/113	31.094	1.61	(1.86)	---	1.49
114		---	---	ND	---	0.495
115	110/115	33.156	1.62	(2.91)	---	0.990
116	85/116/117	---	---	ND	---	1.49
117	85/116/117	---	---	ND	---	1.49
118		36.263	1.59	2.58	---	0.634
119	86/87/97/108/119/125	---	---	ND	---	2.97
120		---	---	ND	---	0.495
121		---	---	ND	---	0.495
122		---	---	ND	---	0.495
123		---	---	ND	---	0.495
124	107/124	---	---	ND	---	0.990
125	86/87/97/108/119/125	---	---	ND	---	2.97
126		---	---	ND	---	0.495
127		---	---	ND	---	0.495
128	128/166	---	---	ND	---	0.990
129	129/138/163	39.416	1.25	3.24	---	1.49
130		---	---	ND	---	0.495
131		---	---	ND	---	0.495
132		36.331	1.20	0.924	---	0.495
133		---	---	ND	---	0.495
134	134/143	---	---	ND	---	0.990
135	135/151	---	---	ND	---	0.990
136		---	---	ND	---	0.495
137		---	---	ND	---	0.495
138	129/138/163	39.416	1.25	(3.24)	---	1.49
139	139/140	---	---	ND	---	0.990
140	139/140	---	---	ND	---	0.990
141		---	---	ND	---	0.495
142		---	---	ND	---	0.495
143	134/143	---	---	ND	---	0.990
144		---	---	ND	---	0.495

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1612528-011  
Lab Sample ID 10366755011  
Filename P161030B\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.495
146		---	---	ND	---	0.495
147	147/149	35.022	1.31	1.47	---	0.990
148		---	---	ND	---	0.495
149	147/149	35.022	1.31	(1.47)	---	0.990
150		---	---	ND	---	0.495
151	135/151	---	---	ND	---	0.990
152		---	---	ND	---	0.495
153	153/168	38.125	1.27	1.82	---	0.990
154		---	---	ND	---	0.495
155		---	---	ND	---	0.495
156	156/157	---	---	ND	---	0.990
157	156/157	---	---	ND	---	0.990
158		---	---	ND	---	0.495
159		---	---	ND	---	0.495
160		---	---	ND	---	0.495
161		---	---	ND	---	0.495
162		---	---	ND	---	0.495
163	129/138/163	39.416	1.25	(3.24)	---	1.49
164		---	---	ND	---	0.495
165		---	---	ND	---	0.495
166	128/166	---	---	ND	---	0.990
167		---	---	ND	---	0.495
168	153/168	38.125	1.27	(1.82)	---	0.990
169		---	---	ND	---	0.495
170		---	---	ND	---	0.495
171	171/173	---	---	ND	---	0.990
172		---	---	ND	---	0.495
173	171/173	---	---	ND	---	0.990
174		---	---	ND	---	0.495
175		---	---	ND	---	0.495
176		---	---	ND	---	0.495
177		---	---	ND	---	0.495
178		---	---	ND	---	0.495
179		---	---	ND	---	0.495
180	180/193	---	---	ND	---	0.990
181		---	---	ND	---	0.495
182		---	---	ND	---	0.495
183	183/185	---	---	ND	---	0.990
184		---	---	ND	---	0.495
185	183/185	---	---	ND	---	0.990
186		---	---	ND	---	0.495
187		---	---	ND	---	0.495
188		---	---	ND	---	0.495
189		---	---	ND	---	0.495
190		---	---	ND	---	0.495
191		---	---	ND	---	0.495
192		---	---	ND	---	0.495

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
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\* = See Discussion  
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RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1612528-011  
 Lab Sample ID        10366755011  
 Filename                P161030B\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.990
194		---	---	ND	---	0.743
195		---	---	ND	---	0.743
196		---	---	ND	---	0.743
197	197/200	---	---	ND	---	1.49
198	198/199	---	---	ND	---	1.49
199	198/199	---	---	ND	---	1.49
200	197/200	---	---	ND	---	1.49
201		---	---	ND	---	0.743
202		---	---	ND	---	0.743
203		---	---	ND	---	0.743
204		---	---	ND	---	0.743
205		---	---	ND	---	0.743
206		---	---	ND	---	0.743
207		---	---	ND	---	0.743
208		---	---	ND	---	0.743
209		---	---	ND	---	0.743

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1612528-011  
Lab Sample ID             10366755011  
Filename                    P161030B\_11

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	10.5
Total Hexachloro Biphenyls	7.46
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	18.0

ND = Not Detected

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-52509	Matrix	Water
Filename	P161029B_06	Extracted	10/25/2016 14:00
Injected By	BAL	Analyzed	10/30/2016 03:37
Total Amount Extracted	1050 mL	Dilution	5
ICAL ID	P161029B02		
CCal Filename(s)	P161029B_01		

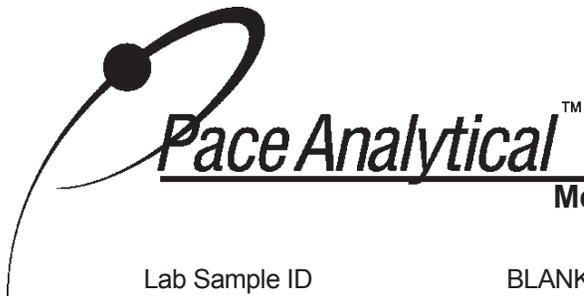
PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery	
<b>Labeled Analytes</b>							
13C-2-MoCB	1	8.897	0.88	2.0	0.0149	1	R
13C-4-MoCB	3	11.545	2.67	2.0	0.0842	4	R
13C-2,2'-DiCB	4	11.772	1.65	2.0	0.0737	4	R
13C-4,4'-DiCB	15	18.612	1.60	2.0	0.422	21	R
13C-2,2',6-TrCB	19	15.389	1.11	2.0	0.246	12	R
13C-3,4,4'-TrCB	37	26.221	1.13	2.0	0.864	43	
13C-2,2',6,6'-TeCB	54	18.842	0.86	2.0	0.455	23	R
13C-3,4,4',5-TeCB	81	33.268	0.77	2.0	0.994	50	
13C-3,3',4,4'-TeCB	77	33.872	0.83	2.0	0.989	49	
13C-2,2',4,6,6'-PeCB	104	24.795	1.60	2.0	0.590	30	
13C-2,3,3',4,4'-PeCB	105	37.415	1.54	2.0	0.968	48	
13C-2,3,4,4',5-PeCB	114	36.728	1.56	2.0	1.01	51	
13C-2,3',4,4',5-PeCB	118	36.174	1.67	2.0	1.02	51	
13C-2,3',4,4',5'-PeCB	123	35.839	1.60	2.0	1.04	52	
13C-3,3',4,4',5-PeCB	126	40.584	1.59	2.0	0.812	41	
13C-2,2',4,4',6,6'-HxCB	155	30.753	1.28	2.0	0.824	41	
13C-HxCB (156/157)	156/157	43.591	1.22	4.0	1.62	41	
13C-2,3',4,4',5,5'-HxCB	167	42.417	1.25	2.0	0.879	44	
13C-3,3',4,4',5,5'-HxCB	169	46.928	1.24	2.0	0.589	29	
13C-2,2',3,4',5,6,6'-HpCB	188	36.627	1.09	2.0	1.32	66	
13C-2,3,3',4,4',5,5'-HpCB	189	49.424	1.01	2.0	0.980	49	
13C-2,2',3,3',5,5',6,6'-OoCB	202	42.082	0.87	2.0	1.43	71	
13C-2,3,3',4,4',5,5',6-OoCB	205	51.989	0.89	2.0	0.937	47	
13C-2,2',3,3',4,4',5,5',6-NoCB	206	53.692	0.80	2.0	0.848	42	
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	48.820	0.81	2.0	1.17	59	
13C-DeCB	209	55.265	0.63	2.0	0.991	50	
<b>Cleanup Standards</b>							
13C-2,4,4'-TrCB	28	21.894	1.03	2.0	1.48	74	
13C-2,3,3',5,5'-PeCB	111	33.805	1.58	2.0	1.58	79	
13C-2,2',3,3',5,5',6-HpCB	178	39.746	1.02	2.0	1.62	81	
<b>Recovery Standards</b>							
13C-2,5-DiCB	9	14.095	1.58	2.0	NA	NA	
13C-2,2',5,5'-TeCB	52	23.806	0.85	2.0	NA	NA	
13C-2,2',4,5,5'-PeCB	101	31.021	1.62	2.0	NA	NA	
13C-2,2',3,4,4',5'-HxCB	138	39.326	1.30	2.0	NA	NA	
13C-2,2',3,3',4,4',5,5'-OoCB	194	51.493	0.96	2.0	NA	NA	

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
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B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52509  
Filename P161029B\_06

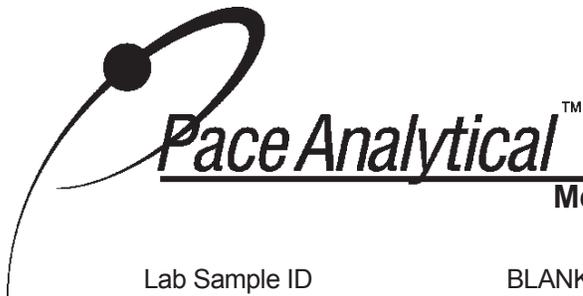
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		--	--	ND	--	0.238
2		--	--	ND	--	0.238
3		--	--	ND	--	0.238
4		--	--	ND	--	0.441
5		--	--	ND	--	0.238
6		--	--	ND	--	0.238
7		--	--	ND	--	0.238
8		--	--	ND	--	0.238
9		--	--	ND	--	0.238
10		--	--	ND	--	0.238
11		--	--	ND	--	2.33
12	12/13	--	--	ND	--	0.476
13	12/13	--	--	ND	--	0.476
14		--	--	ND	--	0.238
15		--	--	ND	--	0.238
16		--	--	ND	--	0.238
17		--	--	ND	--	0.238
18	18/30	--	--	ND	--	0.476
19		--	--	ND	--	0.238
20	20/28	--	--	ND	--	1.23
21	21/33	--	--	ND	--	1.29
22		--	--	ND	--	0.905
23		--	--	ND	--	0.238
24		--	--	ND	--	0.238
25		--	--	ND	--	0.238
26	26/29	--	--	ND	--	0.476
27		--	--	ND	--	0.238
28	20/28	--	--	ND	--	1.23
29	26/29	--	--	ND	--	0.476
30	18/30	--	--	ND	--	0.476
31		--	--	ND	--	1.24
32		--	--	ND	--	0.238
33	21/33	--	--	ND	--	1.29
34		--	--	ND	--	0.238
35		--	--	ND	--	0.238
36		--	--	ND	--	0.238
37		--	--	ND	--	0.505
38		--	--	ND	--	0.238
39		--	--	ND	--	0.238
40	40/41/71	--	--	ND	--	1.43
41	40/41/71	--	--	ND	--	1.43
42		--	--	ND	--	0.476
43	43/73	--	--	ND	--	0.476
44	44/47/65	--	--	ND	--	1.43
45	45/51	--	--	ND	--	0.952

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52509  
Filename P161029B\_06

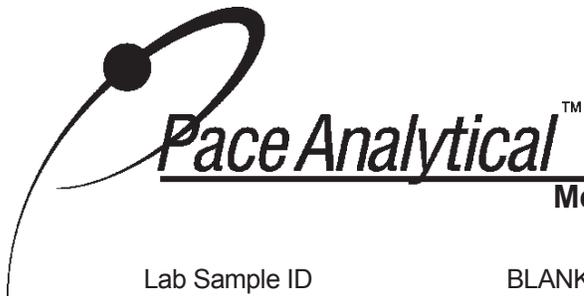
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		--	--	ND	--	0.476
47	44/47/65	--	--	ND	--	1.43
48		--	--	ND	--	0.476
49	49/69	--	--	ND	--	0.952
50	50/53	--	--	ND	--	0.952
51	45/51	--	--	ND	--	0.952
52		--	--	ND	--	1.47
53	50/53	--	--	ND	--	0.952
54		--	--	ND	--	0.476
55		--	--	ND	--	0.476
56		--	--	ND	--	0.476
57		--	--	ND	--	0.476
58		--	--	ND	--	0.476
59	59/62/75	--	--	ND	--	1.43
60		--	--	ND	--	0.476
61	61/70/74/76	--	--	ND	--	1.90
62	59/62/75	--	--	ND	--	1.43
63		--	--	ND	--	0.476
64		--	--	ND	--	0.476
65	44/47/65	--	--	ND	--	1.43
66		--	--	ND	--	0.800
67		--	--	ND	--	0.476
68		--	--	ND	--	0.476
69	49/69	--	--	ND	--	0.952
70	61/70/74/76	--	--	ND	--	1.90
71	40/41/71	--	--	ND	--	1.43
72		--	--	ND	--	0.476
73	43/73	--	--	ND	--	0.476
74	61/70/74/76	--	--	ND	--	1.90
75	59/62/75	--	--	ND	--	1.43
76	61/70/74/76	--	--	ND	--	1.90
77		--	--	ND	--	0.476
78		--	--	ND	--	0.476
79		--	--	ND	--	0.476
80		--	--	ND	--	0.476
81		--	--	ND	--	0.476
82		--	--	ND	--	0.476
83		--	--	ND	--	0.476
84		--	--	ND	--	0.476
85	85/116/117	--	--	ND	--	1.43
86	86/87/97/108/119/125	--	--	ND	--	2.86
87	86/87/97/108/119/125	--	--	ND	--	2.86
88	88/91	--	--	ND	--	0.952
89		--	--	ND	--	0.476
90	90/101/113	--	--	ND	--	1.43

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52509  
 Filename P161029B\_06

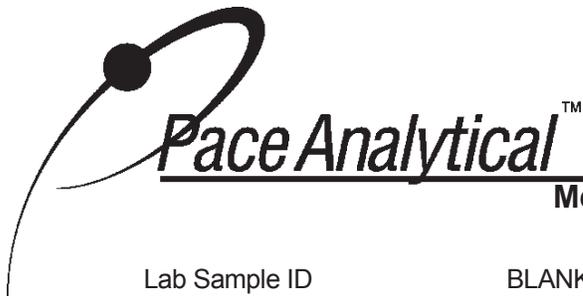
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	--	--	ND	--	0.952
92		--	--	ND	--	0.476
93	93/98/100/102	--	--	ND	--	1.90
94		--	--	ND	--	0.476
95		--	--	ND	--	0.905
96		--	--	ND	--	0.476
97	86/87/97/108/119/125	--	--	ND	--	2.86
98	93/98/100/102	--	--	ND	--	1.90
99		--	--	ND	--	0.476
100	93/98/100/102	--	--	ND	--	1.90
101	90/101/113	--	--	ND	--	1.43
102	93/98/100/102	--	--	ND	--	1.90
103		--	--	ND	--	0.476
104		--	--	ND	--	0.476
105		--	--	ND	--	0.476
106		--	--	ND	--	0.476
107	107/124	--	--	ND	--	0.952
108	86/87/97/108/119/125	--	--	ND	--	2.86
109		--	--	ND	--	0.476
110	110/115	--	--	ND	--	0.952
111		--	--	ND	--	0.476
112		--	--	ND	--	0.476
113	90/101/113	--	--	ND	--	1.43
114		--	--	ND	--	0.476
115	110/115	--	--	ND	--	0.952
116	85/116/117	--	--	ND	--	1.43
117	85/116/117	--	--	ND	--	1.43
118		--	--	ND	--	0.610
119	86/87/97/108/119/125	--	--	ND	--	2.86
120		--	--	ND	--	0.476
121		--	--	ND	--	0.476
122		--	--	ND	--	0.476
123		--	--	ND	--	0.476
124	107/124	--	--	ND	--	0.952
125	86/87/97/108/119/125	--	--	ND	--	2.86
126		--	--	ND	--	0.476
127		--	--	ND	--	0.476
128	128/166	--	--	ND	--	0.952
129	129/138/163	--	--	ND	--	1.43
130		--	--	ND	--	0.476
131		--	--	ND	--	0.476
132		--	--	ND	--	0.476
133		--	--	ND	--	0.476
134	134/143	--	--	ND	--	0.952
135	135/151	--	--	ND	--	0.952

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52509  
Filename P161029B\_06

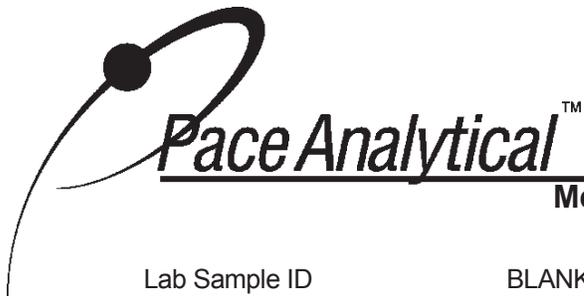
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		--	--	ND	--	0.476
137		--	--	ND	--	0.476
138	129/138/163	--	--	ND	--	1.43
139	139/140	--	--	ND	--	0.952
140	139/140	--	--	ND	--	0.952
141		--	--	ND	--	0.476
142		--	--	ND	--	0.476
143	134/143	--	--	ND	--	0.952
144		--	--	ND	--	0.476
145		--	--	ND	--	0.476
146		--	--	ND	--	0.476
147	147/149	--	--	ND	--	0.952
148		--	--	ND	--	0.476
149	147/149	--	--	ND	--	0.952
150		--	--	ND	--	0.476
151	135/151	--	--	ND	--	0.952
152		--	--	ND	--	0.476
153	153/168	--	--	ND	--	0.952
154		--	--	ND	--	0.476
155		--	--	ND	--	0.476
156	156/157	--	--	ND	--	0.952
157	156/157	--	--	ND	--	0.952
158		--	--	ND	--	0.476
159		--	--	ND	--	0.476
160		--	--	ND	--	0.476
161		--	--	ND	--	0.476
162		--	--	ND	--	0.476
163	129/138/163	--	--	ND	--	1.43
164		--	--	ND	--	0.476
165		--	--	ND	--	0.476
166	128/166	--	--	ND	--	0.952
167		--	--	ND	--	0.476
168	153/168	--	--	ND	--	0.952
169		--	--	ND	--	0.476
170		--	--	ND	--	0.476
171	171/173	--	--	ND	--	0.952
172		--	--	ND	--	0.476
173	171/173	--	--	ND	--	0.952
174		--	--	ND	--	0.476
175		--	--	ND	--	0.476
176		--	--	ND	--	0.476
177		--	--	ND	--	0.476
178		--	--	ND	--	0.476
179		--	--	ND	--	0.476
180	180/193	--	--	ND	--	0.952

Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52509  
Filename P161029B\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		--	--	ND	--	0.476
182		--	--	ND	--	0.476
183	183/185	--	--	ND	--	0.952
184		--	--	ND	--	0.476
185	183/185	--	--	ND	--	0.952
186		--	--	ND	--	0.476
187		--	--	ND	--	0.476
188		--	--	ND	--	0.476
189		--	--	ND	--	0.476
190		--	--	ND	--	0.476
191		--	--	ND	--	0.476
192		--	--	ND	--	0.476
193	180/193	--	--	ND	--	0.952
194		--	--	ND	--	0.714
195		--	--	ND	--	0.714
196		--	--	ND	--	0.714
197	197/200	--	--	ND	--	1.43
198	198/199	--	--	ND	--	1.43
199	198/199	--	--	ND	--	1.43
200	197/200	--	--	ND	--	1.43
201		--	--	ND	--	0.714
202		--	--	ND	--	0.714
203		--	--	ND	--	0.714
204		--	--	ND	--	0.714
205		--	--	ND	--	0.714
206		--	--	ND	--	0.714
207		--	--	ND	--	0.714
208		--	--	ND	--	0.714
209		--	--	ND	--	0.714

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID           CBLKSP  
Lab Sample ID             BLANK-52509  
Filename                    P161029B\_06

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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**Method 1668A Polychlorobiphenyls  
 Laboratory Control Spike Analysis Results**

Lab Sample ID	LCS-52510	Matrix	Water
Filename	P161029B_03	Dilution	5
Total Amount Extracted	1030 mL	Extracted	10/25/2016 14:00
ICAL ID	P161029B02	Analyzed	10/30/2016 00:41
CCal Filename(s)	P161029B_01	Injected By	BAL
Method Blank ID	BLANK-52509		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.17	117	2.0	0.891	45
3	1.0	1.18	118	2.0	0.893	45
4	1.0	1.15	115	2.0	0.681	34
15	1.0	1.10	110	2.0	1.12	56
19	1.0	1.16	116	2.0	0.872	44
37	1.0	1.10	110	2.0	1.55	77
54	1.0	1.06	106	2.0	1.14	57
81	1.0	1.06	106	2.0	1.84	92
77	1.0	1.02	102	2.0	1.76	88
104	1.0	1.13	113	2.0	1.11	56
105	1.0	1.10	110	2.0	1.70	85
114	1.0	1.10	110	2.0	1.68	84
118	1.0	1.06	106	2.0	1.75	88
123	1.0	1.07	107	2.0	1.73	86
126	1.0	1.04	104	2.0	1.53	76
155	1.0	1.03	103	2.0	1.48	74
156/157	2.0	2.09	105	4.0	2.96	74
167	1.0	1.07	107	2.0	1.55	77
169	1.0	1.08	108	2.0	1.18	59
188	1.0	1.12	112	2.0	2.01	100
189	1.0	1.08	108	2.0	1.55	77
202	1.0	1.04	104	2.0	2.15	107
205	1.0	1.06	106	2.0	1.59	79
206	1.0	1.10	110	2.0	1.38	69
208	1.0	1.12	112	2.0	1.79	89
209	1.0	1.03	103	2.0	1.64	82

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCSD-52511	Matrix	Water
Filename	P161029B_04	Dilution	5
Total Amount Extracted	1030 mL	Extracted	10/25/2016 14:00
ICAL ID	P161029B02	Analyzed	10/30/2016 01:40
CCal Filename(s)	P161029B_01	Injected By	BAL
Method Blank ID	BLANK-52509		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.15	115	2.0	1.42	71
3	1.0	1.25	125	2.0	1.29	64
4	1.0	1.16	116	2.0	0.976	49
15	1.0	1.11	111	2.0	1.33	67
19	1.0	1.13	113	2.0	1.20	60
37	1.0	1.04	104	2.0	1.72	86
54	1.0	1.11	111	2.0	1.39	69
81	1.0	1.03	103	2.0	1.86	93
77	1.0	1.02	102	2.0	1.77	88
104	1.0	1.15	115	2.0	1.28	64
105	1.0	1.04	104	2.0	1.81	90
114	1.0	1.05	105	2.0	1.86	93
118	1.0	1.08	108	2.0	1.86	93
123	1.0	1.10	110	2.0	1.82	91
126	1.0	1.07	107	2.0	1.56	78
155	1.0	1.05	105	2.0	1.69	85
156/157	2.0	2.02	101	4.0	3.15	79
167	1.0	1.00	100	2.0	1.73	86
169	1.0	1.02	102	2.0	1.14	57
188	1.0	1.14	114	2.0	2.40	120
189	1.0	1.08	108	2.0	1.69	85
202	1.0	1.07	107	2.0	2.46	123
205	1.0	1.01	101	2.0	1.70	85
206	1.0	1.08	108	2.0	1.54	77
208	1.0	1.05	105	2.0	2.12	106
209	1.0	0.989	99	2.0	1.90	95

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client ALS Environmental

Spike 1 ID LCS-52510  
Spike 1 Filename P161029B\_03

Spike 2 ID LCSD-52511  
Spike 2 Filename P161029B\_04

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	117	115	1.7
4-MoCB	3	118	125	5.8
2,2'-DiCB	4	115	116	0.9
4,4'-DiCB	15	110	111	0.9
2,2',6-TrCB	19	116	113	2.6
3,4,4'-TrCB	37	110	104	5.6
2,2',6,6'-TeCB	54	106	111	4.6
3,3',4,4'-TeCB	77	102	102	0.0
3,4,4',5-TeCB	81	106	103	2.9
2,2',4,6,6'-PeCB	104	113	115	1.8
2,3,3',4,4'-PeCB	105	110	104	5.6
2,3,4,4',5-PeCB	114	110	105	4.7
2,3',4,4',5-PeCB	118	106	108	1.9
2,3',4,4',5'-PeCB	123	107	110	2.8
3,3',4,4',5-PeCB	126	104	107	2.8
2,2',4,4',6,6'-HxCB	155	103	105	1.9
(156/157)	156/157	105	101	3.9
2,3',4,4',5,5'-HxCB	167	107	100	6.8
3,3',4,4',5,5'-HxCB	169	108	102	5.7
2,2',3,4',5,6,6'-HpCB	188	112	114	1.8
2,3,3',4,4',5,5'-HpCB	189	108	108	0.0
2,2',3,3',5,5',6,6'-OxCB	202	104	107	2.8
2,3,3',4,4',5,5',6-OxCB	205	106	101	4.8
2,2',3,3',4,4',5,5',6-NoCB	206	110	108	1.8
2,2',3,3',4,5,5',6,6'-NoCB	208	112	105	6.5
Decachlorobiphenyl	209	103	99	4.0

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

**REPORT OF LABORATORY ANALYSIS**

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55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Sampling in City Outfall Basin 19

**To:** File  
**From:** Brian Anderson, GSI Water Solutions, Inc.  
**Date:** January 26, 2017

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in November 2016. One stormwater composite sample (W16K060-01) was collected in Outfall Basin 19 on November 5 – 6, 2016, and submitted for analysis.

The laboratory analyses for this sample were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Conductivity – FO SOP 1.03a
  - pH – FO SOP 1.01a
  - Temp – FO SOP 1.05a
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- Pace Analytical Services (Pace)
  - Polychlorinated Biphenyls (PCB) Congeners – EPA 1668A

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with this source control program sample.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control (LC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the sample. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## **Analysis Holding Times**

The sample was extracted and analyzed within acceptable holding times.

## **Method Blanks**

Method blanks were analyzed during the laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, and subcontracted analysis of PCB congeners. No analytes were detected in the method blanks processed during any of the analyses.

## **Surrogate Recoveries**

Surrogate recoveries were completed during the analyses of PAHs and phthalates. Surrogate recoveries for the field sample and all associated QC samples were within control criteria.

## **Internal Standard Recoveries**

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. The laboratory reported that internal standards in the sample extracts were recovered at 47-110%. Internal standard recoveries were within the target ranges specified in the method. Because the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery, which allowed accurate values to be obtained.

## **Matrix Spike/Matrix Spike Duplicates**

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates, and one MSD was processed for PAHs and phthalate analysis. One of two MS analyses were beneath acceptance limits for mercury. Based on this low matrix spike recovery, Mercury has been qualified as an estimated value possibly biased low (J-). Remaining MS and MSD sample results were within acceptance limits and MSD sample results were within RPD limits.

## **Laboratory Control Samples**

LC samples were processed during the analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. LC sample recoveries were within laboratory control limits for all analyses.

## **Laboratory Duplicate**

WPCL processed two laboratory duplicate samples during total metals analysis and mercury analysis, while three laboratory duplicate samples were processed during TSS analysis. RPDs were within laboratory acceptance limits. Laboratory duplicate (dup 1) for mercury resulted in a detection with the source sample showing non-detect. Mercury has already been qualified as an estimated value possibly biased low (J-) due to low matrix spike recovery.

## **Other**

The sample was delivered to WPCL with a cooler temperature of 10 degrees C, which is above the required holding temperature, but qualifications have not been made as the cooler was delivered in the same day as sampling and there is evidence that the chilling process has begun. Temperatures during shipping and transport of the sample for subcontracted analyses were less than 6° C.

WPCL reports that the continuing calibration verification was high for Di-n-octyl phthalate and Bis(2-ethylhexyl) phthalate. Di-n-octyl phthalate was not detected above the detection limit and has not been qualified. Bis(2-ethylhexyl) phthalate was detected at 2.0 mg/L, and has been qualified as an estimate possibly biased high (J+).

No other anomalies were reported in by WPCL or the subcontracted laboratories. A list of additional data qualifications added during validation is provided in Table 1.

**Table 1. Qualifiers Added or Modified During Validation**

City of Portland

*Outfall 19*

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
W16K060-01	Mercury	ug/L	0.0161	J-	MS
W16K060-01	Bis(2-ethylhexyl) phthalate	ug/L	1.8	J+	CCV

**Notes**

µg/L = micrograms per liter

**Qualifier Definitions**

J+ = Detection of analyte is considered a high estimate

**Reason Code Definitions**

CCV = The continuing calibration verification was high and the sample results may be high estimates

MS = Based on low matrix spike recovery, the sample result may be a low estimate due to matrix interference



City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



December 16, 2016

Linda Scheffler  
Director's Office

---

Work Order  
**W16K060**

Project  
**Portland Harbor**

Received  
11/06/16 13:03

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W16K060</b>	Project Mgr: Linda Scheffler
Received: 11/6/16 13:03	
Submitted By: Field Operations	

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
19_SW3	W16K060-01	Stormwater	Composite	11/05/16 07:41	11/06/16 01:15	

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**19\_SW3 : W16K060-01**

**General Chemistry**

Total suspended solids	48 mg/L	2	2		B16K161	11/09/16	11/09/16	SM 2540D	
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**Total Metals**

Total Metals by ICPMS

Arsenic	1.51 ug/L	0.100	0.100	1	B16K132	11/07/16	11/09/16	EPA 200.8	
Cadmium	0.152 ug/L	0.100	0.100	1	B16K132	11/07/16	11/09/16	EPA 200.8	
Chromium	2.96 ug/L	0.200	0.200	1	B16K132	11/07/16	11/09/16	EPA 200.8	
Copper	11.4 ug/L	0.200	0.200	1	B16K132	11/07/16	11/09/16	EPA 200.8	
Lead	10.8 ug/L	0.100	0.100	1	B16K132	11/07/16	11/09/16	EPA 200.8	
Mercury	0.0161 ug/L	0.00100	0.00100	1	B16K155	11/09/16	11/09/16	WPCLSOP M-10	
Nickel	2.02 ug/L	0.200	0.200	1	B16K132	11/07/16	11/09/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16K132	11/07/16	11/09/16	EPA 200.8	
Zinc	159 ug/L	0.500	0.500	1	B16K132	11/07/16	11/09/16	EPA 200.8	

Reported: 12/16/16 14:38

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*



**City of Portland  
Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16K060**

**Client: Director's Office**  
**Received: 11/06/16 13:03**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

**Polynuclear Aromatics & Phthalates by GCMS-SIM**

Acenaphthene	ND ug/L	0.020	0.020	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Acenaphthylene	0.020 ug/L	0.020	0.020	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Anthracene	0.055 ug/L	0.020	0.020	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Benzo(a)anthracene	0.033 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Benzo(a)pyrene	0.037 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.065 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.053 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.016 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Chrysene	0.043 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Fluoranthene	0.078 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Fluorene	ND ug/L	0.020	0.020	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.028 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
1-Methylnaphthalene	ND ug/L	0.040	0.040	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
2-Methylnaphthalene	ND ug/L	0.040	0.040	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Naphthalene	ND ug/L	0.040	0.040	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Phenanthrene	0.049 ug/L	0.020	0.020	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Pyrene	0.11 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND ug/L	1.0	0.50	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND ug/L	1.0	0.50	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Diethyl phthalate	ND ug/L	1.0	0.50	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Dimethyl phthalate	ND ug/L	1.0	0.50	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND ug/L	1.0	0.50	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.8 ug/L	1.0	0.50	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.17 ug/L	0.229	74%	31-164	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Fluoranthene-d10	0.23 ug/L	0.229	102%	65-145	B16K133	11/08/16	12/14/16	EPA 8270-SIM	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
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Project: **Portland Harbor**  
Work Order: **W16K060**

Client: Director's Office  
Received: 11/06/16 13:03

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B16K161</b>										
<b>Blank (B16K161-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					11/09/16 : 11/09/16	
<b>LCS (B16K161-BS1)</b>										
Total suspended solids	95	mg/L			100		95% (90-110)		11/09/16 : 11/09/16	
<b>Duplicate (B16K161-DUP1) Source: W16K053-01</b>										
Total suspended solids	19	mg/L	2	2		19		0 (20)	11/09/16 : 11/09/16	
<b>Duplicate (B16K161-DUP3) Source: W16K084-01</b>										
Total suspended solids	308	mg/L	2	2		320		4 (20)	11/09/16 : 11/09/16	
<b>Duplicate (B16K161-DUP4) Source: W16K070-01RE1</b>										
Total suspended solids	150	mg/L	2	2		150		0 (20)	11/09/16 : 11/10/16	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B16K132</b>										
<b>Blank (B16K132-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					11/07/16 : 11/09/16	
Cadmium	ND	ug/L	0.100	0.100					11/07/16 : 11/09/16	
Chromium	ND	ug/L	0.200	0.200					11/07/16 : 11/09/16	
Copper	ND	ug/L	0.200	0.200					11/07/16 : 11/09/16	
Lead	ND	ug/L	0.100	0.100					11/07/16 : 11/09/16	
Nickel	ND	ug/L	0.200	0.200					11/07/16 : 11/09/16	
Silver	ND	ug/L	0.100	0.100					11/07/16 : 11/09/16	
Zinc	ND	ug/L	0.500	0.500					11/07/16 : 11/09/16	
<b>LCS (B16K132-BS1)</b>										
Arsenic	5.00	ug/L	0.100	0.100	5.00		100% (85-115)		11/07/16 : 11/09/16	
Cadmium	4.91	ug/L	0.100	0.100	5.00		98% (85-115)		11/07/16 : 11/09/16	
Chromium	4.92	ug/L	0.200	0.200	5.00		98% (85-115)		11/07/16 : 11/09/16	
Copper	5.01	ug/L	0.200	0.200	5.00		100% (85-115)		11/07/16 : 11/09/16	
Lead	5.00	ug/L	0.100	0.100	5.00		100% (85-115)		11/07/16 : 11/09/16	
Nickel	4.93	ug/L	0.200	0.200	5.00		99% (85-115)		11/07/16 : 11/09/16	
Silver	5.11	ug/L	0.100	0.100	5.00		102% (85-115)		11/07/16 : 11/09/16	
Zinc	24.6	ug/L	0.500	0.500	25.0		99% (85-115)		11/07/16 : 11/09/16	

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**Project: Portland Harbor**  
**Work Order: W16K060**

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**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16K132**

<b>Duplicate (B16K132-DUP1)</b>		<b>Source: W16K058-01</b>								
Arsenic	0.279	ug/L	0.100	0.100		0.267	5 (20)		11/07/16 :11/09/16	
Cadmium	0.114	ug/L	0.100	0.100		0.101	12 (20)		11/07/16 :11/09/16	
Chromium	0.823	ug/L	0.200	0.200		0.805	2 (20)		11/07/16 :11/09/16	
Copper	3.36	ug/L	0.200	0.200		3.30	2 (20)		11/07/16 :11/09/16	
Lead	1.02	ug/L	0.100	0.100		0.978	4 (20)		11/07/16 :11/09/16	
Nickel	0.612	ug/L	0.200	0.200		0.600	2 (20)		11/07/16 :11/09/16	
Silver	ND	ug/L	0.100	0.100		ND	(20)		11/07/16 :11/09/16	
Zinc	35.5	ug/L	0.500	0.500		34.3	4 (20)		11/07/16 :11/09/16	

<b>Duplicate (B16K132-DUP3)</b>		<b>Source: W16K055-01</b>								
Arsenic	1.18	ug/L	0.100	0.100		1.19	0.9 (20)		11/07/16 :11/09/16	
Cadmium	0.244	ug/L	0.100	0.100		0.226	8 (20)		11/07/16 :11/09/16	
Chromium	3.69	ug/L	0.200	0.200		3.65	1 (20)		11/07/16 :11/09/16	
Copper	38.4	ug/L	0.200	0.200		37.1	4 (20)		11/07/16 :11/09/16	
Lead	9.33	ug/L	0.100	0.100		9.62	3 (20)		11/07/16 :11/09/16	
Nickel	4.18	ug/L	0.200	0.200		4.49	7 (20)		11/07/16 :11/09/16	
Silver	0.354	ug/L	0.100	0.100		0.317	11 (20)		11/07/16 :11/09/16	
Zinc	173	ug/L	0.500	0.500		171	0.7 (20)		11/07/16 :11/09/16	

<b>Matrix Spike (B16K132-MS1)</b>		<b>Source: W16K058-01</b>								
Arsenic	5.24	ug/L	0.100	0.100	5.00	0.267	100% (70-130)		11/07/16 :11/09/16	
Cadmium	5.01	ug/L	0.100	0.100	5.00	0.101	98% (70-130)		11/07/16 :11/09/16	
Chromium	5.87	ug/L	0.200	0.200	5.00	0.805	101% (70-130)		11/07/16 :11/09/16	
Copper	8.30	ug/L	0.200	0.200	5.00	3.30	100% (70-130)		11/07/16 :11/09/16	
Lead	6.10	ug/L	0.100	0.100	5.00	0.978	102% (70-130)		11/07/16 :11/09/16	
Nickel	5.60	ug/L	0.200	0.200	5.00	0.600	100% (70-130)		11/07/16 :11/09/16	
Silver	5.12	ug/L	0.100	0.100	5.00	ND	102% (70-130)		11/07/16 :11/09/16	
Zinc	58.5	ug/L	0.500	0.500	25.0	34.3	97% (70-130)		11/07/16 :11/09/16	

<b>Matrix Spike (B16K132-MS2)</b>		<b>Source: W16K055-01</b>								
Arsenic	11.1	ug/L	0.100	0.100	10.0	1.19	99% (70-130)		11/07/16 :11/09/16	
Cadmium	10.0	ug/L	0.100	0.100	10.0	0.226	98% (70-130)		11/07/16 :11/09/16	
Chromium	14.1	ug/L	0.200	0.200	10.0	3.65	105% (70-130)		11/07/16 :11/09/16	
Copper	47.8	ug/L	0.200	0.200	10.0	37.1	107% (70-130)		11/07/16 :11/09/16	
Lead	19.9	ug/L	0.100	0.100	10.0	9.62	102% (70-130)		11/07/16 :11/09/16	
Nickel	14.3	ug/L	0.200	0.200	10.0	4.49	98% (70-130)		11/07/16 :11/09/16	
Silver	10.5	ug/L	0.100	0.100	10.0	0.317	102% (70-130)		11/07/16 :11/09/16	
Zinc	220	ug/L	0.500	0.500	50.0	171	97% (70-130)		11/07/16 :11/09/16	

**Total Metals by ICPMS - Batch B16K155**

<b>Blank (B16K155-BLK1)</b>										
Mercury	ND	ug/L	0.000900	0.000900					11/09/16 :11/09/16	

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Jennifer Shackelford, Laboratory Coordinator QA/QC

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**Project: Portland Harbor**  
**Work Order: W16K060**

**Client: Director's Office**  
**Received: 11/06/16 13:03**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Total Metals by ICPMS - Batch B16K155										
<b>LCS (B16K155-BS1)</b>										
Mercury	0.00981	ug/L	0.000900	0.000900	0.0100		98% (85-125)		11/09/16 :11/09/16	
<b>Duplicate (B16K155-DUP1)</b>			<b>Source: W16K026-01</b>							
Mercury	0.0139	ug/L	0.00100	0.00100		ND	(20)		11/09/16 :11/09/16	
<b>Duplicate (B16K155-DUP2)</b>			<b>Source: W16K058-05</b>							
Mercury	0.00290	ug/L	0.00100	0.00100		0.00299	3 (20)		11/09/16 :11/09/16	
<b>Matrix Spike (B16K155-MS1)</b>			<b>Source: W16K026-01</b>							
Mercury	0.0660	ug/L	0.00100	0.00100	0.111	ND	59% (70-130)		11/09/16 :11/09/16	M4
<b>Matrix Spike (B16K155-MS2)</b>			<b>Source: W16K058-05</b>							
Mercury	0.0137	ug/L	0.00100	0.00100	0.0111	0.00299	97% (70-130)		11/09/16 :11/09/16	

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**Project: Portland Harbor**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16K133**

**Blank (B16K133-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					11/08/16 :12/14/16	
Acenaphthylene	ND	ug/L	0.020	0.020					11/08/16 :12/14/16	
Anthracene	ND	ug/L	0.020	0.020					11/08/16 :12/14/16	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Chrysene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Fluoranthene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Fluorene	ND	ug/L	0.020	0.020					11/08/16 :12/14/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					11/08/16 :12/14/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					11/08/16 :12/14/16	
Naphthalene	ND	ug/L	0.040	0.040					11/08/16 :12/14/16	
Phenanthrene	ND	ug/L	0.020	0.020					11/08/16 :12/14/16	
Pyrene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					11/08/16 :12/14/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					11/08/16 :12/14/16	
Diethyl phthalate	ND	ug/L	1.0	0.50					11/08/16 :12/14/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					11/08/16 :12/14/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					11/08/16 :12/14/16	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					11/08/16 :12/14/16	

**Surrogate**

2-Methylnaphthalene-d10	0.17	ug/L			0.229		73% (31-164)		11/08/16 :12/14/16	
Fluoranthene-d10	0.26	ug/L			0.229		112% (65-145)		11/08/16 :12/14/16	

**LCS (B16K133-BS1)**

Acenaphthene	0.221	ug/L	0.020	0.020	0.229		97% (67-125)		11/08/16 :12/14/16	
Acenaphthylene	0.245	ug/L	0.020	0.020	0.229		107% (64-138)		11/08/16 :12/14/16	
Anthracene	0.249	ug/L	0.020	0.020	0.229		109% (65-143)		11/08/16 :12/14/16	
Benzo(a)anthracene	0.242	ug/L	0.010	0.010	0.229		106% (80-130)		11/08/16 :12/14/16	
Benzo(a)pyrene	0.239	ug/L	0.010	0.010	0.229		105% (74-131)		11/08/16 :12/14/16	
Benzo(b)fluoranthene	0.218	ug/L	0.010	0.010	0.229		95% (67-128)		11/08/16 :12/14/16	
Benzo(g,h,i)perylene	0.233	ug/L	0.010	0.010	0.229		102% (57-137)		11/08/16 :12/14/16	
Benzo(k)fluoranthene	0.210	ug/L	0.010	0.010	0.229		92% (63-140)		11/08/16 :12/14/16	
Chrysene	0.236	ug/L	0.010	0.010	0.229		103% (80-134)		11/08/16 :12/14/16	
Dibenzo(a,h)anthracene	0.238	ug/L	0.010	0.010	0.229		104% (56-138)		11/08/16 :12/14/16	
Fluoranthene	0.256	ug/L	0.010	0.010	0.229		112% (70-150)		11/08/16 :12/14/16	
Fluorene	0.234	ug/L	0.020	0.020	0.229		102% (64-130)		11/08/16 :12/14/16	

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**Project: Portland Harbor**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16K133**

**LCS (B16K133-BS1)**

Indeno(1,2,3-cd)pyrene	0.247	ug/L	0.010	0.010	0.229		108% (58-138)		11/08/16 :12/14/16	
1-Methylnaphthalene	0.151	ug/L	0.040	0.040	0.229		66% (35-164)		11/08/16 :12/14/16	
2-Methylnaphthalene	0.145	ug/L	0.040	0.040	0.229		63% (29-162)		11/08/16 :12/14/16	
Naphthalene	0.209	ug/L	0.040	0.040	0.229		91% (53-134)		11/08/16 :12/14/16	
Phenanthrene	0.230	ug/L	0.020	0.020	0.229		101% (73-132)		11/08/16 :12/14/16	
Pyrene	0.251	ug/L	0.010	0.010	0.229		110% (69-153)		11/08/16 :12/14/16	
Butyl benzyl phthalate	3.00	ug/L	1.0	0.50	2.29		131% (55-181)		11/08/16 :12/14/16	
Di-n-butyl phthalate	2.69	ug/L	1.0	0.50	2.29		118% (61-183)		11/08/16 :12/14/16	
Diethyl phthalate	2.56	ug/L	1.0	0.50	2.29		112% (65-177)		11/08/16 :12/14/16	
Dimethyl phthalate	2.54	ug/L	1.0	0.50	2.29		111% (77-151)		11/08/16 :12/14/16	
Di-n-octyl phthalate	3.30	ug/L	1.0	0.50	2.29		144% (12-185)		11/08/16 :12/14/16	V1
Bis(2-ethylhexyl) phthalate	3.01	ug/L	1.0	0.50	2.29		132% (39-170)		11/08/16 :12/14/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.16	ug/L			0.229		71% (31-164)		11/08/16 :12/14/16	
Fluoranthene-d10	0.26	ug/L			0.229		115% (65-145)		11/08/16 :12/14/16	

**Matrix Spike (B16K133-MS1)**

**Source: W16K060-01**

Acenaphthene	0.246	ug/L	0.020	0.020	0.229	ND	108% (67-125)		11/08/16 :12/14/16	
Acenaphthylene	0.278	ug/L	0.020	0.020	0.229	0.0200	113% (64-138)		11/08/16 :12/14/16	
Anthracene	0.311	ug/L	0.020	0.020	0.229	0.0549	112% (65-143)		11/08/16 :12/14/16	
Benzo(a)anthracene	0.282	ug/L	0.010	0.010	0.229	0.0331	109% (80-130)		11/08/16 :12/14/16	
Benzo(a)pyrene	0.249	ug/L	0.010	0.010	0.229	0.0366	93% (74-131)		11/08/16 :12/14/16	
Benzo(b)fluoranthene	0.250	ug/L	0.010	0.010	0.229	0.0646	81% (67-128)		11/08/16 :12/14/16	
Benzo(g,h,i)perylene	0.257	ug/L	0.010	0.010	0.229	0.0531	89% (57-137)		11/08/16 :12/14/16	
Benzo(k)fluoranthene	0.203	ug/L	0.010	0.010	0.229	0.0160	82% (63-140)		11/08/16 :12/14/16	
Chrysene	0.293	ug/L	0.010	0.010	0.229	0.0429	110% (80-134)		11/08/16 :12/14/16	
Dibenzo(a,h)anthracene	0.198	ug/L	0.010	0.010	0.229	ND	87% (56-138)		11/08/16 :12/14/16	
Fluoranthene	0.326	ug/L	0.010	0.010	0.229	0.0777	109% (70-150)		11/08/16 :12/14/16	
Fluorene	0.258	ug/L	0.020	0.020	0.229	ND	113% (64-130)		11/08/16 :12/14/16	
Indeno(1,2,3-cd)pyrene	0.231	ug/L	0.010	0.010	0.229	0.0280	89% (58-138)		11/08/16 :12/14/16	
1-Methylnaphthalene	0.187	ug/L	0.040	0.040	0.229	ND	82% (35-164)		11/08/16 :12/14/16	
2-Methylnaphthalene	0.182	ug/L	0.040	0.040	0.229	ND	80% (29-162)		11/08/16 :12/14/16	
Naphthalene	0.255	ug/L	0.040	0.040	0.229	ND	112% (53-134)		11/08/16 :12/14/16	
Phenanthrene	0.276	ug/L	0.020	0.020	0.229	0.0486	100% (73-132)		11/08/16 :12/14/16	
Pyrene	0.354	ug/L	0.010	0.010	0.229	0.113	106% (69-153)		11/08/16 :12/14/16	
Butyl benzyl phthalate	3.38	ug/L	1.0	0.50	2.29	ND	148% (55-181)		11/08/16 :12/14/16	
Di-n-butyl phthalate	2.77	ug/L	1.0	0.50	2.29	ND	121% (61-183)		11/08/16 :12/14/16	
Diethyl phthalate	2.69	ug/L	1.0	0.50	2.29	ND	118% (65-177)		11/08/16 :12/14/16	
Dimethyl phthalate	2.86	ug/L	1.0	0.50	2.29	ND	125% (77-151)		11/08/16 :12/14/16	
Di-n-octyl phthalate	2.61	ug/L	1.0	0.50	2.29	ND	114% (12-185)		11/08/16 :12/14/16	V1
Bis(2-ethylhexyl) phthalate	4.17	ug/L	1.0	0.50	2.29	1.81	104% (39-170)		11/08/16 :12/14/16	V1

Reported: 12/16/16 14:38

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16K060**

**Client: Director's Office**  
**Received: 11/06/16 13:03**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16K133**

**Matrix Spike (B16K133-MS1)**

**Source: W16K060-01**

**Surrogate**

2-Methylnaphthalene-d10	0.18	ug/L			0.229		79% (31-164)		11/08/16 :12/14/16	
Fluoranthene-d10	0.24	ug/L			0.229		107% (65-145)		11/08/16 :12/14/16	

**Matrix Spike Dup (B16K133-MSD1)**

**Source: W16K060-01**

Acenaphthene	0.259	ug/L	0.020	0.020	0.229	ND	113% (67-125)	5 (30)	11/08/16 :12/14/16	
Acenaphthylene	0.288	ug/L	0.020	0.020	0.229	0.0200	117% (64-138)	4 (30)	11/08/16 :12/14/16	
Anthracene	0.313	ug/L	0.020	0.020	0.229	0.0549	113% (65-143)	0.5 (30)	11/08/16 :12/14/16	
Benzo(a)anthracene	0.295	ug/L	0.010	0.010	0.229	0.0331	115% (80-130)	5 (30)	11/08/16 :12/14/16	
Benzo(a)pyrene	0.274	ug/L	0.010	0.010	0.229	0.0366	104% (74-131)	9 (30)	11/08/16 :12/14/16	
Benzo(b)fluoranthene	0.277	ug/L	0.010	0.010	0.229	0.0646	93% (67-128)	10 (30)	11/08/16 :12/14/16	
Benzo(g,h,i)perylene	0.298	ug/L	0.010	0.010	0.229	0.0531	107% (57-137)	15 (30)	11/08/16 :12/14/16	
Benzo(k)fluoranthene	0.231	ug/L	0.010	0.010	0.229	0.0160	94% (63-140)	13 (30)	11/08/16 :12/14/16	
Chrysene	0.307	ug/L	0.010	0.010	0.229	0.0429	116% (80-134)	5 (30)	11/08/16 :12/14/16	
Dibenzo(a,h)anthracene	0.238	ug/L	0.010	0.010	0.229	ND	104% (56-138)	18 (30)	11/08/16 :12/14/16	
Fluoranthene	0.370	ug/L	0.010	0.010	0.229	0.0777	128% (70-150)	12 (30)	11/08/16 :12/14/16	
Fluorene	0.269	ug/L	0.020	0.020	0.229	ND	118% (64-130)	4 (30)	11/08/16 :12/14/16	
Indeno(1,2,3-cd)pyrene	0.273	ug/L	0.010	0.010	0.229	0.0280	107% (58-138)	17 (30)	11/08/16 :12/14/16	
1-Methylnaphthalene	0.194	ug/L	0.040	0.040	0.229	ND	85% (35-164)	4 (30)	11/08/16 :12/14/16	
2-Methylnaphthalene	0.190	ug/L	0.040	0.040	0.229	ND	83% (29-162)	4 (30)	11/08/16 :12/14/16	
Naphthalene	0.270	ug/L	0.040	0.040	0.229	ND	118% (53-134)	6 (30)	11/08/16 :12/14/16	
Phenanthrene	0.298	ug/L	0.020	0.020	0.229	0.0486	109% (73-132)	8 (30)	11/08/16 :12/14/16	
Pyrene	0.403	ug/L	0.010	0.010	0.229	0.113	127% (69-153)	13 (30)	11/08/16 :12/14/16	
Butyl benzyl phthalate	3.59	ug/L	1.0	0.50	2.29	ND	157% (55-181)	6 (30)	11/08/16 :12/14/16	
Di-n-butyl phthalate	2.95	ug/L	1.0	0.50	2.29	ND	129% (61-183)	7 (30)	11/08/16 :12/14/16	
Diethyl phthalate	2.78	ug/L	1.0	0.50	2.29	ND	122% (65-177)	3 (30)	11/08/16 :12/14/16	
Dimethyl phthalate	2.98	ug/L	1.0	0.50	2.29	ND	130% (77-151)	4 (30)	11/08/16 :12/14/16	
Di-n-octyl phthalate	3.40	ug/L	1.0	0.50	2.29	ND	149% (12-185)	26 (30)	11/08/16 :12/14/16	V1
Bis(2-ethylhexyl) phthalate	4.89	ug/L	1.0	0.50	2.29	1.81	135% (39-170)	16 (30)	11/08/16 :12/14/16	V1

**Surrogate**

2-Methylnaphthalene-d10	0.18	ug/L			0.229		80% (31-164)		11/08/16 :12/14/16	
Fluoranthene-d10	0.27	ug/L			0.229		119% (65-145)		11/08/16 :12/14/16	

Reported: 12/16/16 14:38

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



City of Portland  
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W16K060**

Client: Director's Office  
Received: 11/06/16 13:03

**Qualifiers**

- M4 Based on low matrix spike recovery, the sample result may be a low estimate due to matrix interference.  
V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.

**Definitions**

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 12/16/16 14:38

Jennifer Shackelford, Laboratory Coordinator QA/QC

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



Bureau of Environmental Services

Date: 11/6/16  
 Work Order #: W16K060  
 Collected By: MJS, RLR

Client Name: Directors Office Matrix: Stormwater  
 Project Name: Portland Harbor

**Requested Analyses**

Lab Number	2016 Stormwater Outfall Monitoring Composite Sample COC		Requested Analyses										# of Containers	Remarks								
	Location ID	Composite Start Date/Time	Composite End Date/Time	Sample Type	TSS	Total Metals (As, Cd, Cr, Cu, Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs + phthalates (low-level)													
19_SW3	11/5/16 0741	11/6/16 0115	C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	4	SW-19-AAP918 (OF19) 4900 NW Kittridge Ave, DS of MH
-FIELDUP			C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		Field Duplicate

Relinquished By: Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_

Received By: Signature: [Signature] Date: 11/6/16  
 Signature: [Signature] Date: 11/6/16  
 Printed Name: Urbetha Bar Time: 1303

### WPCL Cooler Receipt Form

Work Order Number: W16K060

Cooler Receipt Form Filled Out By: (Signature)

Project: Portland Harbor

Sample transport: Samples received on ice  Courier \_\_\_\_\_

Directly from field \_\_\_\_\_

Temperature (°C) 10

	Yes	No	NA
Is the COC present and signed?	✓		
Are sample bottles intact?	✓		
Do the COC and sample labels match?	✓		
Are the appropriate containers used?	✓		
Are samples appropriately preserved?	in lab		
Do VOA vials have Headspace?			✓
Are samples received within holding times?	✓		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	1601146	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
11/7/16	1028	(Signature)	W16K060-07	D	1	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

December 08, 2016

**Analytical Report for Service Request No: K1613708**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W16K060**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory November 08, 2016  
For your reference, these analyses have been assigned our service request number **K1613708**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

**SUBCONTRACT ORDER**  
**City of Portland Water Pollution Control Lab**  
**W16K060**

*K1613708*

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

ALS Environmental  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

**WPCL Project Name**  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>	
<input checked="" type="checkbox"/> Standard	
<input type="checkbox"/> Rush _ day(s)	

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W16K060-01</b>	<b>Water</b>	<b>Sampled: 11/06/16 01:15</b>		
Out-PCB Congeners 209	11/22/16 17:00	05/05/17 01:15		
<i>Containers Supplied:</i> G amber 1L (A)				

*called 11/7 for pick up 11/8*

Released By	Date	<i>Coyle</i>	Date	<i>11/8/16 1035</i>
Released By	Date	<i>Charles Lytle</i>	Date	<i>11-8-16 14:15</i>



PC H2

### Cooler Receipt and Preservation Form

Client City of Portland Service Request K16 13708  
 Received: 11-8-16 Opened: 11-8-16 By: [Signature] Unloaded: 11-8-16 By: [Signature]

1. Samples were received via?  USPS  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
2. Samples were received in: (circle)  Cooler  Box  Envelope  Other  NA
3. Were custody seals on coolers? NA Y  N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
3.1	3.2	5.8	5.9	+0.1	350	NA		NA	
2.1	2.0	-	-	-0.1	298				
2.1	2.0	-	-	-0.1	375				
5.7	5.6	-	-	-0.1	325				

4. Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves
5. Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA  Y  N  
 If applicable, tissue samples were received:  Frozen  Partially Thawed  Thawed
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA  Y  N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below*  NA Y  N
11. Were VOA vials received without headspace? *Indicate in the table below.*  NA Y  N
12. Was C12/Res negative?  NA Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

**Notes, Discrepancies, & Resolutions:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Report Prepared for:**

Accounts Payable  
ALS Environmental  
1317 South 13th Avenue  
Kelso WA 98626

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Prepared Date:**

November 23, 2016

**Report Information:**

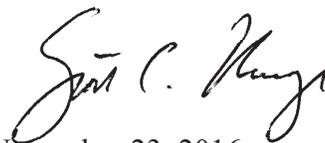
**Pace Project #: 10369405**  
**Sample Receipt Date: 11/10/2016**  
**Client Project #: K1613708**  
**Client Sub PO #: 51K1613709**  
**State Cert #: MN200001-005**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



November 23, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

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The results relate only to the samples included in this report.



## **DISCUSSION**

This report presents the results from the analyses performed on one sample submitted by a representative of ALS Environmental. The sample was analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the amount of sample extracted.

The isotopically-labeled PCB internal standards in the sample extract were recovered at 47-110%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the sample material.

Laboratory spike samples were also prepared with the sample batch using reference material that had been fortified with native standards. The results show that the spiked native compounds were recovered at 86-118% with relative percent differences of 1.8-9.6%. These results were within the target ranges for this method. Matrix spikes were not prepared with this extraction batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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Report No.....10369405

# Appendix A

## Sample Management

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

Project Number: K1613708  
 Project Manager: Howard Holmes  
 QAP: LAB QAP

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Misc Out 1 None
				Date	Time	Lab ID	
K1613708-001	W16K060-01	1	Water	11/6/16	0115	Pace MN	X

10369405

001

Test Comments  
 Misc Out 1 - None  
 K1613708-001 1668 PCB Congeners-209 list to Pace

Folder Comments:  
 Tier II

*For City of Portland*

Special Instructions/Comments Please provide the electronic (PDF and EDD) report to the following e-mail address: ALKLS.Data@alsglobal.com.  <i>Report to City of Portland EDD to City of Portland</i>  <i>Report, City of Portland EDD &amp; Invoice to ACS Kelso - 179 award Ho lines</i> H - Test is On Hold P - Test is Authorized for Prep Only	Turnaround Requirements ___ RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 ___ STANDARD	Report Requirements ___ I. Results Only ___ II. Results + QC Summaries ___ III. Results + QC and Calibration Summaries ___ IV. Data Validation Report with Raw Data PQL/MDL/J <u>Y</u> EDD <u>Y</u>	Invoice Information PO# 51K1613708 Bill to
	Requested FAX Date: _____ Requested Report Date: 11/25/16	Received By: <i>[Signature]</i> 11/9/16 Airbill Number: 1000	

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

Project Number: K1613708  
Project Manager: Howard Holmes  
QAP: LAB QAP

K1613708

Ship To: Pace MN  
Pace Analytical Services  
1700 Elm Street  
Suite 200  
Minneapolis, MN 55414

PC  
SMO

Date 11/19/2016  
Date 11/19/16

**Instructions:**

Ice

Dry Ice

No Ice

**Shipping:**

Overnight

2nd Day

Ground

Bill to Client Account

Comments:

**Sample Condition Upon Receipt**

Client Name: ALS Environmental Project # WO# : 10369405

**WO# : 10369405**



10369405

Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  SpeedDee  Other: \_\_\_\_\_  
 Tracking Number: 6447 9281 2014

Custody Seal on Cooler/Box Present?  Yes  No Seals Intact?  Yes  No Optional: Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_

Packing Material:  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_ Temp Blank?  Yes  No

Thermometer Used:  151401163  151401164  B88A912167504  B88A0143310098  
 Type of Ice:  Wet  Blue  None  Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.3 Cooler Temp Corrected (°C): 0.2 Biological Tissue Frozen?  Yes  No  N/A  
 Temp should be above freezing to 6°C Correction Factor: -0.1 Date and Initials of Person Examining Contents: 11.10.16 TC

USDA Regulated Soil  N/A, water sample  
 Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes  No  
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No  
**If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.**

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH >12 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Field Data Required?  Yes  No  
 Comments/Resolution: \_\_\_\_\_

**Project Manager Review:**

*[Signature]*

Date: 11/10/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

### REPORT OF LABORATORY ANALYSIS

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# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	W16K060-01		
Lab Sample ID	10369405001		
Filename	P161121A_11		
Injected By	BAL		
Total Amount Extracted	994 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	11/06/2016 01:15
ICAL ID	P161121A02	Received	11/10/2016 10:00
CCal Filename(s)	P161121A_01	Extracted	11/15/2016 11:15
Method Blank ID	BLANK-52783	Analyzed	11/21/2016 20:29

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.932	2.75	2.0	0.991	50
13C-4-MoCB	3	11.676	2.95	2.0	0.937	47
13C-2,2'-DiCB	4	11.927	1.55	2.0	0.955	48
13C-4,4'-DiCB	15	18.946	1.58	2.0	1.03	52
13C-2,2',6-TrCB	19	15.759	1.10	2.0	1.12	56
13C-3,4,4'-TrCB	37	26.671	1.03	2.0	1.26	63
13C-2,2',6,6'-TeCB	54	19.210	0.79	2.0	1.19	60
13C-3,4,4',5'-TeCB	81	33.752	0.79	2.0	1.44	72
13C-3,3',4,4'-TeCB	77	34.338	0.80	2.0	1.39	69
13C-2,2',4,6,6'-PeCB	104	25.279	1.61	2.0	1.29	65
13C-2,3,3',4,4'-PeCB	105	37.915	1.55	2.0	1.32	66
13C-2,3,4,4',5'-PeCB	114	37.244	1.50	2.0	1.33	67
13C-2,3',4,4',5'-PeCB	118	36.708	1.64	2.0	1.37	68
13C-2,3',4,4',5'-PeCB	123	36.355	1.57	2.0	1.38	69
13C-3,3',4,4',5'-PeCB	126	41.100	1.58	2.0	1.21	60
13C-2,2',4,4',6,6'-HxCB	155	31.287	1.26	2.0	1.58	79
13C-HxCB (156/157)	156/157	44.140	1.26	4.0	2.39	60
13C-2,3',4,4',5,5'-HxCB	167	42.967	1.26	2.0	1.36	68
13C-3,3',4,4',5,5'-HxCB	169	47.460	1.24	2.0	1.05	53
13C-2,2',3,4',5,6,6'-HpCB	188	37.177	1.11	2.0	2.09	104
13C-2,3,3',4,4',5,5'-HpCB	189	49.951	1.06	2.0	1.29	64
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.648	0.89	2.0	2.20	110
13C-2,3,3',4,4',5,5',6-OxCB	205	52.516	0.91	2.0	1.38	69
13C-2,2',3,3',4,4',5,5',6-NoCB	206	54.262	0.79	2.0	1.44	72
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	49.412	0.79	2.0	1.75	87
13C--DeCB	209	55.835	0.71	2.0	1.79	90
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	22.295	1.09	2.0	1.42	71
13C-2,3,3',5,5'-PeCB	111	34.338	1.60	2.0	1.45	73
13C-2,2',3,3',5,5',6-HpCB	178	40.296	1.01	2.0	1.69	85
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.346	1.59	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	24.274	0.79	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.538	1.62	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.876	1.30	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	52.042	0.86	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16K060-01  
 Lab Sample ID 10369405001  
 Filename P161121A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.251
2		---	---	ND	---	0.251
3		---	---	ND	---	0.251
4		---	---	ND	---	0.251
5		---	---	ND	---	0.251
6		---	---	ND	---	0.251
7		---	---	ND	---	0.251
8		---	---	ND	---	0.251
9		---	---	ND	---	0.251
10		---	---	ND	---	0.251
11		---	---	ND	---	2.46
12	12/13	---	---	ND	---	0.503
13	12/13	---	---	ND	---	0.503
14		---	---	ND	---	0.251
15		---	---	ND	---	0.332
16		---	---	ND	---	0.251
17		---	---	ND	---	0.251
18	18/30	---	---	ND	---	0.503
19		---	---	ND	---	0.251
20	20/28	---	---	ND	---	1.30
21	21/33	---	---	ND	---	1.36
22		---	---	ND	---	0.956
23		---	---	ND	---	0.251
24		---	---	ND	---	0.251
25		---	---	ND	---	0.251
26	26/29	---	---	ND	---	0.503
27		---	---	ND	---	0.251
28	20/28	---	---	ND	---	1.30
29	26/29	---	---	ND	---	0.503
30	18/30	---	---	ND	---	0.503
31		---	---	ND	---	1.31
32		---	---	ND	---	0.251
33	21/33	---	---	ND	---	1.36
34		---	---	ND	---	0.251
35		---	---	ND	---	0.251
36		---	---	ND	---	0.251
37		---	---	ND	---	0.533
38		---	---	ND	---	0.251
39		---	---	ND	---	0.251
40	40/41/71	---	---	ND	---	1.51
41	40/41/71	---	---	ND	---	1.51
42		---	---	ND	---	0.503
43	43/73	---	---	ND	---	0.503
44	44/47/65	---	---	ND	---	1.51
45	45/51	---	---	ND	---	1.01
46		---	---	ND	---	0.503
47	44/47/65	---	---	ND	---	1.51
48		---	---	ND	---	0.503

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W16K060-01  
Lab Sample ID 10369405001  
Filename P161121A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.01
50	50/53	---	---	ND	---	1.01
51	45/51	---	---	ND	---	1.01
52		---	---	ND	---	1.55
53	50/53	---	---	ND	---	1.01
54		---	---	ND	---	0.503
55		---	---	ND	---	0.503
56		---	---	ND	---	0.503
57		---	---	ND	---	0.503
58		---	---	ND	---	0.503
59	59/62/75	---	---	ND	---	1.51
60		---	---	ND	---	0.503
61	61/70/74/76	---	---	ND	---	2.01
62	59/62/75	---	---	ND	---	1.51
63		---	---	ND	---	0.503
64		---	---	ND	---	0.503
65	44/47/65	---	---	ND	---	1.51
66		---	---	ND	---	0.845
67		---	---	ND	---	0.503
68		---	---	ND	---	0.503
69	49/69	---	---	ND	---	1.01
70	61/70/74/76	---	---	ND	---	2.01
71	40/41/71	---	---	ND	---	1.51
72		---	---	ND	---	0.503
73	43/73	---	---	ND	---	0.503
74	61/70/74/76	---	---	ND	---	2.01
75	59/62/75	---	---	ND	---	1.51
76	61/70/74/76	---	---	ND	---	2.01
77		---	---	ND	---	0.503
78		---	---	ND	---	0.503
79		---	---	ND	---	0.503
80		---	---	ND	---	0.503
81		---	---	ND	---	0.503
82		---	---	ND	---	0.503
83		---	---	ND	---	0.503
84		---	---	ND	---	0.503
85	85/116/117	---	---	ND	---	1.51
86	86/87/97/108/119/125	---	---	ND	---	3.02
87	86/87/97/108/119/125	---	---	ND	---	3.02
88	88/91	---	---	ND	---	1.01
89		---	---	ND	---	0.503
90	90/101/113	---	---	ND	---	1.51
91	88/91	---	---	ND	---	1.01
92		---	---	ND	---	0.503
93	93/98/100/102	---	---	ND	---	2.01
94		---	---	ND	---	0.503
95		---	---	ND	---	0.956
96		---	---	ND	---	0.503

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
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X = Outside QC Limits  
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ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16K060-01  
 Lab Sample ID 10369405001  
 Filename P161121A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.02
98	93/98/100/102	---	---	ND	---	2.01
99		---	---	ND	---	0.503
100	93/98/100/102	---	---	ND	---	2.01
101	90/101/113	---	---	ND	---	1.51
102	93/98/100/102	---	---	ND	---	2.01
103		---	---	ND	---	0.503
104		---	---	ND	---	0.503
105		---	---	ND	---	0.503
106		---	---	ND	---	0.503
107	107/124	---	---	ND	---	1.01
108	86/87/97/108/119/125	---	---	ND	---	3.02
109		---	---	ND	---	0.503
110	110/115	---	---	ND	---	1.01
111		---	---	ND	---	0.503
112		---	---	ND	---	0.503
113	90/101/113	---	---	ND	---	1.51
114		---	---	ND	---	0.503
115	110/115	---	---	ND	---	1.01
116	85/116/117	---	---	ND	---	1.51
117	85/116/117	---	---	ND	---	1.51
118		---	---	ND	---	0.644
119	86/87/97/108/119/125	---	---	ND	---	3.02
120		---	---	ND	---	0.503
121		---	---	ND	---	0.503
122		---	---	ND	---	0.503
123		---	---	ND	---	0.503
124	107/124	---	---	ND	---	1.01
125	86/87/97/108/119/125	---	---	ND	---	3.02
126		---	---	ND	---	0.503
127		---	---	ND	---	0.503
128	128/166	---	---	ND	---	1.01
129	129/138/163	---	---	ND	---	1.51
130		---	---	ND	---	0.503
131		---	---	ND	---	0.503
132		---	---	ND	---	0.503
133		---	---	ND	---	0.503
134	134/143	---	---	ND	---	1.01
135	135/151	---	---	ND	---	1.01
136		---	---	ND	---	0.503
137		---	---	ND	---	0.503
138	129/138/163	---	---	ND	---	1.51
139	139/140	---	---	ND	---	1.01
140	139/140	---	---	ND	---	1.01
141		---	---	ND	---	0.503
142		---	---	ND	---	0.503
143	134/143	---	---	ND	---	1.01
144		---	---	ND	---	0.503

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
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 ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16K060-01  
 Lab Sample ID 10369405001  
 Filename P161121A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.503
146		---	---	ND	---	0.503
147	147/149	---	---	ND	---	1.01
148		---	---	ND	---	0.503
149	147/149	---	---	ND	---	1.01
150		---	---	ND	---	0.503
151	135/151	---	---	ND	---	1.01
152		---	---	ND	---	0.503
153	153/168	---	---	ND	---	1.01
154		---	---	ND	---	0.503
155		---	---	ND	---	0.503
156	156/157	---	---	ND	---	1.01
157	156/157	---	---	ND	---	1.01
158		---	---	ND	---	0.503
159		---	---	ND	---	0.503
160		---	---	ND	---	0.503
161		---	---	ND	---	0.503
162		---	---	ND	---	0.503
163	129/138/163	---	---	ND	---	1.51
164		---	---	ND	---	0.503
165		---	---	ND	---	0.503
166	128/166	---	---	ND	---	1.01
167		---	---	ND	---	0.503
168	153/168	---	---	ND	---	1.01
169		---	---	ND	---	0.503
170		---	---	ND	---	0.503
171	171/173	---	---	ND	---	1.01
172		---	---	ND	---	0.503
173	171/173	---	---	ND	---	1.01
174		---	---	ND	---	0.503
175		---	---	ND	---	0.503
176		---	---	ND	---	0.503
177		---	---	ND	---	0.503
178		---	---	ND	---	0.503
179		---	---	ND	---	0.503
180	180/193	---	---	ND	---	1.01
181		---	---	ND	---	0.503
182		---	---	ND	---	0.503
183	183/185	---	---	ND	---	1.01
184		---	---	ND	---	0.503
185	183/185	---	---	ND	---	1.01
186		---	---	ND	---	0.503
187		---	---	ND	---	0.503
188		---	---	ND	---	0.503
189		---	---	ND	---	0.503
190		---	---	ND	---	0.503
191		---	---	ND	---	0.503
192		---	---	ND	---	0.503

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      W16K060-01  
 Lab Sample ID        10369405001  
 Filename                P161121A\_11

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.01
194		---	---	ND	---	0.754
195		---	---	ND	---	0.754
196		---	---	ND	---	0.754
197	197/200	---	---	ND	---	1.51
198	198/199	---	---	ND	---	1.51
199	198/199	---	---	ND	---	1.51
200	197/200	---	---	ND	---	1.51
201		---	---	ND	---	0.754
202		---	---	ND	---	0.754
203		---	---	ND	---	0.754
204		---	---	ND	---	0.754
205		---	---	ND	---	0.754
206		---	---	ND	---	0.754
207		---	---	ND	---	0.754
208		---	---	ND	---	0.754
209		---	---	ND	---	0.754

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

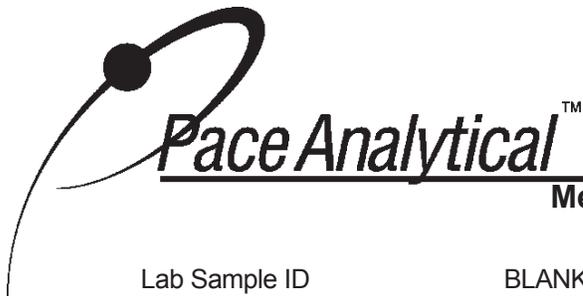
Client Sample ID            W16K060-01  
Lab Sample ID              10369405001  
Filename                     P161121A\_11

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-52783	Matrix	Water
Filename	P161120A_08	Extracted	11/15/2016 11:15
Injected By	BAL	Analyzed	11/20/2016 12:49
Total Amount Extracted	1010 mL	Dilution	5
ICAL ID	P161120A02		
CCal Filename(s)	P161120A_01		

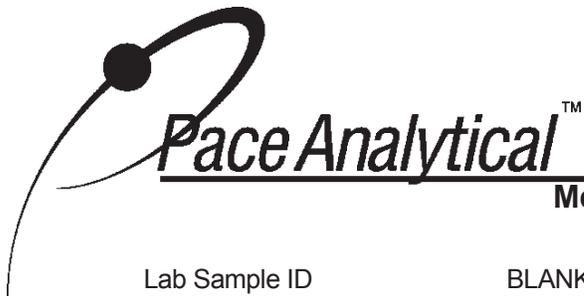
PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.932	2.93	2.0	0.937	47
13C-4-MoCB	3	11.664	2.81	2.0	0.998	50
13C-2,2'-DiCB	4	11.940	1.56	2.0	0.835	42
13C-4,4'-DiCB	15	18.911	1.57	2.0	0.992	50
13C-2,2',6-TrCB	19	15.652	1.14	2.0	0.888	44
13C-3,4,4'-TrCB	37	26.639	1.03	2.0	1.39	70
13C-2,2',6,6'-TeCB	54	19.194	0.78	2.0	1.07	53
13C-3,4,4',5-TeCB	81	33.736	0.80	2.0	1.55	78
13C-3,3',4,4'-TeCB	77	34.323	0.75	2.0	1.59	79
13C-2,2',4,6,6'-PeCB	104	25.247	1.60	2.0	1.14	57
13C-2,3,3',4,4'-PeCB	105	37.883	1.59	2.0	1.58	79
13C-2,3,4,4',5-PeCB	114	37.229	1.56	2.0	1.51	76
13C-2,3',4,4',5-PeCB	118	36.676	1.59	2.0	1.61	80
13C-2,3',4,4',5'-PeCB	123	36.324	1.61	2.0	1.59	80
13C-3,3',4,4',5-PeCB	126	41.069	1.60	2.0	1.51	75
13C-2,2',4,4',6,6'-HxCB	155	31.255	1.25	2.0	1.41	71
13C-HxCB (156/157)	156/157	44.109	1.28	4.0	2.82	71
13C-2,3',4,4',5,5'-HxCB	167	42.918	1.29	2.0	1.54	77
13C-3,3',4,4',5,5'-HxCB	169	47.429	1.20	2.0	1.25	62
13C-2,2',3,4',5,6,6'-HpCB	188	37.145	1.05	2.0	1.86	93
13C-2,3,3',4,4',5,5'-HpCB	189	49.910	1.04	2.0	1.56	78
13C-2,2',3,3',5,5',6,6'-OoCB	202	42.617	0.87	2.0	2.01	101
13C-2,3,3',4,4',5,5',6-OoCB	205	52.496	0.92	2.0	1.58	79
13C-2,2',3,3',4,4',5,5',6-NoCB	206	54.221	0.86	2.0	1.47	73
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	49.371	0.75	2.0	1.75	87
13C-DeCB	209	55.794	0.76	2.0	1.79	90
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	22.279	1.12	2.0	1.33	66
13C-2,3,3',5,5'-PeCB	111	34.306	1.69	2.0	1.45	73
13C-2,2',3,3',5,5',6-HpCB	178	40.264	1.05	2.0	1.66	83
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.334	1.60	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	24.241	0.81	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.506	1.56	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.828	1.29	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	52.001	0.92	2.0	NA	NA

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52783  
 Filename P161120A\_08

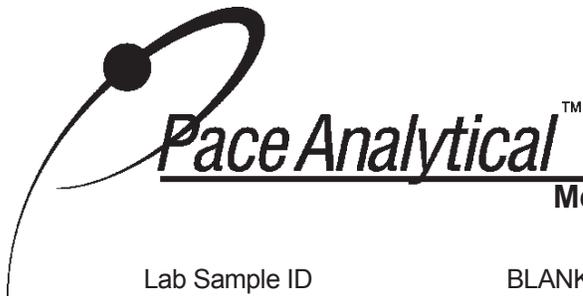
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		--	--	ND	--	0.247
2		--	--	ND	--	0.247
3		--	--	ND	--	0.247
4		--	--	ND	--	0.247
5		--	--	ND	--	0.247
6		--	--	ND	--	0.247
7		--	--	ND	--	0.247
8		--	--	ND	--	0.247
9		--	--	ND	--	0.247
10		--	--	ND	--	0.247
11		--	--	ND	--	2.42
12	12/13	--	--	ND	--	0.494
13	12/13	--	--	ND	--	0.494
14		--	--	ND	--	0.247
15		--	--	ND	--	0.247
16		--	--	ND	--	0.247
17		--	--	ND	--	0.247
18	18/30	--	--	ND	--	0.494
19		--	--	ND	--	0.247
20	20/28	--	--	ND	--	1.27
21	21/33	--	--	ND	--	1.33
22		--	--	ND	--	0.938
23		--	--	ND	--	0.247
24		--	--	ND	--	0.247
25		--	--	ND	--	0.247
26	26/29	--	--	ND	--	0.494
27		--	--	ND	--	0.247
28	20/28	--	--	ND	--	1.27
29	26/29	--	--	ND	--	0.494
30	18/30	--	--	ND	--	0.494
31		--	--	ND	--	1.28
32		--	--	ND	--	0.247
33	21/33	--	--	ND	--	1.33
34		--	--	ND	--	0.247
35		--	--	ND	--	0.247
36		--	--	ND	--	0.247
37		--	--	ND	--	0.523
38		--	--	ND	--	0.247
39		--	--	ND	--	0.247
40	40/41/71	--	--	ND	--	1.48
41	40/41/71	--	--	ND	--	1.48
42		--	--	ND	--	0.494
43	43/73	--	--	ND	--	0.494
44	44/47/65	--	--	ND	--	1.48
45	45/51	--	--	ND	--	0.988

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52783  
 Filename P161120A\_08

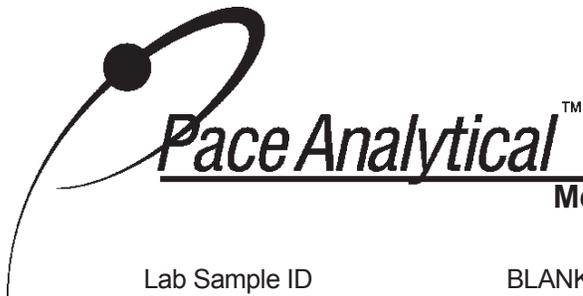
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		--	--	ND	--	0.494
47	44/47/65	--	--	ND	--	1.48
48		--	--	ND	--	0.494
49	49/69	--	--	ND	--	0.988
50	50/53	--	--	ND	--	0.988
51	45/51	--	--	ND	--	0.988
52		--	--	ND	--	1.52
53	50/53	--	--	ND	--	0.988
54		--	--	ND	--	0.494
55		--	--	ND	--	0.494
56		--	--	ND	--	0.494
57		--	--	ND	--	0.494
58		--	--	ND	--	0.494
59	59/62/75	--	--	ND	--	1.48
60		--	--	ND	--	0.494
61	61/70/74/76	--	--	ND	--	1.98
62	59/62/75	--	--	ND	--	1.48
63		--	--	ND	--	0.494
64		--	--	ND	--	0.494
65	44/47/65	--	--	ND	--	1.48
66		--	--	ND	--	0.830
67		--	--	ND	--	0.494
68		--	--	ND	--	0.494
69	49/69	--	--	ND	--	0.988
70	61/70/74/76	--	--	ND	--	1.98
71	40/41/71	--	--	ND	--	1.48
72		--	--	ND	--	0.494
73	43/73	--	--	ND	--	0.494
74	61/70/74/76	--	--	ND	--	1.98
75	59/62/75	--	--	ND	--	1.48
76	61/70/74/76	--	--	ND	--	1.98
77		--	--	ND	--	0.494
78		--	--	ND	--	0.494
79		--	--	ND	--	0.494
80		--	--	ND	--	0.494
81		--	--	ND	--	0.494
82		--	--	ND	--	0.494
83		--	--	ND	--	0.494
84		--	--	ND	--	0.494
85	85/116/117	--	--	ND	--	1.48
86	86/87/97/108/119/125	--	--	ND	--	2.96
87	86/87/97/108/119/125	--	--	ND	--	2.96
88	88/91	--	--	ND	--	0.988
89		--	--	ND	--	0.494
90	90/101/113	--	--	ND	--	1.48

Conc = Concentration  
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 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
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 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52783  
 Filename P161120A\_08

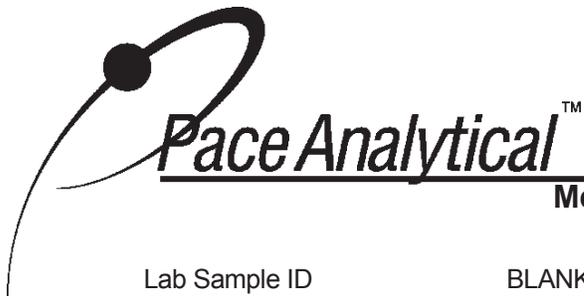
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	--	--	ND	--	0.988
92		--	--	ND	--	0.494
93	93/98/100/102	--	--	ND	--	1.98
94		--	--	ND	--	0.494
95		--	--	ND	--	0.938
96		--	--	ND	--	0.494
97	86/87/97/108/119/125	--	--	ND	--	2.96
98	93/98/100/102	--	--	ND	--	1.98
99		--	--	ND	--	0.494
100	93/98/100/102	--	--	ND	--	1.98
101	90/101/113	--	--	ND	--	1.48
102	93/98/100/102	--	--	ND	--	1.98
103		--	--	ND	--	0.494
104		--	--	ND	--	0.494
105		--	--	ND	--	0.494
106		--	--	ND	--	0.494
107	107/124	--	--	ND	--	0.988
108	86/87/97/108/119/125	--	--	ND	--	2.96
109		--	--	ND	--	0.494
110	110/115	--	--	ND	--	0.988
111		--	--	ND	--	0.494
112		--	--	ND	--	0.494
113	90/101/113	--	--	ND	--	1.48
114		--	--	ND	--	0.494
115	110/115	--	--	ND	--	0.988
116	85/116/117	--	--	ND	--	1.48
117	85/116/117	--	--	ND	--	1.48
118		--	--	ND	--	0.632
119	86/87/97/108/119/125	--	--	ND	--	2.96
120		--	--	ND	--	0.494
121		--	--	ND	--	0.494
122		--	--	ND	--	0.494
123		--	--	ND	--	0.494
124	107/124	--	--	ND	--	0.988
125	86/87/97/108/119/125	--	--	ND	--	2.96
126		--	--	ND	--	0.494
127		--	--	ND	--	0.494
128	128/166	--	--	ND	--	0.988
129	129/138/163	--	--	ND	--	1.48
130		--	--	ND	--	0.494
131		--	--	ND	--	0.494
132		--	--	ND	--	0.494
133		--	--	ND	--	0.494
134	134/143	--	--	ND	--	0.988
135	135/151	--	--	ND	--	0.988

Conc = Concentration  
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 RT = Retention Time  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52783  
 Filename P161120A\_08

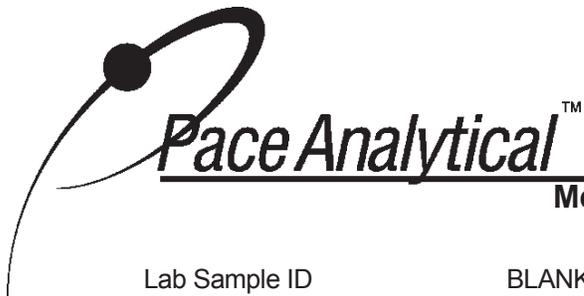
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		--	--	ND	--	0.494
137		--	--	ND	--	0.494
138	129/138/163	--	--	ND	--	1.48
139	139/140	--	--	ND	--	0.988
140	139/140	--	--	ND	--	0.988
141		--	--	ND	--	0.494
142		--	--	ND	--	0.494
143	134/143	--	--	ND	--	0.988
144		--	--	ND	--	0.494
145		--	--	ND	--	0.494
146		--	--	ND	--	0.494
147	147/149	--	--	ND	--	0.988
148		--	--	ND	--	0.494
149	147/149	--	--	ND	--	0.988
150		--	--	ND	--	0.494
151	135/151	--	--	ND	--	0.988
152		--	--	ND	--	0.494
153	153/168	--	--	ND	--	0.988
154		--	--	ND	--	0.494
155		--	--	ND	--	0.494
156	156/157	--	--	ND	--	0.988
157	156/157	--	--	ND	--	0.988
158		--	--	ND	--	0.494
159		--	--	ND	--	0.494
160		--	--	ND	--	0.494
161		--	--	ND	--	0.494
162		--	--	ND	--	0.494
163	129/138/163	--	--	ND	--	1.48
164		--	--	ND	--	0.494
165		--	--	ND	--	0.494
166	128/166	--	--	ND	--	0.988
167		--	--	ND	--	0.494
168	153/168	--	--	ND	--	0.988
169		--	--	ND	--	0.494
170		--	--	ND	--	0.494
171	171/173	--	--	ND	--	0.988
172		--	--	ND	--	0.494
173	171/173	--	--	ND	--	0.988
174		--	--	ND	--	0.494
175		--	--	ND	--	0.494
176		--	--	ND	--	0.494
177		--	--	ND	--	0.494
178		--	--	ND	--	0.494
179		--	--	ND	--	0.494
180	180/193	--	--	ND	--	0.988

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52783  
 Filename P161120A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		--	--	ND	--	0.494
182		--	--	ND	--	0.494
183	183/185	--	--	ND	--	0.988
184		--	--	ND	--	0.494
185	183/185	--	--	ND	--	0.988
186		--	--	ND	--	0.494
187		--	--	ND	--	0.494
188		--	--	ND	--	0.494
189		--	--	ND	--	0.494
190		--	--	ND	--	0.494
191		--	--	ND	--	0.494
192		--	--	ND	--	0.494
193	180/193	--	--	ND	--	0.988
194		--	--	ND	--	0.741
195		--	--	ND	--	0.741
196		--	--	ND	--	0.741
197	197/200	--	--	ND	--	1.48
198	198/199	--	--	ND	--	1.48
199	198/199	--	--	ND	--	1.48
200	197/200	--	--	ND	--	1.48
201		--	--	ND	--	0.741
202		--	--	ND	--	0.741
203		--	--	ND	--	0.741
204		--	--	ND	--	0.741
205		--	--	ND	--	0.741
206		--	--	ND	--	0.741
207		--	--	ND	--	0.741
208		--	--	ND	--	0.741
209		--	--	ND	--	0.741

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
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 RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID           CBLKWH  
Lab Sample ID             BLANK-52783  
Filename                    P161120A\_08

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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### Method 1668A Polychlorobiphenyls Laboratory Control Spike Analysis Results

Lab Sample ID	LCS-52784	Matrix	Water
Filename	P161117A_11	Dilution	5
Total Amount Extracted	962 mL	Extracted	11/15/2016 11:15
ICAL ID	P161117A02	Analyzed	11/17/2016 18:49
CCal Filename(s)	P161117A_01	Injected By	CVS
Method Blank ID	BLANK-52783		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.08	108	2.0	1.08	54
3	1.0	1.07	107	2.0	1.07	54
4	1.0	1.13	113	2.0	0.876	44
15	1.0	1.08	108	2.0	1.09	54
19	1.0	1.17	117	2.0	0.966	48
37	1.0	0.904	90	2.0	1.28	64
54	1.0	1.09	109	2.0	1.10	55
81	1.0	0.991	99	2.0	1.58	79
77	1.0	0.990	99	2.0	1.55	78
104	1.0	1.11	111	2.0	1.09	54
105	1.0	1.06	106	2.0	1.48	74
114	1.0	1.09	109	2.0	1.44	72
118	1.0	1.09	109	2.0	1.48	74
123	1.0	1.06	106	2.0	1.44	72
126	1.0	1.10	110	2.0	1.33	67
155	1.0	1.06	106	2.0	1.43	71
156/157	2.0	2.15	107	4.0	2.66	67
167	1.0	1.00	100	2.0	1.47	74
169	1.0	1.10	110	2.0	1.18	59
188	1.0	1.15	115	2.0	1.75	87
189	1.0	0.959	96	2.0	1.46	73
202	1.0	1.04	104	2.0	2.00	100
205	1.0	1.04	104	2.0	1.53	76
206	1.0	1.08	108	2.0	1.47	74
208	1.0	1.03	103	2.0	1.68	84
209	1.0	0.910	91	2.0	1.93	96

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCSD-52785	Matrix	Water
Filename	P161118A_04	Dilution	5
Total Amount Extracted	972 mL	Extracted	11/15/2016 11:15
ICAL ID	P161118A07	Analyzed	11/18/2016 14:55
CCal Filename(s)	P161118A_06	Injected By	CVS
Method Blank ID	BLANK-52783		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.18	118	2.0	1.35	67
3	1.0	1.09	109	2.0	1.39	70
4	1.0	1.15	115	2.0	1.16	58
15	1.0	1.11	111	2.0	1.37	68
19	1.0	1.14	114	2.0	1.28	64
37	1.0	0.855	86	2.0	1.50	75
54	1.0	1.11	111	2.0	1.40	70
81	1.0	1.09	109	2.0	1.64	82
77	1.0	1.01	101	2.0	1.69	84
104	1.0	1.14	114	2.0	1.39	70
105	1.0	0.988	99	2.0	1.66	83
114	1.0	1.04	104	2.0	1.57	79
118	1.0	1.06	106	2.0	1.62	81
123	1.0	1.03	103	2.0	1.64	82
126	1.0	1.02	102	2.0	1.45	73
155	1.0	1.09	109	2.0	1.66	83
156/157	2.0	2.06	103	4.0	2.87	72
167	1.0	0.983	98	2.0	1.57	78
169	1.0	1.12	112	2.0	1.24	62
188	1.0	1.11	111	2.0	2.00	100
189	1.0	0.889	89	2.0	1.54	77
202	1.0	1.08	108	2.0	2.15	107
205	1.0	1.07	107	2.0	1.58	79
206	1.0	1.15	115	2.0	1.51	75
208	1.0	1.10	110	2.0	1.85	93
209	1.0	0.961	96	2.0	1.93	97

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client ALS Environmental

Spike 1 ID LCS-52784  
Spike 1 Filename P161117A\_11

Spike 2 ID LCSD-52785  
Spike 2 Filename P161118A\_04

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	108	118	8.8
4-MoCB	3	107	109	1.9
2,2'-DiCB	4	113	115	1.8
4,4'-DiCB	15	108	111	2.7
2,2',6-TrCB	19	117	114	2.6
3,4,4'-TrCB	37	90	86	4.5
2,2',6,6'-TeCB	54	109	111	1.8
3,3',4,4'-TeCB	77	99	101	2.0
3,4,4',5-TeCB	81	99	109	9.6
2,2',4,6,6'-PeCB	104	111	114	2.7
2,3,3',4,4'-PeCB	105	106	99	6.8
2,3,4,4',5-PeCB	114	109	104	4.7
2,3',4,4',5-PeCB	118	109	106	2.8
2,3',4,4',5'-PeCB	123	106	103	2.9
3,3',4,4',5-PeCB	126	110	102	7.5
2,2',4,4',6,6'-HxCB	155	106	109	2.8
(156/157)	156/157	107	103	3.8
2,3',4,4',5,5'-HxCB	167	100	98	2.0
3,3',4,4',5,5'-HxCB	169	110	112	1.8
2,2',3,4',5,6,6'-HpCB	188	115	111	3.5
2,3,3',4,4',5,5'-HpCB	189	96	89	7.6
2,2',3,3',5,5',6,6'-OxCB	202	104	108	3.8
2,3,3',4,4',5,5',6-OxCB	205	104	107	2.8
2,2',3,3',4,4',5,5',6-NoCB	206	108	115	6.3
2,2',3,3',4,5,5',6,6'-NoCB	208	103	110	6.6
Decachlorobiphenyl	209	91	96	5.3

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

**REPORT OF LABORATORY ANALYSIS**

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55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Sampling in City Outfall Basin 19

**To:** File  
**From:** Brian Anderson, GSI Water Solutions, Inc.  
**Date:** January 26, 2017

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in November 2016. One stormwater grab sample (W16K053-01) was collected in Outfall Basin 19 on November 5, 2016, and submitted for analysis.

The laboratory analyses for this sample were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Conductivity – FO SOP 1.03a
  - pH – FO SOP 1.01a
  - Temp – FO SOP 1.05a
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- Pace Analytical Services (Pace)
  - Polychlorinated Biphenyls (PCB) Congeners – EPA 1668A

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with this source control program sample.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control (LC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the sample. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## **Analysis Holding Times**

The sample was extracted and analyzed within acceptable holding times.

## **Method Blanks**

Method blanks were analyzed during the laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, and subcontracted analysis of PCB congeners. No analytes were detected in the method blanks processed during any of the analyses.

## **Surrogate Recoveries**

Surrogate recoveries were completed during the analyses of PAHs and phthalates. Surrogate recoveries for the field sample and all associated QC samples were within control criteria.

## **Internal Standard Recoveries**

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. The laboratory reported that internal standards in the sample extracts were recovered at 57-119%. Internal standard recoveries were within the target ranges specified in the method. Because the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery, which allowed accurate values to be obtained.

## **Matrix Spike/Matrix Spike Duplicates**

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates, and one MSD was processed for PAHs and phthalate analysis. One of two MS analyses were beneath acceptance limits for mercury. Based on this low matrix spike recovery, Mercury has been qualified as an estimated value possibly biased low (J-). Remaining MS and MSD sample results were within acceptance limits and MSD sample results were within RPD limits.

## **Laboratory Control Samples**

LC samples were processed during the analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. LC sample recoveries were within laboratory control limits for all analyses.

## **Laboratory Duplicate**

WPCL processed two laboratory duplicate samples during total metals analysis and mercury analysis, while three laboratory duplicate samples were processed during TSS analysis. RPDs were within laboratory acceptance limits. Laboratory duplicate (dup 1) for mercury resulted in a detection with the source sample showing non-detect. Mercury has already been qualified as an estimated value possibly biased low (J-) due to low matrix spike recovery.

## **Other**

The sample was delivered to WPCL with a cooler temperature of 12 degrees C, which is above the required holding temperature, but qualifications have not been made as the cooler was delivered soon after sampling and there is evidence that the chilling process has begun. Temperatures during shipping and transport of the sample to subcontracted analyses were less than 6° C.

WPCL reports that the continuing calibration verification was high for Di-n-octyl phthalate and Bis(2-ethylhexyl) phthalate. Di-n-octyl phthalate was not detected above the detection limit and has not been qualified. Bis(2-ethylhexyl) phthalate was detected at 2.0 mg/L, and has been qualified as an estimate possibly biased high (J+).

No other anomalies were reported in by WPCL or the subcontracted laboratories. A list of additional data qualifications added during validation is provided in Table 1.

**Table 1. Qualifiers Added or Modified During Validation**

City of Portland

*Outfall 19*

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
W16K053-01	Mercury	ug/L	0.0132	J-	MS
W16K053-01	Bis(2-ethylhexyl) phthalate	ug/L	2.0	J+	CCV

**Notes**

µg/L = micrograms per liter

**Qualifier Definitions**

J+ = Detection of analyte is considered a high estimate

**Reason Code Definitions**

CCV = The continuing calibration verification was high and the sample results may be high estimates

MS = Based on low matrix spike recovery, the sample result may be a low estimate due to matrix interference



City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



December 16, 2016

Linda Scheffler  
Director's Office

---

Work Order  
**W16K053**

Project  
**Portland Harbor**

Received  
11/05/16 12:12

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

*Jennifer Shackelford*

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W16K053</b>	Project Mgr: Linda Scheffler
Received: 11/5/16 12:12	
Submitted By: Field Operations	

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
19_SW2	W16K053-01	Stormwater	Grab	11/05/16 11:35	11/05/16 11:35	

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**19\_SW2 : W16K053-01**

**Field Parameters**

Conductivity*	15 umhos/cm			1	B16K102	11/05/16	11/05/16	FO SOP 1.03a	
pH*	4.8 pH Units			1	B16K102	11/05/16 11:35	11/05/16	FO SOP 1.01a	
Temperature*	13.8 °C			1	B16K102	11/05/16 11:35	11/05/16	FO SOP 1.05a	

**General Chemistry**

Total suspended solids	19 mg/L	2	2		B16K161	11/09/16	11/09/16	SM 2540D	
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**Total Metals**

Total Metals by ICPMS									
Arsenic	0.307 ug/L	0.100	0.100	1	B16K131	11/07/16	11/09/16	EPA 200.8	
Cadmium	0.124 ug/L	0.100	0.100	1	B16K131	11/07/16	11/09/16	EPA 200.8	
Chromium	1.01 ug/L	0.200	0.200	1	B16K131	11/07/16	11/09/16	EPA 200.8	
Copper	17.5 ug/L	0.200	0.200	1	B16K131	11/07/16	11/09/16	EPA 200.8	
Lead	7.01 ug/L	0.100	0.100	1	B16K131	11/07/16	11/09/16	EPA 200.8	
Mercury	0.0132 ug/L	0.00100	0.00100	1	B16K155	11/09/16	11/09/16	WPCLSOP M-10	
Nickel	1.40 ug/L	0.200	0.200	1	B16K131	11/07/16	11/09/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16K131	11/07/16	11/09/16	EPA 200.8	
Zinc	136 ug/L	0.500	0.500	1	B16K131	11/07/16	11/09/16	EPA 200.8	

Reported: 12/16/16 14:36

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16K053**

**Client: Director's Office**  
**Received: 11/05/16 12:12**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

Acenaphthene	ND ug/L	0.020	0.020	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Acenaphthylene	ND ug/L	0.020	0.020	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Anthracene	ND ug/L	0.020	0.020	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Benzo(a)anthracene	ND ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Benzo(a)pyrene	ND ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.020 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.036 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Benzo(k)fluoranthene	ND ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Chrysene	0.019 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Fluoranthene	0.058 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Fluorene	0.027 ug/L	0.020	0.020	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.011 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
1-Methylnaphthalene	ND ug/L	0.040	0.040	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
2-Methylnaphthalene	ND ug/L	0.040	0.040	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Naphthalene	ND ug/L	0.040	0.040	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Phenanthrene	0.079 ug/L	0.020	0.020	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Pyrene	0.089 ug/L	0.010	0.010	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND ug/L	1.0	0.50	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND ug/L	1.0	0.50	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Diethyl phthalate	ND ug/L	1.0	0.50	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Dimethyl phthalate	ND ug/L	1.0	0.50	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND ug/L	1.0	0.50	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.0 ug/L	1.0	0.50	1	B16K133	11/08/16	12/14/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.15 ug/L	0.229	68%	31-164	B16K133	11/08/16	12/14/16	EPA 8270-SIM	
Fluoranthene-d10	0.24 ug/L	0.229	104%	65-145	B16K133	11/08/16	12/14/16	EPA 8270-SIM	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

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Project: **Portland Harbor**  
Work Order: **W16K053**

Client: Director's Office  
Received: 11/05/16 12:12

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B16K161</b>										
<b>Blank (B16K161-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					11/09/16 :11/09/16	
<b>LCS (B16K161-BS1)</b>										
Total suspended solids	95	mg/L			100		95% (90-110)		11/09/16 :11/09/16	
<b>Duplicate (B16K161-DUP1) Source: W16K053-01</b>										
Total suspended solids	19	mg/L	2	2		19		0 (20)	11/09/16 :11/09/16	
<b>Duplicate (B16K161-DUP3) Source: W16K084-01</b>										
Total suspended solids	308	mg/L	2	2		320		4 (20)	11/09/16 :11/09/16	
<b>Duplicate (B16K161-DUP4) Source: W16K070-01RE1</b>										
Total suspended solids	150	mg/L	2	2		150		0 (20)	11/09/16 :11/10/16	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B16K131</b>										
<b>Blank (B16K131-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					11/07/16 :11/09/16	
Cadmium	ND	ug/L	0.100	0.100					11/07/16 :11/09/16	
Chromium	ND	ug/L	0.200	0.200					11/07/16 :11/09/16	
Copper	ND	ug/L	0.200	0.200					11/07/16 :11/09/16	
Lead	ND	ug/L	0.100	0.100					11/07/16 :11/09/16	
Nickel	ND	ug/L	0.200	0.200					11/07/16 :11/09/16	
Silver	ND	ug/L	0.100	0.100					11/07/16 :11/09/16	
Zinc	ND	ug/L	0.500	0.500					11/07/16 :11/09/16	
<b>LCS (B16K131-BS1)</b>										
Arsenic	5.07	ug/L	0.100	0.100	5.00		101% (85-115)		11/07/16 :11/09/16	
Cadmium	5.00	ug/L	0.100	0.100	5.00		100% (85-115)		11/07/16 :11/09/16	
Chromium	5.13	ug/L	0.200	0.200	5.00		103% (85-115)		11/07/16 :11/09/16	
Copper	5.11	ug/L	0.200	0.200	5.00		102% (85-115)		11/07/16 :11/09/16	
Lead	5.03	ug/L	0.100	0.100	5.00		101% (85-115)		11/07/16 :11/09/16	
Nickel	5.07	ug/L	0.200	0.200	5.00		101% (85-115)		11/07/16 :11/09/16	
Silver	5.24	ug/L	0.100	0.100	5.00		105% (85-115)		11/07/16 :11/09/16	
Zinc	25.0	ug/L	0.500	0.500	25.0		100% (85-115)		11/07/16 :11/09/16	

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**Project: Portland Harbor**  
**Work Order: W16K053**

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**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16K131**

**Duplicate (B16K131-DUP1)**

**Source: W16K053-01**

Arsenic	0.311	ug/L	0.100	0.100		0.307		1 (20)	11/07/16 :11/09/16	
Cadmium	0.125	ug/L	0.100	0.100		0.124		0.4 (20)	11/07/16 :11/09/16	
Chromium	0.994	ug/L	0.200	0.200		1.01		2 (20)	11/07/16 :11/09/16	
Copper	17.0	ug/L	0.200	0.200		17.5		3 (20)	11/07/16 :11/09/16	
Lead	7.12	ug/L	0.100	0.100		7.01		2 (20)	11/07/16 :11/09/16	
Nickel	1.43	ug/L	0.200	0.200		1.40		2 (20)	11/07/16 :11/09/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	11/07/16 :11/09/16	
Zinc	137	ug/L	0.500	0.500		136		1 (20)	11/07/16 :11/09/16	

**Duplicate (B16K131-DUP2)**

**Source: W16K057-02**

Arsenic	0.236	ug/L	0.100	0.100		0.248		5 (20)	11/07/16 :11/09/16	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	11/07/16 :11/09/16	
Chromium	0.507	ug/L	0.200	0.200		0.500		1 (20)	11/07/16 :11/09/16	
Copper	1.55	ug/L	0.200	0.200		1.58		2 (20)	11/07/16 :11/09/16	
Lead	0.241	ug/L	0.100	0.100		0.253		5 (20)	11/07/16 :11/09/16	
Nickel	0.463	ug/L	0.200	0.200		0.469		1 (20)	11/07/16 :11/09/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	11/07/16 :11/09/16	
Zinc	20.2	ug/L	0.500	0.500		19.8		2 (20)	11/07/16 :11/09/16	

**Matrix Spike (B16K131-MS1)**

**Source: W16K053-01**

Arsenic	5.25	ug/L	0.100	0.100	5.00	0.307	99% (70-130)		11/07/16 :11/09/16	
Cadmium	5.06	ug/L	0.100	0.100	5.00	0.124	99% (70-130)		11/07/16 :11/09/16	
Chromium	6.11	ug/L	0.200	0.200	5.00	1.01	102% (70-130)		11/07/16 :11/09/16	
Copper	21.5	ug/L	0.200	0.200	5.00	17.5	79% (70-130)		11/07/16 :11/09/16	
Lead	12.1	ug/L	0.100	0.100	5.00	7.01	101% (70-130)		11/07/16 :11/09/16	
Nickel	6.42	ug/L	0.200	0.200	5.00	1.40	100% (70-130)		11/07/16 :11/09/16	
Silver	5.20	ug/L	0.100	0.100	5.00	ND	104% (70-130)		11/07/16 :11/09/16	
Zinc	157	ug/L	0.500	0.500	25.0	136	86% (70-130)		11/07/16 :11/09/16	

**Matrix Spike (B16K131-MS2)**

**Source: W16K057-02**

Arsenic	5.25	ug/L	0.100	0.100	5.00	0.248	100% (70-130)		11/07/16 :11/09/16	
Cadmium	4.88	ug/L	0.100	0.100	5.00	ND	98% (70-130)		11/07/16 :11/09/16	
Chromium	5.55	ug/L	0.200	0.200	5.00	0.500	101% (70-130)		11/07/16 :11/09/16	
Copper	6.36	ug/L	0.200	0.200	5.00	1.58	96% (70-130)		11/07/16 :11/09/16	
Lead	5.29	ug/L	0.100	0.100	5.00	0.253	101% (70-130)		11/07/16 :11/09/16	
Nickel	5.31	ug/L	0.200	0.200	5.00	0.469	97% (70-130)		11/07/16 :11/09/16	
Silver	4.79	ug/L	0.100	0.100	5.00	ND	96% (70-130)		11/07/16 :11/09/16	
Zinc	43.7	ug/L	0.500	0.500	25.0	19.8	95% (70-130)		11/07/16 :11/09/16	

**Total Metals by ICPMS - Batch B16K155**

**Blank (B16K155-BLK1)**

Mercury	ND	ug/L	0.000900	0.000900					11/09/16 :11/09/16	
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Jennifer Shackelford, Laboratory Coordinator QA/QC

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**Project: Portland Harbor**  
**Work Order: W16K053**

**Client: Director's Office**  
**Received: 11/05/16 12:12**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Total Metals by ICPMS - Batch B16K155										
<b>LCS (B16K155-BS1)</b>										
Mercury	0.00981	ug/L	0.000900	0.000900	0.0100		98% (85-125)		11/09/16 :11/09/16	
<b>Duplicate (B16K155-DUP1)</b>			<b>Source: W16K026-01</b>							
Mercury	0.0139	ug/L	0.00100	0.00100		ND	(20)		11/09/16 :11/09/16	
<b>Duplicate (B16K155-DUP2)</b>			<b>Source: W16K058-05</b>							
Mercury	0.00290	ug/L	0.00100	0.00100		0.00299	3 (20)		11/09/16 :11/09/16	
<b>Matrix Spike (B16K155-MS1)</b>			<b>Source: W16K026-01</b>							
Mercury	0.0660	ug/L	0.00100	0.00100	0.111	ND	59% (70-130)		11/09/16 :11/09/16	M4
<b>Matrix Spike (B16K155-MS2)</b>			<b>Source: W16K058-05</b>							
Mercury	0.0137	ug/L	0.00100	0.00100	0.0111	0.00299	97% (70-130)		11/09/16 :11/09/16	

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**Project: Portland Harbor**  
**Work Order: W16K053**

**Client: Director's Office**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16K133**

**Blank (B16K133-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					11/08/16 :12/14/16	
Acenaphthylene	ND	ug/L	0.020	0.020					11/08/16 :12/14/16	
Anthracene	ND	ug/L	0.020	0.020					11/08/16 :12/14/16	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Chrysene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Fluoranthene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Fluorene	ND	ug/L	0.020	0.020					11/08/16 :12/14/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					11/08/16 :12/14/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					11/08/16 :12/14/16	
Naphthalene	ND	ug/L	0.040	0.040					11/08/16 :12/14/16	
Phenanthrene	ND	ug/L	0.020	0.020					11/08/16 :12/14/16	
Pyrene	ND	ug/L	0.010	0.010					11/08/16 :12/14/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					11/08/16 :12/14/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					11/08/16 :12/14/16	
Diethyl phthalate	ND	ug/L	1.0	0.50					11/08/16 :12/14/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					11/08/16 :12/14/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					11/08/16 :12/14/16	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					11/08/16 :12/14/16	

**Surrogate**

2-Methylnaphthalene-d10	0.17	ug/L			0.229		73% (31-164)		11/08/16 :12/14/16	
Fluoranthene-d10	0.26	ug/L			0.229		112% (65-145)		11/08/16 :12/14/16	

**LCS (B16K133-BS1)**

Acenaphthene	0.221	ug/L	0.020	0.020	0.229		97% (67-125)		11/08/16 :12/14/16	
Acenaphthylene	0.245	ug/L	0.020	0.020	0.229		107% (64-138)		11/08/16 :12/14/16	
Anthracene	0.249	ug/L	0.020	0.020	0.229		109% (65-143)		11/08/16 :12/14/16	
Benzo(a)anthracene	0.242	ug/L	0.010	0.010	0.229		106% (80-130)		11/08/16 :12/14/16	
Benzo(a)pyrene	0.239	ug/L	0.010	0.010	0.229		105% (74-131)		11/08/16 :12/14/16	
Benzo(b)fluoranthene	0.218	ug/L	0.010	0.010	0.229		95% (67-128)		11/08/16 :12/14/16	
Benzo(g,h,i)perylene	0.233	ug/L	0.010	0.010	0.229		102% (57-137)		11/08/16 :12/14/16	
Benzo(k)fluoranthene	0.210	ug/L	0.010	0.010	0.229		92% (63-140)		11/08/16 :12/14/16	
Chrysene	0.236	ug/L	0.010	0.010	0.229		103% (80-134)		11/08/16 :12/14/16	
Dibenzo(a,h)anthracene	0.238	ug/L	0.010	0.010	0.229		104% (56-138)		11/08/16 :12/14/16	
Fluoranthene	0.256	ug/L	0.010	0.010	0.229		112% (70-150)		11/08/16 :12/14/16	
Fluorene	0.234	ug/L	0.020	0.020	0.229		102% (64-130)		11/08/16 :12/14/16	

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**Project: Portland Harbor**  
**Work Order: W16K053**

**Client: Director's Office**  
**Received: 11/05/16 12:12**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16K133**

**LCS (B16K133-BS1)**

Indeno(1,2,3-cd)pyrene	0.247	ug/L	0.010	0.010	0.229		108% (58-138)		11/08/16 :12/14/16	
1-Methylnaphthalene	0.151	ug/L	0.040	0.040	0.229		66% (35-164)		11/08/16 :12/14/16	
2-Methylnaphthalene	0.145	ug/L	0.040	0.040	0.229		63% (29-162)		11/08/16 :12/14/16	
Naphthalene	0.209	ug/L	0.040	0.040	0.229		91% (53-134)		11/08/16 :12/14/16	
Phenanthrene	0.230	ug/L	0.020	0.020	0.229		101% (73-132)		11/08/16 :12/14/16	
Pyrene	0.251	ug/L	0.010	0.010	0.229		110% (69-153)		11/08/16 :12/14/16	
Butyl benzyl phthalate	3.00	ug/L	1.0	0.50	2.29		131% (55-181)		11/08/16 :12/14/16	
Di-n-butyl phthalate	2.69	ug/L	1.0	0.50	2.29		118% (61-183)		11/08/16 :12/14/16	
Diethyl phthalate	2.56	ug/L	1.0	0.50	2.29		112% (65-177)		11/08/16 :12/14/16	
Dimethyl phthalate	2.54	ug/L	1.0	0.50	2.29		111% (77-151)		11/08/16 :12/14/16	
Di-n-octyl phthalate	3.30	ug/L	1.0	0.50	2.29		144% (12-185)		11/08/16 :12/14/16	V1
Bis(2-ethylhexyl) phthalate	3.01	ug/L	1.0	0.50	2.29		132% (39-170)		11/08/16 :12/14/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.16	ug/L			0.229		71% (31-164)		11/08/16 :12/14/16	
Fluoranthene-d10	0.26	ug/L			0.229		115% (65-145)		11/08/16 :12/14/16	

**Matrix Spike (B16K133-MS1)**

**Source: W16K060-01**

Acenaphthene	0.246	ug/L	0.020	0.020	0.229	ND	108% (67-125)		11/08/16 :12/14/16	
Acenaphthylene	0.278	ug/L	0.020	0.020	0.229	0.0200	113% (64-138)		11/08/16 :12/14/16	
Anthracene	0.311	ug/L	0.020	0.020	0.229	0.0549	112% (65-143)		11/08/16 :12/14/16	
Benzo(a)anthracene	0.282	ug/L	0.010	0.010	0.229	0.0331	109% (80-130)		11/08/16 :12/14/16	
Benzo(a)pyrene	0.249	ug/L	0.010	0.010	0.229	0.0366	93% (74-131)		11/08/16 :12/14/16	
Benzo(b)fluoranthene	0.250	ug/L	0.010	0.010	0.229	0.0646	81% (67-128)		11/08/16 :12/14/16	
Benzo(g,h,i)perylene	0.257	ug/L	0.010	0.010	0.229	0.0531	89% (57-137)		11/08/16 :12/14/16	
Benzo(k)fluoranthene	0.203	ug/L	0.010	0.010	0.229	0.0160	82% (63-140)		11/08/16 :12/14/16	
Chrysene	0.293	ug/L	0.010	0.010	0.229	0.0429	110% (80-134)		11/08/16 :12/14/16	
Dibenzo(a,h)anthracene	0.198	ug/L	0.010	0.010	0.229	ND	87% (56-138)		11/08/16 :12/14/16	
Fluoranthene	0.326	ug/L	0.010	0.010	0.229	0.0777	109% (70-150)		11/08/16 :12/14/16	
Fluorene	0.258	ug/L	0.020	0.020	0.229	ND	113% (64-130)		11/08/16 :12/14/16	
Indeno(1,2,3-cd)pyrene	0.231	ug/L	0.010	0.010	0.229	0.0280	89% (58-138)		11/08/16 :12/14/16	
1-Methylnaphthalene	0.187	ug/L	0.040	0.040	0.229	ND	82% (35-164)		11/08/16 :12/14/16	
2-Methylnaphthalene	0.182	ug/L	0.040	0.040	0.229	ND	80% (29-162)		11/08/16 :12/14/16	
Naphthalene	0.255	ug/L	0.040	0.040	0.229	ND	112% (53-134)		11/08/16 :12/14/16	
Phenanthrene	0.276	ug/L	0.020	0.020	0.229	0.0486	100% (73-132)		11/08/16 :12/14/16	
Pyrene	0.354	ug/L	0.010	0.010	0.229	0.113	106% (69-153)		11/08/16 :12/14/16	
Butyl benzyl phthalate	3.38	ug/L	1.0	0.50	2.29	ND	148% (55-181)		11/08/16 :12/14/16	
Di-n-butyl phthalate	2.77	ug/L	1.0	0.50	2.29	ND	121% (61-183)		11/08/16 :12/14/16	
Diethyl phthalate	2.69	ug/L	1.0	0.50	2.29	ND	118% (65-177)		11/08/16 :12/14/16	
Dimethyl phthalate	2.86	ug/L	1.0	0.50	2.29	ND	125% (77-151)		11/08/16 :12/14/16	
Di-n-octyl phthalate	2.61	ug/L	1.0	0.50	2.29	ND	114% (12-185)		11/08/16 :12/14/16	V1
Bis(2-ethylhexyl) phthalate	4.17	ug/L	1.0	0.50	2.29	1.81	104% (39-170)		11/08/16 :12/14/16	V1

Reported: 12/16/16 14:36

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16K053**

**Client: Director's Office**  
**Received: 11/05/16 12:12**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16K133**

**Matrix Spike (B16K133-MS1) Source: W16K060-01**

**Surrogate**

2-Methylnaphthalene-d10	0.18	ug/L			0.229		79% (31-164)		11/08/16 :12/14/16	
Fluoranthene-d10	0.24	ug/L			0.229		107% (65-145)		11/08/16 :12/14/16	

**Matrix Spike Dup (B16K133-MSD1) Source: W16K060-01**

Acenaphthene	0.259	ug/L	0.020	0.020	0.229	ND	113% (67-125)	5 (30)	11/08/16 :12/14/16	
Acenaphthylene	0.288	ug/L	0.020	0.020	0.229	0.0200	117% (64-138)	4 (30)	11/08/16 :12/14/16	
Anthracene	0.313	ug/L	0.020	0.020	0.229	0.0549	113% (65-143)	0.5 (30)	11/08/16 :12/14/16	
Benzo(a)anthracene	0.295	ug/L	0.010	0.010	0.229	0.0331	115% (80-130)	5 (30)	11/08/16 :12/14/16	
Benzo(a)pyrene	0.274	ug/L	0.010	0.010	0.229	0.0366	104% (74-131)	9 (30)	11/08/16 :12/14/16	
Benzo(b)fluoranthene	0.277	ug/L	0.010	0.010	0.229	0.0646	93% (67-128)	10 (30)	11/08/16 :12/14/16	
Benzo(g,h,i)perylene	0.298	ug/L	0.010	0.010	0.229	0.0531	107% (57-137)	15 (30)	11/08/16 :12/14/16	
Benzo(k)fluoranthene	0.231	ug/L	0.010	0.010	0.229	0.0160	94% (63-140)	13 (30)	11/08/16 :12/14/16	
Chrysene	0.307	ug/L	0.010	0.010	0.229	0.0429	116% (80-134)	5 (30)	11/08/16 :12/14/16	
Dibenzo(a,h)anthracene	0.238	ug/L	0.010	0.010	0.229	ND	104% (56-138)	18 (30)	11/08/16 :12/14/16	
Fluoranthene	0.370	ug/L	0.010	0.010	0.229	0.0777	128% (70-150)	12 (30)	11/08/16 :12/14/16	
Fluorene	0.269	ug/L	0.020	0.020	0.229	ND	118% (64-130)	4 (30)	11/08/16 :12/14/16	
Indeno(1,2,3-cd)pyrene	0.273	ug/L	0.010	0.010	0.229	0.0280	107% (58-138)	17 (30)	11/08/16 :12/14/16	
1-Methylnaphthalene	0.194	ug/L	0.040	0.040	0.229	ND	85% (35-164)	4 (30)	11/08/16 :12/14/16	
2-Methylnaphthalene	0.190	ug/L	0.040	0.040	0.229	ND	83% (29-162)	4 (30)	11/08/16 :12/14/16	
Naphthalene	0.270	ug/L	0.040	0.040	0.229	ND	118% (53-134)	6 (30)	11/08/16 :12/14/16	
Phenanthrene	0.298	ug/L	0.020	0.020	0.229	0.0486	109% (73-132)	8 (30)	11/08/16 :12/14/16	
Pyrene	0.403	ug/L	0.010	0.010	0.229	0.113	127% (69-153)	13 (30)	11/08/16 :12/14/16	
Butyl benzyl phthalate	3.59	ug/L	1.0	0.50	2.29	ND	157% (55-181)	6 (30)	11/08/16 :12/14/16	
Di-n-butyl phthalate	2.95	ug/L	1.0	0.50	2.29	ND	129% (61-183)	7 (30)	11/08/16 :12/14/16	
Diethyl phthalate	2.78	ug/L	1.0	0.50	2.29	ND	122% (65-177)	3 (30)	11/08/16 :12/14/16	
Dimethyl phthalate	2.98	ug/L	1.0	0.50	2.29	ND	130% (77-151)	4 (30)	11/08/16 :12/14/16	
Di-n-octyl phthalate	3.40	ug/L	1.0	0.50	2.29	ND	149% (12-185)	26 (30)	11/08/16 :12/14/16	V1
Bis(2-ethylhexyl) phthalate	4.89	ug/L	1.0	0.50	2.29	1.81	135% (39-170)	16 (30)	11/08/16 :12/14/16	V1

**Surrogate**

2-Methylnaphthalene-d10	0.18	ug/L			0.229		80% (31-164)		11/08/16 :12/14/16	
Fluoranthene-d10	0.27	ug/L			0.229		119% (65-145)		11/08/16 :12/14/16	

Reported: 12/16/16 14:36

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



City of Portland  
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W16K053**

Client: Director's Office  
Received: 11/05/16 12:12

**Qualifiers**

- M4 Based on low matrix spike recovery, the sample result may be a low estimate due to matrix interference.  
V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.

**Definitions**

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 12/16/16 14:36

Jennifer Shackelford, Laboratory Coordinator QA/QC

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*



### WPCL Cooler Receipt Form

Work Order Number: W16K053

Cooler Receipt Form Filled Out By: RM

Project: Portland Harbor

Sample transport:    Samples received on ice                       Courier \_\_\_\_\_  
    Directly from field   
    Temperature (°C) 12

	Yes	No	NA
Is the COC present and signed?	<input checked="" type="checkbox"/>		
Are sample bottles intact?	<input checked="" type="checkbox"/>		
Do the COC and sample labels match?	<input checked="" type="checkbox"/>		
Are the appropriate containers used?	<input checked="" type="checkbox"/>		
Are samples appropriately preserved?	<input checked="" type="checkbox"/>		
Do VOA vials have Headspace?			<input checked="" type="checkbox"/>
Are samples received within holding times?	<input checked="" type="checkbox"/>		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	1601146	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
11-5-16	1220	RM	W16K053-01	C	1	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

December 08, 2016

**Analytical Report for Service Request No: K1613709**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W16K053**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory November 08, 2016  
For your reference, these analyses have been assigned our service request number **K1613709**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

6

Howard Holmes  
Project Manager



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

## Table of Contents

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

**SUBCONTRACT ORDER**  
**City of Portland Water Pollution Control Lab**  
**W16K053**

K1613709

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

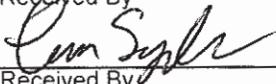
ALS Environmental  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

WPCL Project Name  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>	
<input checked="" type="checkbox"/> Standard	
<input type="checkbox"/> Rush _ day(s)	

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: W16K053-01	Water	Sampled:11/05/16 11:35		
Out-PCB Congeners 209	11/22/16 17:00	05/04/17 11:35		
<i>Containers Supplied:</i>				
G amber 1L (A)				

Called ALS on 11/5/16 @ 1350  
 by called on 11/7 for pickup 11/8

			11/8/16	10:35
Released By	Date	Received By	Date	
			11-8-16	14:15
Released By	Date	Received By	Date	



PC HZ

### Cooler Receipt and Preservation Form

Client City of Portland Service Request K16 13709  
 Received: 11-8-16 Opened: 11-8-16 By: es Unloaded: 11-8-16 By: es

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered  
 2. Samples were received in: (circle) Cooler Box Envelope Other NA  
 3. Were custody seals on coolers? NA Y N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
3.1	3.2	5.8	5.9	+0.1	350			NA	
2.1	2.0	-	-	-0.1	298				
2.1	2.0	-	-	-0.1	375				
5.7	5.6	-	-	-0.1	323				

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves  
 5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N  
 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N  
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed  
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N  
 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N  
 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N  
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N  
 11. Were VOA vials received without headspace? Indicate in the table below. NA Y N  
 12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Report Prepared for:**

Accounts Payable  
ALS Environmental  
1317 South 13th Avenue  
Kelso WA 98626

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Prepared Date:**

November 23, 2016

**Report Information:**

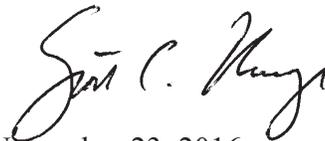
**Pace Project #: 10369402**  
**Sample Receipt Date: 11/10/2016**  
**Client Project #: K1613709**  
**Client Sub PO #: 51K1613709**  
**State Cert #: MN200001-005**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



November 23, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

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The results relate only to the samples included in this report.



## **DISCUSSION**

This report presents the results from the analyses performed on one sample submitted by a representative of ALS Environmental. The sample was analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the amount of sample extracted.

The isotopically-labeled PCB internal standards in the sample extract were recovered at 57-119%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the sample material.

Laboratory spike samples were also prepared with the sample batch using reference material that had been fortified with native standards. The results show that the spiked native compounds were recovered at 86-118% with relative percent differences of 1.8-9.6%. These results were within the target ranges for this method. Matrix spikes were not prepared with this extraction batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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Report No.....10369402

# Appendix A

## Sample Management

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

Project Number: K1613709  
 Project Manager: Howard Holmes  
 QAP: LAB QAP

10369402

Lab Code	Sample ID	# of Cont.	Matrix	Sample		Lab ID	Misc Out 1
				Date	Time		
K1613709-001	W16K053-01	1	Water	11/5/16	1135	Pace MIN	X

001

Test Comments  
 Misc Out 1 - None  
 Folder Comments:  
 Tier II  
 1668 PCB Congeners-209 list to Pace

For City of Portland

HA

Special Instructions/Comments Please provide the electronic (PDF and EDD) report to the following e-mail address: ALS.Data@alsglobal.com Report 1 City of Portland EDD to City of Portland Report 2 City of Portland EDD at Kelso to ALS Kelso - Ho ward Holmes P - Test is Authorized for Prep Only HI - Test is On Hold	Turnaround Requirements RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD Requested FAX Date: _____ Requested Report Date: 11/25/16	Report Requirements I. Results Only _____ II. Results + QC Summaries <input checked="" type="checkbox"/> III. Results + QC and Calibration Summaries _____ IV. Data Validation Report with Raw Data _____ PQL/MDL/J <u>Y</u> EDD <u>Y</u>	Invoice Information PO# 51K1613709 Bill to
---	--	---	--

Received By: *[Signature]* 11/9/16  
 Received By: *[Signature]* Pace 11-16-16  
 Airbill Number: 1000  
 T: 0.20C

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

Project Number: K1613709  
Project Manager: Howard Holmes  
QAP: LAB QAP

**K1613709**

**Ship To: Pace MN**  
Pace Analytical Services  
1700 Elm Street  
Suite 200  
Minneapolis, MN 55414

PC  
SMO

Date  
Date

*[Signature]* 11/9/2016  
*[Signature]* 11/9/16

**Instructions:**

Ice \_\_\_\_\_  
Dry Ice \_\_\_\_\_  
No Ice \_\_\_\_\_

**Shipping:**

Overnight \_\_\_\_\_  
2nd Day \_\_\_\_\_  
Ground \_\_\_\_\_

Bill to Client Account \_\_\_\_\_

Comments:

ALS Group USA, Corp.  
www.alsglobal.com  
An ALS Limited Company

**Sample Condition Upon Receipt**

Client Name: ALS Environmental

Project #:

WO#: **10369402**



Courier:  Fed Ex  UPS  USPS  Client  
 Commercial  Pace  Speedee  Other: \_\_\_\_\_  
 Tracking Number: 6447 9281 2019

Custody Seal on Cooler/Box Present?  Yes  No      Seals Intact?  Yes  No      Optional: Proj. Due Date: \_\_\_\_\_

Packing Material:  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_      Temp Blank?  Yes  No

Thermometer Used:  151401163  151401164  B88A912167504  B88A0143310098  
 Type of Ice:  Wet  Blue  None      Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.3      Cooler Temp Corrected (°C): 0.2      Biological Tissue Frozen?  Yes  No  N/A  
 Temp should be above freezing to 6°C      Correction Factor: -0.1      Date and Initials of Person Examining Contents: 11.10.16 TL

USDA Regulated Soil  N/A, water sample

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes  No      Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH >12 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Exceptions: VOA, Colliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**

Field Data Required?  Yes  No

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/Resolution: \_\_\_\_\_

Project Manager Review: Walter Boberg

Date: 11/10/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

### REPORT OF LABORATORY ANALYSIS

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Report No.....10369402

# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	W16K053-01	Matrix	Water
Lab Sample ID	10369402001	Dilution	5
Filename	P161121A_10	Collected	11/05/2016 11:35
Injected By	BAL	Received	11/10/2016 10:00
Total Amount Extracted	970 mL	Extracted	11/15/2016 11:15
% Moisture	NA	Analyzed	11/21/2016 19:29
Dry Weight Extracted	NA		
ICAL ID	P161121A02		
CCal Filename(s)	P161121A_01		
Method Blank ID	BLANK-52783		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.908	3.15	2.0	1.30	65
13C-4-MoCB	3	11.652	3.05	2.0	1.28	64
13C-2,2'-DiCB	4	11.916	1.62	2.0	1.25	63
13C-4,4'-DiCB	15	18.947	1.61	2.0	1.21	61
13C-2,2',6-TrCB	19	15.736	1.13	2.0	1.46	73
13C-3,4,4'-TrCB	37	26.655	1.00	2.0	1.33	66
13C-2,2',6,6'-TeCB	54	19.210	0.81	2.0	1.38	69
13C-3,4,4',5'-TeCB	81	33.752	0.79	2.0	1.48	74
13C-3,3',4,4'-TeCB	77	34.356	0.76	2.0	1.45	73
13C-2,2',4,6,6'-PeCB	104	25.263	1.63	2.0	1.37	68
13C-2,3,3',4,4'-PeCB	105	37.916	1.58	2.0	1.32	66
13C-2,3,4,4',5'-PeCB	114	37.245	1.50	2.0	1.36	68
13C-2,3',4,4',5'-PeCB	118	36.692	1.59	2.0	1.40	70
13C-2,3',4,4',5'-PeCB	123	36.356	1.48	2.0	1.43	72
13C-3,3',4,4',5'-PeCB	126	41.102	1.62	2.0	1.23	61
13C-2,2',4,4',6,6'-HxCB	155	31.271	1.29	2.0	1.72	86
13C-HxCB (156/157)	156/157	44.125	1.28	4.0	2.52	63
13C-2,3',4,4',5,5'-HxCB	167	42.951	1.19	2.0	1.37	68
13C-3,3',4,4',5,5'-HxCB	169	47.444	1.30	2.0	1.15	57
13C-2,2',3,4',5,6,6'-HpCB	188	37.178	1.02	2.0	2.25	113
13C-2,3,3',4,4',5,5'-HpCB	189	49.952	1.01	2.0	1.42	71
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.632	0.91	2.0	2.38	119
13C-2,3,3',4,4',5,5',6-OxCB	205	52.517	0.87	2.0	1.50	75
13C-2,2',3,3',4,4',5,5',6-NoCB	206	54.241	0.71	2.0	1.59	80
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	49.414	0.82	2.0	1.94	97
13C--DeCB	209	55.836	0.76	2.0	1.99	99
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	22.295	1.06	2.0	1.48	74
13C-2,3,3',5,5'-PeCB	111	34.322	1.55	2.0	1.48	74
13C-2,2',3,3',5,5',6-HpCB	178	40.297	1.03	2.0	1.81	91
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.346	1.57	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	24.274	0.82	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.522	1.63	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.861	1.30	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	52.043	0.90	2.0	NA	NA

Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16K053-01  
 Lab Sample ID 10369402001  
 Filename P161121A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.258
2		---	---	ND	---	0.258
3		---	---	ND	---	0.258
4		---	---	ND	---	0.258
5		---	---	ND	---	0.258
6		---	---	ND	---	0.258
7		---	---	ND	---	0.258
8		---	---	ND	---	0.258
9		---	---	ND	---	0.258
10		---	---	ND	---	0.258
11		---	---	ND	---	2.53
12	12/13	---	---	ND	---	0.516
13	12/13	---	---	ND	---	0.516
14		---	---	ND	---	0.258
15		---	---	ND	---	0.340
16		---	---	ND	---	0.258
17		---	---	ND	---	0.258
18	18/30	---	---	ND	---	0.516
19		---	---	ND	---	0.258
20	20/28	---	---	ND	---	1.33
21	21/33	---	---	ND	---	1.39
22		---	---	ND	---	0.979
23		---	---	ND	---	0.258
24		---	---	ND	---	0.258
25		---	---	ND	---	0.258
26	26/29	---	---	ND	---	0.516
27		---	---	ND	---	0.258
28	20/28	---	---	ND	---	1.33
29	26/29	---	---	ND	---	0.516
30	18/30	---	---	ND	---	0.516
31		---	---	ND	---	1.34
32		---	---	ND	---	0.258
33	21/33	---	---	ND	---	1.39
34		---	---	ND	---	0.258
35		---	---	ND	---	0.258
36		---	---	ND	---	0.258
37		---	---	ND	---	0.546
38		---	---	ND	---	0.258
39		---	---	ND	---	0.258
40	40/41/71	---	---	ND	---	1.55
41	40/41/71	---	---	ND	---	1.55
42		---	---	ND	---	0.516
43	43/73	---	---	ND	---	0.516
44	44/47/65	---	---	ND	---	1.55
45	45/51	---	---	ND	---	1.03
46		---	---	ND	---	0.516
47	44/47/65	---	---	ND	---	1.55
48		---	---	ND	---	0.516

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16K053-01  
 Lab Sample ID 10369402001  
 Filename P161121A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.03
50	50/53	---	---	ND	---	1.03
51	45/51	---	---	ND	---	1.03
52		---	---	ND	---	1.59
53	50/53	---	---	ND	---	1.03
54		---	---	ND	---	0.516
55		---	---	ND	---	0.516
56		---	---	ND	---	0.516
57		---	---	ND	---	0.516
58		---	---	ND	---	0.516
59	59/62/75	---	---	ND	---	1.55
60		---	---	ND	---	0.516
61	61/70/74/76	---	---	ND	---	2.06
62	59/62/75	---	---	ND	---	1.55
63		---	---	ND	---	0.516
64		---	---	ND	---	0.516
65	44/47/65	---	---	ND	---	1.55
66		---	---	ND	---	0.866
67		---	---	ND	---	0.516
68		---	---	ND	---	0.516
69	49/69	---	---	ND	---	1.03
70	61/70/74/76	---	---	ND	---	2.06
71	40/41/71	---	---	ND	---	1.55
72		---	---	ND	---	0.516
73	43/73	---	---	ND	---	0.516
74	61/70/74/76	---	---	ND	---	2.06
75	59/62/75	---	---	ND	---	1.55
76	61/70/74/76	---	---	ND	---	2.06
77		---	---	ND	---	0.516
78		---	---	ND	---	0.516
79		---	---	ND	---	0.516
80		---	---	ND	---	0.516
81		---	---	ND	---	0.516
82		---	---	ND	---	0.516
83		---	---	ND	---	0.516
84		---	---	ND	---	0.516
85	85/116/117	---	---	ND	---	1.55
86	86/87/97/108/119/125	---	---	ND	---	3.09
87	86/87/97/108/119/125	---	---	ND	---	3.09
88	88/91	---	---	ND	---	1.03
89		---	---	ND	---	0.516
90	90/101/113	---	---	ND	---	1.55
91	88/91	---	---	ND	---	1.03
92		---	---	ND	---	0.516
93	93/98/100/102	---	---	ND	---	2.06
94		---	---	ND	---	0.516
95		---	---	ND	---	0.979
96		---	---	ND	---	0.516

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
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 B = Less than 10 times higher than method blank level  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W16K053-01  
Lab Sample ID 10369402001  
Filename P161121A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.09
98	93/98/100/102	---	---	ND	---	2.06
99		32.160	1.56	0.527	---	0.516
100	93/98/100/102	---	---	ND	---	2.06
101	90/101/113	---	---	ND	---	1.55
102	93/98/100/102	---	---	ND	---	2.06
103		---	---	ND	---	0.516
104		---	---	ND	---	0.516
105		37.933	1.45	0.730	---	0.516
106		---	---	ND	---	0.516
107	107/124	---	---	ND	---	1.03
108	86/87/97/108/119/125	---	---	ND	---	3.09
109		---	---	ND	---	0.516
110	110/115	33.602	1.59	2.01	---	1.03
111		---	---	ND	---	0.516
112		---	---	ND	---	0.516
113	90/101/113	---	---	ND	---	1.55
114		---	---	ND	---	0.516
115	110/115	33.602	1.59	(2.01)	---	1.03
116	85/116/117	---	---	ND	---	1.55
117	85/116/117	---	---	ND	---	1.55
118		36.725	1.58	1.61	---	0.660
119	86/87/97/108/119/125	---	---	ND	---	3.09
120		---	---	ND	---	0.516
121		---	---	ND	---	0.516
122		---	---	ND	---	0.516
123		---	---	ND	---	0.516
124	107/124	---	---	ND	---	1.03
125	86/87/97/108/119/125	---	---	ND	---	3.09
126		---	---	ND	---	0.516
127		---	---	ND	---	0.516
128	128/166	---	---	ND	---	1.03
129	129/138/163	39.894	1.20	2.35	---	1.55
130		---	---	ND	---	0.516
131		---	---	ND	---	0.516
132		36.792	1.26	0.728	---	0.516
133		---	---	ND	---	0.516
134	134/143	---	---	ND	---	1.03
135	135/151	---	---	ND	---	1.03
136		---	---	ND	---	0.516
137		---	---	ND	---	0.516
138	129/138/163	39.894	1.20	(2.35)	---	1.55
139	139/140	---	---	ND	---	1.03
140	139/140	---	---	ND	---	1.03
141		---	---	ND	---	0.516
142		---	---	ND	---	0.516
143	134/143	---	---	ND	---	1.03
144		---	---	ND	---	0.516

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID W16K053-01  
Lab Sample ID 10369402001  
Filename P161121A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.516
146		---	---	ND	---	0.516
147	147/149	35.485	1.27	1.11	---	1.03
148		---	---	ND	---	0.516
149	147/149	35.485	1.27	(1.11)	---	1.03
150		---	---	ND	---	0.516
151	135/151	---	---	ND	---	1.03
152		---	---	ND	---	0.516
153	153/168	38.620	1.19	1.37	---	1.03
154		---	---	ND	---	0.516
155		---	---	ND	---	0.516
156	156/157	---	---	ND	---	1.03
157	156/157	---	---	ND	---	1.03
158		---	---	ND	---	0.516
159		---	---	ND	---	0.516
160		---	---	ND	---	0.516
161		---	---	ND	---	0.516
162		---	---	ND	---	0.516
163	129/138/163	39.894	1.20	(2.35)	---	1.55
164		---	---	ND	---	0.516
165		---	---	ND	---	0.516
166	128/166	---	---	ND	---	1.03
167		---	---	ND	---	0.516
168	153/168	38.620	1.19	(1.37)	---	1.03
169		---	---	ND	---	0.516
170		---	---	ND	---	0.516
171	171/173	---	---	ND	---	1.03
172		---	---	ND	---	0.516
173	171/173	---	---	ND	---	1.03
174		---	---	ND	---	0.516
175		---	---	ND	---	0.516
176		---	---	ND	---	0.516
177		---	---	ND	---	0.516
178		---	---	ND	---	0.516
179		---	---	ND	---	0.516
180	180/193	---	---	ND	---	1.03
181		---	---	ND	---	0.516
182		---	---	ND	---	0.516
183	183/185	---	---	ND	---	1.03
184		---	---	ND	---	0.516
185	183/185	---	---	ND	---	1.03
186		---	---	ND	---	0.516
187		---	---	ND	---	0.516
188		---	---	ND	---	0.516
189		---	---	ND	---	0.516
190		---	---	ND	---	0.516
191		---	---	ND	---	0.516
192		---	---	ND	---	0.516

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
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\* = See Discussion  
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I = Interference  
ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID W16K053-01  
 Lab Sample ID 10369402001  
 Filename P161121A\_10

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	1.03
194		---	---	ND	---	0.773
195		---	---	ND	---	0.773
196		---	---	ND	---	0.773
197	197/200	---	---	ND	---	1.55
198	198/199	---	---	ND	---	1.55
199	198/199	---	---	ND	---	1.55
200	197/200	---	---	ND	---	1.55
201		---	---	ND	---	0.773
202		---	---	ND	---	0.773
203		---	---	ND	---	0.773
204		---	---	ND	---	0.773
205		---	---	ND	---	0.773
206		---	---	ND	---	0.773
207		---	---	ND	---	0.773
208		---	---	ND	---	0.773
209		---	---	ND	---	0.773

Conc = Concentration  
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 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

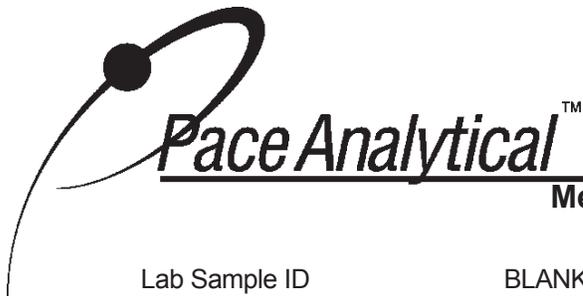
Client Sample ID           W16K053-01  
Lab Sample ID             10369402001  
Filename                    P161121A\_10

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	4.88
Total Hexachloro Biphenyls	5.55
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	10.4

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-52783	Matrix	Water
Filename	P161120A_08	Extracted	11/15/2016 11:15
Injected By	BAL	Analyzed	11/20/2016 12:49
Total Amount Extracted	1010 mL	Dilution	5
ICAL ID	P161120A02		
CCal Filename(s)	P161120A_01		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
------------	-------	----	-------	------------	------------	------------

Labeled Analytes

13C-2-MoCB	1	8.932	2.93	2.0	0.937	47
13C-4-MoCB	3	11.664	2.81	2.0	0.998	50
13C-2,2'-DiCB	4	11.940	1.56	2.0	0.835	42
13C-4,4'-DiCB	15	18.911	1.57	2.0	0.992	50
13C-2,2',6-TrCB	19	15.652	1.14	2.0	0.888	44
13C-3,4,4'-TrCB	37	26.639	1.03	2.0	1.39	70
13C-2,2',6,6'-TeCB	54	19.194	0.78	2.0	1.07	53
13C-3,4,4',5-TeCB	81	33.736	0.80	2.0	1.55	78
13C-3,3',4,4'-TeCB	77	34.323	0.75	2.0	1.59	79
13C-2,2',4,6,6'-PeCB	104	25.247	1.60	2.0	1.14	57
13C-2,3,3',4,4'-PeCB	105	37.883	1.59	2.0	1.58	79
13C-2,3,4,4',5-PeCB	114	37.229	1.56	2.0	1.51	76
13C-2,3',4,4',5-PeCB	118	36.676	1.59	2.0	1.61	80
13C-2,3',4,4',5'-PeCB	123	36.324	1.61	2.0	1.59	80
13C-3,3',4,4',5-PeCB	126	41.069	1.60	2.0	1.51	75
13C-2,2',4,4',6,6'-HxCB	155	31.255	1.25	2.0	1.41	71
13C-HxCB (156/157)	156/157	44.109	1.28	4.0	2.82	71
13C-2,3',4,4',5,5'-HxCB	167	42.918	1.29	2.0	1.54	77
13C-3,3',4,4',5,5'-HxCB	169	47.429	1.20	2.0	1.25	62
13C-2,2',3,4',5,6,6'-HpCB	188	37.145	1.05	2.0	1.86	93
13C-2,3,3',4,4',5,5'-HpCB	189	49.910	1.04	2.0	1.56	78
13C-2,2',3,3',5,5',6,6'-OoCB	202	42.617	0.87	2.0	2.01	101
13C-2,3,3',4,4',5,5',6-OoCB	205	52.496	0.92	2.0	1.58	79
13C-2,2',3,3',4,4',5,5',6-NoCB	206	54.221	0.86	2.0	1.47	73
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	49.371	0.75	2.0	1.75	87
13C-DeCB	209	55.794	0.76	2.0	1.79	90

Cleanup Standards

13C-2,4,4'-TrCB	28	22.279	1.12	2.0	1.33	66
13C-2,3,3',5,5'-PeCB	111	34.306	1.69	2.0	1.45	73
13C-2,2',3,3',5,5',6-HpCB	178	40.264	1.05	2.0	1.66	83

Recovery Standards

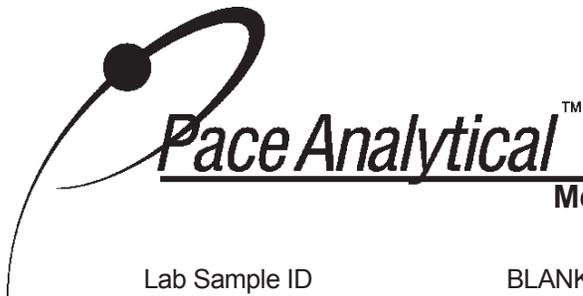
13C-2,5-DiCB	9	14.334	1.60	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	24.241	0.81	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.506	1.56	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.828	1.29	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	52.001	0.92	2.0	NA	NA

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52783  
 Filename P161120A\_08

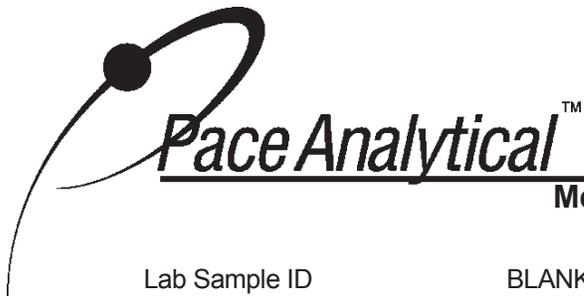
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		--	--	ND	--	0.247
2		--	--	ND	--	0.247
3		--	--	ND	--	0.247
4		--	--	ND	--	0.247
5		--	--	ND	--	0.247
6		--	--	ND	--	0.247
7		--	--	ND	--	0.247
8		--	--	ND	--	0.247
9		--	--	ND	--	0.247
10		--	--	ND	--	0.247
11		--	--	ND	--	2.42
12	12/13	--	--	ND	--	0.494
13	12/13	--	--	ND	--	0.494
14		--	--	ND	--	0.247
15		--	--	ND	--	0.247
16		--	--	ND	--	0.247
17		--	--	ND	--	0.247
18	18/30	--	--	ND	--	0.494
19		--	--	ND	--	0.247
20	20/28	--	--	ND	--	1.27
21	21/33	--	--	ND	--	1.33
22		--	--	ND	--	0.938
23		--	--	ND	--	0.247
24		--	--	ND	--	0.247
25		--	--	ND	--	0.247
26	26/29	--	--	ND	--	0.494
27		--	--	ND	--	0.247
28	20/28	--	--	ND	--	1.27
29	26/29	--	--	ND	--	0.494
30	18/30	--	--	ND	--	0.494
31		--	--	ND	--	1.28
32		--	--	ND	--	0.247
33	21/33	--	--	ND	--	1.33
34		--	--	ND	--	0.247
35		--	--	ND	--	0.247
36		--	--	ND	--	0.247
37		--	--	ND	--	0.523
38		--	--	ND	--	0.247
39		--	--	ND	--	0.247
40	40/41/71	--	--	ND	--	1.48
41	40/41/71	--	--	ND	--	1.48
42		--	--	ND	--	0.494
43	43/73	--	--	ND	--	0.494
44	44/47/65	--	--	ND	--	1.48
45	45/51	--	--	ND	--	0.988

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
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 RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52783  
 Filename P161120A\_08

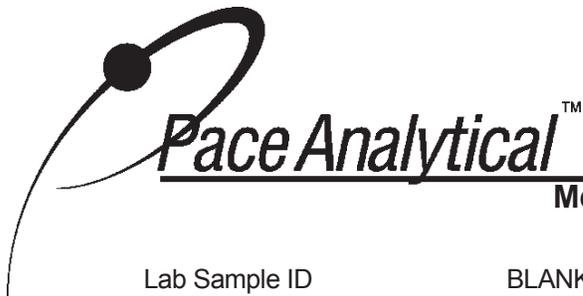
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		--	--	ND	--	0.494
47	44/47/65	--	--	ND	--	1.48
48		--	--	ND	--	0.494
49	49/69	--	--	ND	--	0.988
50	50/53	--	--	ND	--	0.988
51	45/51	--	--	ND	--	0.988
52		--	--	ND	--	1.52
53	50/53	--	--	ND	--	0.988
54		--	--	ND	--	0.494
55		--	--	ND	--	0.494
56		--	--	ND	--	0.494
57		--	--	ND	--	0.494
58		--	--	ND	--	0.494
59	59/62/75	--	--	ND	--	1.48
60		--	--	ND	--	0.494
61	61/70/74/76	--	--	ND	--	1.98
62	59/62/75	--	--	ND	--	1.48
63		--	--	ND	--	0.494
64		--	--	ND	--	0.494
65	44/47/65	--	--	ND	--	1.48
66		--	--	ND	--	0.830
67		--	--	ND	--	0.494
68		--	--	ND	--	0.494
69	49/69	--	--	ND	--	0.988
70	61/70/74/76	--	--	ND	--	1.98
71	40/41/71	--	--	ND	--	1.48
72		--	--	ND	--	0.494
73	43/73	--	--	ND	--	0.494
74	61/70/74/76	--	--	ND	--	1.98
75	59/62/75	--	--	ND	--	1.48
76	61/70/74/76	--	--	ND	--	1.98
77		--	--	ND	--	0.494
78		--	--	ND	--	0.494
79		--	--	ND	--	0.494
80		--	--	ND	--	0.494
81		--	--	ND	--	0.494
82		--	--	ND	--	0.494
83		--	--	ND	--	0.494
84		--	--	ND	--	0.494
85	85/116/117	--	--	ND	--	1.48
86	86/87/97/108/119/125	--	--	ND	--	2.96
87	86/87/97/108/119/125	--	--	ND	--	2.96
88	88/91	--	--	ND	--	0.988
89		--	--	ND	--	0.494
90	90/101/113	--	--	ND	--	1.48

Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52783  
Filename P161120A\_08

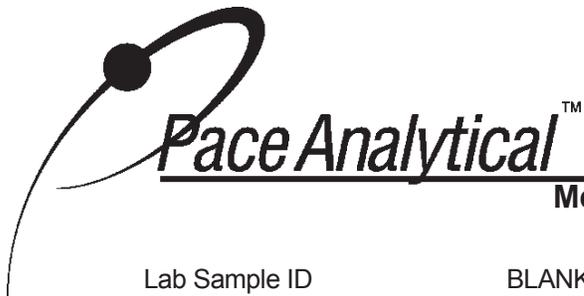
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	--	--	ND	--	0.988
92		--	--	ND	--	0.494
93	93/98/100/102	--	--	ND	--	1.98
94		--	--	ND	--	0.494
95		--	--	ND	--	0.938
96		--	--	ND	--	0.494
97	86/87/97/108/119/125	--	--	ND	--	2.96
98	93/98/100/102	--	--	ND	--	1.98
99		--	--	ND	--	0.494
100	93/98/100/102	--	--	ND	--	1.98
101	90/101/113	--	--	ND	--	1.48
102	93/98/100/102	--	--	ND	--	1.98
103		--	--	ND	--	0.494
104		--	--	ND	--	0.494
105		--	--	ND	--	0.494
106		--	--	ND	--	0.494
107	107/124	--	--	ND	--	0.988
108	86/87/97/108/119/125	--	--	ND	--	2.96
109		--	--	ND	--	0.494
110	110/115	--	--	ND	--	0.988
111		--	--	ND	--	0.494
112		--	--	ND	--	0.494
113	90/101/113	--	--	ND	--	1.48
114		--	--	ND	--	0.494
115	110/115	--	--	ND	--	0.988
116	85/116/117	--	--	ND	--	1.48
117	85/116/117	--	--	ND	--	1.48
118		--	--	ND	--	0.632
119	86/87/97/108/119/125	--	--	ND	--	2.96
120		--	--	ND	--	0.494
121		--	--	ND	--	0.494
122		--	--	ND	--	0.494
123		--	--	ND	--	0.494
124	107/124	--	--	ND	--	0.988
125	86/87/97/108/119/125	--	--	ND	--	2.96
126		--	--	ND	--	0.494
127		--	--	ND	--	0.494
128	128/166	--	--	ND	--	0.988
129	129/138/163	--	--	ND	--	1.48
130		--	--	ND	--	0.494
131		--	--	ND	--	0.494
132		--	--	ND	--	0.494
133		--	--	ND	--	0.494
134	134/143	--	--	ND	--	0.988
135	135/151	--	--	ND	--	0.988

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52783  
 Filename P161120A\_08

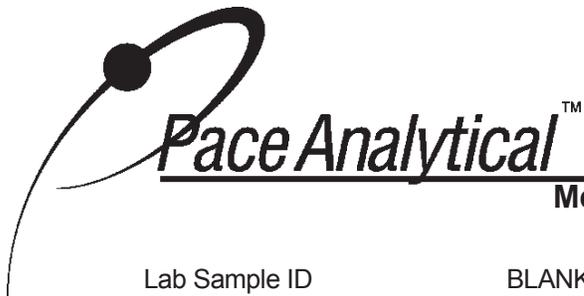
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		--	--	ND	--	0.494
137		--	--	ND	--	0.494
138	129/138/163	--	--	ND	--	1.48
139	139/140	--	--	ND	--	0.988
140	139/140	--	--	ND	--	0.988
141		--	--	ND	--	0.494
142		--	--	ND	--	0.494
143	134/143	--	--	ND	--	0.988
144		--	--	ND	--	0.494
145		--	--	ND	--	0.494
146		--	--	ND	--	0.494
147	147/149	--	--	ND	--	0.988
148		--	--	ND	--	0.494
149	147/149	--	--	ND	--	0.988
150		--	--	ND	--	0.494
151	135/151	--	--	ND	--	0.988
152		--	--	ND	--	0.494
153	153/168	--	--	ND	--	0.988
154		--	--	ND	--	0.494
155		--	--	ND	--	0.494
156	156/157	--	--	ND	--	0.988
157	156/157	--	--	ND	--	0.988
158		--	--	ND	--	0.494
159		--	--	ND	--	0.494
160		--	--	ND	--	0.494
161		--	--	ND	--	0.494
162		--	--	ND	--	0.494
163	129/138/163	--	--	ND	--	1.48
164		--	--	ND	--	0.494
165		--	--	ND	--	0.494
166	128/166	--	--	ND	--	0.988
167		--	--	ND	--	0.494
168	153/168	--	--	ND	--	0.988
169		--	--	ND	--	0.494
170		--	--	ND	--	0.494
171	171/173	--	--	ND	--	0.988
172		--	--	ND	--	0.494
173	171/173	--	--	ND	--	0.988
174		--	--	ND	--	0.494
175		--	--	ND	--	0.494
176		--	--	ND	--	0.494
177		--	--	ND	--	0.494
178		--	--	ND	--	0.494
179		--	--	ND	--	0.494
180	180/193	--	--	ND	--	0.988

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52783  
 Filename P161120A\_08

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		--	--	ND	--	0.494
182		--	--	ND	--	0.494
183	183/185	--	--	ND	--	0.988
184		--	--	ND	--	0.494
185	183/185	--	--	ND	--	0.988
186		--	--	ND	--	0.494
187		--	--	ND	--	0.494
188		--	--	ND	--	0.494
189		--	--	ND	--	0.494
190		--	--	ND	--	0.494
191		--	--	ND	--	0.494
192		--	--	ND	--	0.494
193	180/193	--	--	ND	--	0.988
194		--	--	ND	--	0.741
195		--	--	ND	--	0.741
196		--	--	ND	--	0.741
197	197/200	--	--	ND	--	1.48
198	198/199	--	--	ND	--	1.48
199	198/199	--	--	ND	--	1.48
200	197/200	--	--	ND	--	1.48
201		--	--	ND	--	0.741
202		--	--	ND	--	0.741
203		--	--	ND	--	0.741
204		--	--	ND	--	0.741
205		--	--	ND	--	0.741
206		--	--	ND	--	0.741
207		--	--	ND	--	0.741
208		--	--	ND	--	0.741
209		--	--	ND	--	0.741

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
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 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID            CBLKWH  
Lab Sample ID              BLANK-52783  
Filename                     P161120A\_08

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCS-52784	Matrix	Water
Filename	P161117A_11	Dilution	5
Total Amount Extracted	962 mL	Extracted	11/15/2016 11:15
ICAL ID	P161117A02	Analyzed	11/17/2016 18:49
CCal Filename(s)	P161117A_01	Injected By	CVS
Method Blank ID	BLANK-52783		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.08	108	2.0	1.08	54
3	1.0	1.07	107	2.0	1.07	54
4	1.0	1.13	113	2.0	0.876	44
15	1.0	1.08	108	2.0	1.09	54
19	1.0	1.17	117	2.0	0.966	48
37	1.0	0.904	90	2.0	1.28	64
54	1.0	1.09	109	2.0	1.10	55
81	1.0	0.991	99	2.0	1.58	79
77	1.0	0.990	99	2.0	1.55	78
104	1.0	1.11	111	2.0	1.09	54
105	1.0	1.06	106	2.0	1.48	74
114	1.0	1.09	109	2.0	1.44	72
118	1.0	1.09	109	2.0	1.48	74
123	1.0	1.06	106	2.0	1.44	72
126	1.0	1.10	110	2.0	1.33	67
155	1.0	1.06	106	2.0	1.43	71
156/157	2.0	2.15	107	4.0	2.66	67
167	1.0	1.00	100	2.0	1.47	74
169	1.0	1.10	110	2.0	1.18	59
188	1.0	1.15	115	2.0	1.75	87
189	1.0	0.959	96	2.0	1.46	73
202	1.0	1.04	104	2.0	2.00	100
205	1.0	1.04	104	2.0	1.53	76
206	1.0	1.08	108	2.0	1.47	74
208	1.0	1.03	103	2.0	1.68	84
209	1.0	0.910	91	2.0	1.93	96

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyls  
 Laboratory Control Spike Analysis Results**

Lab Sample ID	LCSD-52785	Matrix	Water
Filename	P161118A_04	Dilution	5
Total Amount Extracted	972 mL	Extracted	11/15/2016 11:15
ICAL ID	P161118A07	Analyzed	11/18/2016 14:55
CCal Filename(s)	P161118A_06	Injected By	CVS
Method Blank ID	BLANK-52783		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.18	118	2.0	1.35	67
3	1.0	1.09	109	2.0	1.39	70
4	1.0	1.15	115	2.0	1.16	58
15	1.0	1.11	111	2.0	1.37	68
19	1.0	1.14	114	2.0	1.28	64
37	1.0	0.855	86	2.0	1.50	75
54	1.0	1.11	111	2.0	1.40	70
81	1.0	1.09	109	2.0	1.64	82
77	1.0	1.01	101	2.0	1.69	84
104	1.0	1.14	114	2.0	1.39	70
105	1.0	0.988	99	2.0	1.66	83
114	1.0	1.04	104	2.0	1.57	79
118	1.0	1.06	106	2.0	1.62	81
123	1.0	1.03	103	2.0	1.64	82
126	1.0	1.02	102	2.0	1.45	73
155	1.0	1.09	109	2.0	1.66	83
156/157	2.0	2.06	103	4.0	2.87	72
167	1.0	0.983	98	2.0	1.57	78
169	1.0	1.12	112	2.0	1.24	62
188	1.0	1.11	111	2.0	2.00	100
189	1.0	0.889	89	2.0	1.54	77
202	1.0	1.08	108	2.0	2.15	107
205	1.0	1.07	107	2.0	1.58	79
206	1.0	1.15	115	2.0	1.51	75
208	1.0	1.10	110	2.0	1.85	93
209	1.0	0.961	96	2.0	1.93	97

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client ALS Environmental

Spike 1 ID LCS-52784  
Spike 1 Filename P161117A\_11

Spike 2 ID LCSD-52785  
Spike 2 Filename P161118A\_04

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	108	118	8.8
4-MoCB	3	107	109	1.9
2,2'-DiCB	4	113	115	1.8
4,4'-DiCB	15	108	111	2.7
2,2',6-TrCB	19	117	114	2.6
3,4,4'-TrCB	37	90	86	4.5
2,2',6,6'-TeCB	54	109	111	1.8
3,3',4,4'-TeCB	77	99	101	2.0
3,4,4',5-TeCB	81	99	109	9.6
2,2',4,6,6'-PeCB	104	111	114	2.7
2,3,3',4,4'-PeCB	105	106	99	6.8
2,3,4,4',5-PeCB	114	109	104	4.7
2,3',4,4',5-PeCB	118	109	106	2.8
2,3',4,4',5'-PeCB	123	106	103	2.9
3,3',4,4',5-PeCB	126	110	102	7.5
2,2',4,4',6,6'-HxCB	155	106	109	2.8
(156/157)	156/157	107	103	3.8
2,3',4,4',5,5'-HxCB	167	100	98	2.0
3,3',4,4',5,5'-HxCB	169	110	112	1.8
2,2',3,4',5,6,6'-HpCB	188	115	111	3.5
2,3,3',4,4',5,5'-HpCB	189	96	89	7.6
2,2',3,3',5,5',6,6'-OxCB	202	104	108	3.8
2,3,3',4,4',5,5',6-OxCB	205	104	107	2.8
2,2',3,3',4,4',5,5',6-NoCB	206	108	115	6.3
2,2',3,3',4,5,5',6,6'-NoCB	208	103	110	6.6
Decachlorobiphenyl	209	91	96	5.3

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

**REPORT OF LABORATORY ANALYSIS**

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55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Sampling in City Outfall Basin 53A

**To:** File  
**From:** Brian Anderson, GSI Water Solutions, Inc.  
**Date:** January 30, 2017

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in November 2016. One stormwater grab sample (W16K144-01) was collected in Outfall Basin 53A on November 15, 2016, and submitted for analysis.

The laboratory analyses for this sample were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Conductivity – FO SOP 1.03a
  - pH – FO SOP 1.01a
  - Temp – FO SOP 1.05a
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- Pace Analytical Services (Pace)
  - Polychlorinated Biphenyls (PCB) Congeners – EPA 1668A

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with this source control program sample.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control (LC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the sample. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## **Analysis Holding Times**

The sample was extracted and analyzed within acceptable holding times.

## **Method Blanks**

Method blanks were analyzed during the laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, and subcontracted analysis of PCB congeners. No analytes were detected in the method blanks processed during any of the analyses.

## **Surrogate Recoveries**

Surrogate recoveries were completed during the analyses of PAHs and phthalates. Surrogate recoveries for the field sample and all associated QC samples were within control criteria.

## **Internal Standard Recoveries**

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. The laboratory reported that internal standards in the sample extracts were recovered at 50-86%. Internal standard recoveries were within the target ranges specified in the method. Because the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery, which allowed accurate values to be obtained.

## **Matrix Spike/Matrix Spike Duplicates**

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates, and one MSD was processed for PAHs and phthalate analysis. MS and MSD sample results were within acceptance limits and MSD sample results were within RPD limits.

## **Laboratory Control Samples**

LC samples were processed during the analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. LC sample recoveries were within laboratory control limits for all analyses.

## **Laboratory Duplicate**

WPCL processed two laboratory duplicate samples during total metals analysis, TSS analysis, and mercury analysis. RPDs were within laboratory acceptance limits.

## **Other**

The sample was delivered to WPCL with a cooler temperature of 13 degrees C, but qualifications have not been made as the cooler was delivered soon after sampling and there is evidence that the chilling process has begun. Temperatures during shipping and transport of the sample for subcontracted analyses were less than 6° C.

WPCL reports that the continuing calibration verification was high for Di-n-butyl phthalate, Di-n-octyl phthalate, and Bis(2-ethylhexyl) phthalate. Bis(2-ethylhexyl) phthalate was detected at 2.6 mg/L, and has been qualified as an estimate possibly biased high (J+). Di-n-octyl phthalate and Di-n-butyl phthalate were not detected above the detection limit and thus no qualifications have been added to these analytes.

No other anomalies were reported in by WPCL or the subcontracted laboratories. A list of additional data qualifications added during validation is provided in Table 1.

**Table 1. Qualifiers Added or Modified During Validation**

City of Portland

*Outfall 53A*

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
W16K144-01	Bis(2-ethylhexyl) phthalate	ug/L	2.6	J+	CCV

**Notes**

µg/L = micrograms per liter

**Qualifier Definitions**

J+ = Detection of analyte is considered a high estimate

**Reason Code Definitions**

CCV = The continuing calibration verification was high and the sample results may be high estimates



City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



December 30, 2016

Linda Scheffler  
Director's Office

---

Work Order  
**W16K144**

Project  
**Portland Harbor**

Received  
11/15/16 15:38

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W16K144</b>	Project Mgr: Linda Scheffler
Received: 11/15/16 15:38	
Submitted By: Field Operations	

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
53A_SW1	W16K144-01	Stormwater	Grab	11/15/16 14:59	11/15/16 14:59	

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**53A\_SW1 : W16K144-01**

**Field Parameters**

Conductivity*	30 umhos/cm			1	B16K278	11/15/16	11/15/16	FO SOP 1.03a	
pH*	7.7 pH Units			1	B16K278	11/15/16 14:59	11/15/16	FO SOP 1.01a	
Temperature*	13.5 °C			1	B16K278	11/15/16 14:59	11/15/16	FO SOP 1.05a	

**General Chemistry**

Total suspended solids	191 mg/L	2	2		B16K321	11/18/16	11/18/16	SM 2540D	
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**Total Metals**

Total Metals by ICPMS									
Arsenic	1.37 ug/L	0.100	0.100	1	B16K290	11/16/16	11/17/16	EPA 200.8	
Cadmium	0.280 ug/L	0.100	0.100	1	B16K290	11/16/16	11/17/16	EPA 200.8	
Chromium	31.9 ug/L	0.200	0.200	1	B16K290	11/16/16	11/17/16	EPA 200.8	
Copper	21.8 ug/L	0.200	0.200	1	B16K290	11/16/16	11/17/16	EPA 200.8	
Lead	14.0 ug/L	0.100	0.100	1	B16K290	11/16/16	11/17/16	EPA 200.8	
Mercury	0.00856 ug/L	0.00100	0.00100	1	B16K315	11/18/16	11/18/16	WPCLSOP M-10	
Nickel	5.79 ug/L	0.200	0.200	1	B16K290	11/16/16	11/17/16	EPA 200.8	
Silver	0.193 ug/L	0.100	0.100	1	B16K290	11/16/16	11/17/16	EPA 200.8	
Zinc	258 ug/L	0.500	0.500	1	B16K290	11/16/16	11/17/16	EPA 200.8	

Reported: 12/30/16 14:56

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16K144**

**Client: Director's Office**  
**Received: 11/15/16 15:38**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

Acenaphthene	0.028 ug/L	0.020	0.020	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Acenaphthylene	0.11 ug/L	0.020	0.020	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Anthracene	0.098 ug/L	0.020	0.020	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Benzo(a)anthracene	0.24 ug/L	0.010	0.010	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Benzo(a)pyrene	0.41 ug/L	0.010	0.010	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Benzo(b)fluoranthene	1.0 ug/L	0.010	0.010	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.75 ug/L	0.010	0.010	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.29 ug/L	0.010	0.010	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Chrysene	0.64 ug/L	0.010	0.010	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.12 ug/L	0.010	0.010	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Fluoranthene	0.96 ug/L	0.010	0.010	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Fluorene	0.036 ug/L	0.020	0.020	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.51 ug/L	0.010	0.010	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
1-Methylnaphthalene	ND ug/L	0.040	0.040	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
2-Methylnaphthalene	ND ug/L	0.040	0.040	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Naphthalene	0.047 ug/L	0.040	0.040	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Phenanthrene	0.24 ug/L	0.020	0.020	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Pyrene	0.86 ug/L	0.010	0.010	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND ug/L	1.0	0.50	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND ug/L	1.0	0.50	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Diethyl phthalate	ND ug/L	1.0	0.50	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Dimethyl phthalate	ND ug/L	1.0	0.50	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND ug/L	1.0	0.50	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.6 ug/L	1.0	0.50	1	B16K353	11/21/16	11/22/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.19 ug/L	0.229	83%	31-164	B16K353	11/21/16	11/22/16	EPA 8270-SIM	
Fluoranthene-d10	0.27 ug/L	0.229	119%	65-145	B16K353	11/21/16	11/22/16	EPA 8270-SIM	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W16K144**

Client: Director's Office  
Received: 11/15/16 15:38

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B16K321</b>										
<b>Blank (B16K321-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					11/18/16 :11/18/16	
<b>LCS (B16K321-BS1)</b>										
Total suspended solids	98	mg/L			100		98% (90-110)		11/18/16 :11/18/16	
<b>Duplicate (B16K321-DUP1) Source: W16K132-01</b>										
Total suspended solids	12	mg/L	2	2		12		3 (20)	11/18/16 :11/18/16	
<b>Duplicate (B16K321-DUP2) Source: W16K168-01</b>										
Total suspended solids	340	mg/L	2	2		357		5 (20)	11/18/16 :11/18/16	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B16K290</b>										
<b>Blank (B16K290-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					11/16/16 :11/17/16	
Cadmium	ND	ug/L	0.100	0.100					11/16/16 :11/17/16	
Chromium	ND	ug/L	0.200	0.200					11/16/16 :11/17/16	
Copper	ND	ug/L	0.200	0.200					11/16/16 :11/17/16	
Lead	ND	ug/L	0.100	0.100					11/16/16 :11/17/16	
Nickel	ND	ug/L	0.200	0.200					11/16/16 :11/17/16	
Silver	ND	ug/L	0.100	0.100					11/16/16 :11/17/16	
Zinc	ND	ug/L	0.500	0.500					11/16/16 :11/17/16	
<b>LCS (B16K290-BS1)</b>										
Arsenic	5.04	ug/L	0.100	0.100	5.00		101% (85-115)		11/16/16 :11/17/16	
Cadmium	4.94	ug/L	0.100	0.100	5.00		99% (85-115)		11/16/16 :11/17/16	
Chromium	5.05	ug/L	0.200	0.200	5.00		101% (85-115)		11/16/16 :11/17/16	
Copper	5.03	ug/L	0.200	0.200	5.00		101% (85-115)		11/16/16 :11/17/16	
Lead	4.78	ug/L	0.100	0.100	5.00		96% (85-115)		11/16/16 :11/17/16	
Nickel	5.06	ug/L	0.200	0.200	5.00		101% (85-115)		11/16/16 :11/17/16	
Silver	4.86	ug/L	0.100	0.100	5.00		97% (85-115)		11/16/16 :11/17/16	
Zinc	25.1	ug/L	0.500	0.500	25.0		100% (85-115)		11/16/16 :11/17/16	
<b>Duplicate (B16K290-DUP1) Source: W16K129-02</b>										
Arsenic	0.714	ug/L	0.100	0.100		0.689		3 (20)	11/16/16 :11/17/16	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	11/16/16 :11/17/16	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W16K144**

**Client: Director's Office**  
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**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16K290**

<b>Duplicate (B16K290-DUP1)</b>		<b>Source: W16K129-02</b>								
Chromium	2.20 ug/L	0.200	0.200			2.16		2 (20)	11/16/16 :11/17/16	
Copper	5.20 ug/L	0.200	0.200			5.13		1 (20)	11/16/16 :11/17/16	
Lead	1.20 ug/L	0.100	0.100			1.17		2 (20)	11/16/16 :11/17/16	
Nickel	1.87 ug/L	0.200	0.200			1.80		4 (20)	11/16/16 :11/17/16	
Silver	ND ug/L	0.100	0.100			ND		(20)	11/16/16 :11/17/16	
Zinc	17.6 ug/L	0.500	0.500			17.3		2 (20)	11/16/16 :11/17/16	

<b>Duplicate (B16K290-DUP2)</b>		<b>Source: W16K144-01</b>								
Arsenic	1.39 ug/L	0.100	0.100			1.37		1 (20)	11/16/16 :11/17/16	
Cadmium	0.279 ug/L	0.100	0.100			0.280		0.4 (20)	11/16/16 :11/17/16	
Chromium	32.6 ug/L	0.200	0.200			31.9		2 (20)	11/16/16 :11/17/16	
Copper	22.3 ug/L	0.200	0.200			21.8		2 (20)	11/16/16 :11/17/16	
Lead	14.5 ug/L	0.100	0.100			14.0		3 (20)	11/16/16 :11/17/16	
Nickel	5.92 ug/L	0.200	0.200			5.79		2 (20)	11/16/16 :11/17/16	
Silver	0.180 ug/L	0.100	0.100			0.193		7 (20)	11/16/16 :11/17/16	
Zinc	268 ug/L	0.500	0.500			258		4 (20)	11/16/16 :11/17/16	

<b>Matrix Spike (B16K290-MS1)</b>		<b>Source: W16K129-02</b>								
Arsenic	10.4 ug/L	0.100	0.100	10.0	0.689	98% (70-130)			11/16/16 :11/17/16	
Cadmium	9.78 ug/L	0.100	0.100	10.0	ND	98% (70-130)			11/16/16 :11/17/16	
Chromium	12.5 ug/L	0.200	0.200	10.0	2.16	104% (70-130)			11/16/16 :11/17/16	
Copper	15.1 ug/L	0.200	0.200	10.0	5.13	99% (70-130)			11/16/16 :11/17/16	
Lead	10.8 ug/L	0.100	0.100	10.0	1.17	96% (70-130)			11/16/16 :11/17/16	
Nickel	12.1 ug/L	0.200	0.200	10.0	1.80	103% (70-130)			11/16/16 :11/17/16	
Silver	9.75 ug/L	0.100	0.100	10.0	ND	97% (70-130)			11/16/16 :11/17/16	
Zinc	66.3 ug/L	0.500	0.500	50.0	17.3	98% (70-130)			11/16/16 :11/17/16	

<b>Matrix Spike (B16K290-MS2)</b>		<b>Source: W16K144-01</b>								
Arsenic	11.0 ug/L	0.100	0.100	10.0	1.37	96% (70-130)			11/16/16 :11/17/16	
Cadmium	9.89 ug/L	0.100	0.100	10.0	0.280	96% (70-130)			11/16/16 :11/17/16	
Chromium	43.7 ug/L	0.200	0.200	10.0	31.9	118% (70-130)			11/16/16 :11/17/16	
Copper	32.1 ug/L	0.200	0.200	10.0	21.8	104% (70-130)			11/16/16 :11/17/16	
Lead	24.9 ug/L	0.100	0.100	10.0	14.0	108% (70-130)			11/16/16 :11/17/16	
Nickel	16.0 ug/L	0.200	0.200	10.0	5.79	102% (70-130)			11/16/16 :11/17/16	
Silver	9.82 ug/L	0.100	0.100	10.0	0.193	96% (70-130)			11/16/16 :11/17/16	
Zinc	310 ug/L	0.500	0.500	50.0	258	103% (70-130)			11/16/16 :11/17/16	

**Total Metals by ICPMS - Batch B16K315**

<b>Blank (B16K315-BLK1)</b>										
Mercury	ND ug/L	0.000900	0.000900						11/18/16 :11/18/16	

**LCS (B16K315-BS1)**

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC

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**Project: Portland Harbor**  
**Work Order: W16K144**

**Client: Director's Office**  
**Received: 11/15/16 15:38**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Total Metals by ICPMS - Batch B16K315										
<b>LCS (B16K315-BS1)</b>										
Mercury	0.0104	ug/L	0.000900	0.000900	0.0100		104% (85-125)		11/18/16 :11/18/16	
<b>Duplicate (B16K315-DUP1)</b>			<b>Source: W16K129-11</b>							
Mercury	0.0245	ug/L	0.00100	0.00100		0.0240		2 (20)	11/18/16 :11/18/16	
<b>Duplicate (B16K315-DUP2)</b>			<b>Source: W16K145-07</b>							
Mercury	0.00245	ug/L	0.00100	0.00100		0.00285		15 (20)	11/18/16 :11/18/16	
<b>Matrix Spike (B16K315-MS1)</b>			<b>Source: W16K129-11</b>							
Mercury	0.0469	ug/L	0.00100	0.00100	0.0222	0.0240	103% (70-130)		11/18/16 :11/18/16	
<b>Matrix Spike (B16K315-MS2)</b>			<b>Source: W16K145-07</b>							
Mercury	0.0242	ug/L	0.00100	0.00100	0.0222	0.00285	96% (70-130)		11/18/16 :11/18/16	

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**Project: Portland Harbor**  
**Work Order: W16K144**

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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16K353**

**Blank (B16K353-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					11/21/16 :11/21/16	
Acenaphthylene	ND	ug/L	0.020	0.020					11/21/16 :11/21/16	
Anthracene	ND	ug/L	0.020	0.020					11/21/16 :11/21/16	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					11/21/16 :11/21/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					11/21/16 :11/21/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					11/21/16 :11/21/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					11/21/16 :11/21/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					11/21/16 :11/21/16	
Chrysene	ND	ug/L	0.010	0.010					11/21/16 :11/21/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					11/21/16 :11/21/16	
Fluoranthene	ND	ug/L	0.010	0.010					11/21/16 :11/21/16	
Fluorene	ND	ug/L	0.020	0.020					11/21/16 :11/21/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					11/21/16 :11/21/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					11/21/16 :11/21/16	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					11/21/16 :11/21/16	
Naphthalene	ND	ug/L	0.040	0.040					11/21/16 :11/21/16	
Phenanthrene	ND	ug/L	0.020	0.020					11/21/16 :11/21/16	
Pyrene	ND	ug/L	0.010	0.010					11/21/16 :11/21/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					11/21/16 :11/21/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					11/21/16 :11/21/16	
Diethyl phthalate	ND	ug/L	1.0	0.50					11/21/16 :11/21/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					11/21/16 :11/21/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					11/21/16 :11/21/16	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					11/21/16 :11/21/16	

**Surrogate**

2-Methylnaphthalene-d10	0.18	ug/L			0.229		78% (31-164)		11/21/16 :11/21/16	
Fluoranthene-d10	0.23	ug/L			0.229		100% (65-145)		11/21/16 :11/21/16	

**LCS (B16K353-BS1)**

Acenaphthene	0.237	ug/L	0.020	0.020	0.229		104% (67-125)		11/21/16 :11/21/16	
Acenaphthylene	0.262	ug/L	0.020	0.020	0.229		114% (64-138)		11/21/16 :11/21/16	
Anthracene	0.258	ug/L	0.020	0.020	0.229		113% (65-143)		11/21/16 :11/21/16	
Benzo(a)anthracene	0.255	ug/L	0.010	0.010	0.229		112% (80-130)		11/21/16 :11/21/16	
Benzo(a)pyrene	0.246	ug/L	0.010	0.010	0.229		108% (74-131)		11/21/16 :11/21/16	
Benzo(b)fluoranthene	0.238	ug/L	0.010	0.010	0.229		104% (67-128)		11/21/16 :11/21/16	
Benzo(g,h,i)perylene	0.259	ug/L	0.010	0.010	0.229		114% (57-137)		11/21/16 :11/21/16	
Benzo(k)fluoranthene	0.225	ug/L	0.010	0.010	0.229		99% (63-140)		11/21/16 :11/21/16	
Chrysene	0.258	ug/L	0.010	0.010	0.229		113% (80-134)		11/21/16 :11/21/16	
Dibenzo(a,h)anthracene	0.268	ug/L	0.010	0.010	0.229		117% (56-138)		11/21/16 :11/21/16	
Fluoranthene	0.247	ug/L	0.010	0.010	0.229		108% (70-150)		11/21/16 :11/21/16	
Fluorene	0.245	ug/L	0.020	0.020	0.229		107% (64-130)		11/21/16 :11/21/16	

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**Project: Portland Harbor**  
**Work Order: W16K144**

**Client: Director's Office**  
**Received: 11/15/16 15:38**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16K353**

**LCS (B16K353-BS1)**

Indeno(1,2,3-cd)pyrene	0.276	ug/L	0.010	0.010	0.229		121% (58-138)		11/21/16 :11/21/16	
Naphthalene	0.223	ug/L	0.040	0.040	0.229		98% (53-134)		11/21/16 :11/21/16	
Phenanthrene	0.242	ug/L	0.020	0.020	0.229		106% (73-132)		11/21/16 :11/21/16	
Pyrene	0.244	ug/L	0.010	0.010	0.229		107% (69-153)		11/21/16 :11/21/16	
Butyl benzyl phthalate	3.17	ug/L	1.0	0.50	2.29		138% (55-181)		11/21/16 :11/21/16	V1
Di-n-butyl phthalate	2.61	ug/L	1.0	0.50	2.29		114% (61-183)		11/21/16 :11/21/16	
Diethyl phthalate	2.55	ug/L	1.0	0.50	2.29		112% (65-177)		11/21/16 :11/21/16	
Dimethyl phthalate	2.67	ug/L	1.0	0.50	2.29		117% (77-151)		11/21/16 :11/21/16	
Di-n-octyl phthalate	3.71	ug/L	1.0	0.50	2.29		162% (12-185)		11/21/16 :11/21/16	V1
Bis(2-ethylhexyl) phthalate	3.27	ug/L	1.0	0.50	2.29		143% (39-170)		11/21/16 :11/21/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.18	ug/L			0.229		79% (31-164)		11/21/16 :11/21/16	
Fluoranthene-d10	0.25	ug/L			0.229		111% (65-145)		11/21/16 :11/21/16	

**Matrix Spike (B16K353-MS1)**

**Source: W16K178-01**

Acenaphthene	0.245	ug/L	0.020	0.020	0.229	ND	107% (67-125)		11/21/16 :11/22/16	
Acenaphthylene	0.269	ug/L	0.020	0.020	0.229	ND	118% (64-138)		11/21/16 :11/22/16	
Anthracene	0.271	ug/L	0.020	0.020	0.229	ND	118% (65-143)		11/21/16 :11/22/16	
Benzo(a)anthracene	0.251	ug/L	0.010	0.010	0.229	ND	110% (80-130)		11/21/16 :11/22/16	
Benzo(a)pyrene	0.237	ug/L	0.010	0.010	0.229	ND	104% (74-131)		11/21/16 :11/22/16	
Benzo(b)fluoranthene	0.219	ug/L	0.010	0.010	0.229	ND	96% (67-128)		11/21/16 :11/22/16	
Benzo(g,h,i)perylene	0.229	ug/L	0.010	0.010	0.229	ND	100% (57-137)		11/21/16 :11/22/16	
Benzo(k)fluoranthene	0.205	ug/L	0.010	0.010	0.229	ND	90% (63-140)		11/21/16 :11/22/16	
Chrysene	0.250	ug/L	0.010	0.010	0.229	ND	110% (80-134)		11/21/16 :11/22/16	
Dibenzo(a,h)anthracene	0.231	ug/L	0.010	0.010	0.229	ND	101% (56-138)		11/21/16 :11/22/16	
Fluoranthene	0.251	ug/L	0.010	0.010	0.229	ND	110% (70-150)		11/21/16 :11/22/16	
Fluorene	0.251	ug/L	0.020	0.020	0.229	ND	110% (64-130)		11/21/16 :11/22/16	
Indeno(1,2,3-cd)pyrene	0.238	ug/L	0.010	0.010	0.229	ND	104% (58-138)		11/21/16 :11/22/16	
Naphthalene	0.267	ug/L	0.040	0.040	0.229	0.0857	80% (53-134)		11/21/16 :11/22/16	
Phenanthrene	0.257	ug/L	0.020	0.020	0.229	0.0240	102% (73-132)		11/21/16 :11/22/16	
Pyrene	0.251	ug/L	0.010	0.010	0.229	ND	110% (69-153)		11/21/16 :11/22/16	
Butyl benzyl phthalate	3.17	ug/L	1.0	0.50	2.29	ND	139% (55-181)		11/21/16 :11/22/16	
Di-n-butyl phthalate	2.72	ug/L	1.0	0.50	2.29	ND	119% (61-183)		11/21/16 :11/22/16	V1
Diethyl phthalate	2.69	ug/L	1.0	0.50	2.29	ND	118% (65-177)		11/21/16 :11/22/16	
Dimethyl phthalate	2.65	ug/L	1.0	0.50	2.29	ND	116% (77-151)		11/21/16 :11/22/16	
Di-n-octyl phthalate	2.98	ug/L	1.0	0.50	2.29	ND	130% (12-185)		11/21/16 :11/22/16	V1
Bis(2-ethylhexyl) phthalate	2.74	ug/L	1.0	0.50	2.29	ND	120% (39-170)		11/21/16 :11/22/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.18	ug/L			0.229		80% (31-164)		11/21/16 :11/22/16	
Fluoranthene-d10	0.25	ug/L			0.229		108% (65-145)		11/21/16 :11/22/16	

**Matrix Spike Dup (B16K353-MSD1)**

**Source: W16K178-01**

Reported: 12/30/16 14:56

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16K144**

**Client: Director's Office**  
**Received: 11/15/16 15:38**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16K353**

**Matrix Spike Dup (B16K353-MSD1)**

**Source: W16K178-01**

Acenaphthene	0.246	ug/L	0.020	0.020	0.229	ND	108% (67-125)	0.7 (30)	11/21/16 :11/22/16	
Acenaphthylene	0.267	ug/L	0.020	0.020	0.229	ND	117% (64-138)	0.6 (30)	11/21/16 :11/22/16	
Anthracene	0.266	ug/L	0.020	0.020	0.229	ND	116% (65-143)	2 (30)	11/21/16 :11/22/16	
Benzo(a)anthracene	0.255	ug/L	0.010	0.010	0.229	ND	112% (80-130)	2 (30)	11/21/16 :11/22/16	
Benzo(a)pyrene	0.247	ug/L	0.010	0.010	0.229	ND	108% (74-131)	4 (30)	11/21/16 :11/22/16	
Benzo(b)fluoranthene	0.234	ug/L	0.010	0.010	0.229	ND	102% (67-128)	7 (30)	11/21/16 :11/22/16	
Benzo(g,h,i)perylene	0.252	ug/L	0.010	0.010	0.229	ND	110% (57-137)	10 (30)	11/21/16 :11/22/16	
Benzo(k)fluoranthene	0.218	ug/L	0.010	0.010	0.229	ND	95% (63-140)	6 (30)	11/21/16 :11/22/16	
Chrysene	0.250	ug/L	0.010	0.010	0.229	ND	109% (80-134)	0.2 (30)	11/21/16 :11/22/16	
Dibenzo(a,h)anthracene	0.253	ug/L	0.010	0.010	0.229	ND	110% (56-138)	9 (30)	11/21/16 :11/22/16	
Fluoranthene	0.266	ug/L	0.010	0.010	0.229	ND	116% (70-150)	6 (30)	11/21/16 :11/22/16	
Fluorene	0.245	ug/L	0.020	0.020	0.229	ND	107% (64-130)	3 (30)	11/21/16 :11/22/16	
Indeno(1,2,3-cd)pyrene	0.257	ug/L	0.010	0.010	0.229	ND	112% (58-138)	8 (30)	11/21/16 :11/22/16	
Naphthalene	0.249	ug/L	0.040	0.040	0.229	0.0857	71% (53-134)	7 (30)	11/21/16 :11/22/16	
Phenanthrene	0.251	ug/L	0.020	0.020	0.229	0.0240	100% (73-132)	2 (30)	11/21/16 :11/22/16	
Pyrene	0.263	ug/L	0.010	0.010	0.229	ND	115% (69-153)	5 (30)	11/21/16 :11/22/16	
Butyl benzyl phthalate	3.28	ug/L	1.0	0.50	2.29	ND	143% (55-181)	3 (30)	11/21/16 :11/22/16	
Di-n-butyl phthalate	2.83	ug/L	1.0	0.50	2.29	ND	124% (61-183)	4 (30)	11/21/16 :11/22/16	V1
Diethyl phthalate	2.64	ug/L	1.0	0.50	2.29	ND	115% (65-177)	2 (30)	11/21/16 :11/22/16	
Dimethyl phthalate	2.61	ug/L	1.0	0.50	2.29	ND	114% (77-151)	2 (30)	11/21/16 :11/22/16	
Di-n-octyl phthalate	3.33	ug/L	1.0	0.50	2.29	ND	146% (12-185)	11 (30)	11/21/16 :11/22/16	V1
Bis(2-ethylhexyl) phthalate	3.11	ug/L	1.0	0.50	2.29	ND	136% (39-170)	13 (30)	11/21/16 :11/22/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.17	ug/L			0.229		74% (31-164)		11/21/16 :11/22/16	
Fluoranthene-d10	0.25	ug/L			0.229		110% (65-145)		11/21/16 :11/22/16	

**Qualifiers**

V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.

**Definitions**

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 12/30/16 14:56

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody



Bureau of Environmental Services

Date: 11/15/16

Work Order #: W16K144

Collected By: MJS

Client Name: Director's Office Matrix: Stormwater  
 Project Name: Portland Harbor

Requested Analyses smartroll #2

Lab Number	2016 Stormwater Outfall Monitoring COC				TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs +phthalates (low-level)	Pesticides (Low-level)								Conductivity (umhos/cm) Meter:	pH (pH units) Meter:	Temperature (Deg C) Meter:	# of Containers	Remarks
	Location ID	Sample Date	Sample Time	Sample Type																		
01	53A_SW1	11/15/16	1459	G	o	o	o	o	o												4	

<b>Relinquished By:</b> Signature: <u>Matt Sullivan</u> Date: <u>11/15/16</u> Printed Name: <u>Matt Sullivan</u> Time: <u>1538</u>	<b>Received By:</b> Signature: <u>[Signature]</u> Date: <u>11/15/16</u> Printed Name: <u>Walter Edson</u> Time: <u>1538</u>	<b>Relinquished By:</b> Signature: _____ Date: _____ Printed Name: _____ Time: _____	<b>Received By:</b> Signature: _____ Date: _____ Printed Name: _____ Time: _____
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### WPCL Cooler Receipt Form

Work Order Number: W16K144

Cooler Receipt Form Filled Out By: (Signature)

Project: Portland Harbor

Sample transport: Samples received on ice (Signature) Courier \_\_\_\_\_

Directly from field \_\_\_\_\_

Temperature (°C) 13

	Yes	No	NA
Is the COC present and signed?	✓		
Are sample bottles intact?	✓		
Do the COC and sample labels match?	✓		
Are the appropriate containers used?	✓		
Are samples appropriately preserved?	✓ <i>in lab</i>		
Do VOA vials have Headspace?			✓
Are samples received within holding times?	✓		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	<u>1601146</u>	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
<u>11/15/16</u>	<u>1553</u>	<u>(Signature)</u>	<u>W16K144-01</u>	<u>D</u>	<u>1</u>	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

December 30, 2016

**Analytical Report for Service Request No: K1614043**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W16K144**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory November 16, 2016  
For your reference, these analyses have been assigned our service request number **K1614043**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

## Table of Contents

Acronyms

Qualifiers

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Subcontract Lab Results

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

SUBCONTRACT ORDER  
 City of Portland Water Pollution Control Lab  
 W16K144

K1614043

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

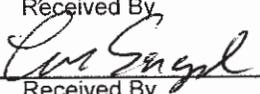
**RECEIVING LABORATORY:**

ALS Environmental  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

WPCL Project Name  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>
<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush _ day(s)

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W16K144-01</b>	<b>Water</b>	<b>Sampled: 11/15/16 14:59</b>		
Out-PCB Congeners 209	12/01/16 17:00	05/14/17 14:59		
<i>Containers Supplied:</i>				
G amber 1L (A)				

	11-16-16	 11/16/16 10:26	
Released By	Date	Received By	Date
		 11-16-16 13:00	
Released By	Date	Received By	Date



PCH2

### Cooler Receipt and Preservation Form

Client Portland Water Pollution Service Request K16 14043  
 Received: 11-16-16 Opened: 11-16-16 By: es Unloaded: 11-16-16 By: es

1. Samples were received via? **USPS** Fed Ex UPS DHL PDX Courier Hand Delivered  
 2. Samples were received in: (circle) **Cooler** Box Envelope Other \_\_\_\_\_ NA  
 3. Were custody seals on coolers? NA Y N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
5.4	5.5	-	-	10.1	373			

4. Packing material: Inserts Baggies **Bubble Wrap** Gel Packs Wet Ice Dry Ice Sleeves \_\_\_\_\_  
 5. Were custody papers properly filled out (ink, signed, etc.)? NA  Y N  
 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA  Y N  
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed  
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y N  
 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA  Y N  
 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y N  
 10. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below. NA  Y N  
 11. Were VOA vials received without headspace? Indicate in the table below.  NA Y N  
 12. Was C12/Res negative?  NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Report Prepared for:**

Howard Holmes  
ALS Environmental  
1317 S. 13th Avenue  
Kelso WA 98626

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Prepared Date:**

December 12, 2016

**Report Information:**

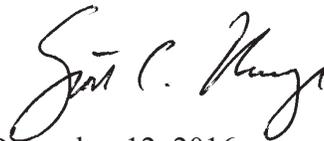
**Pace Project #: 10370561**  
**Sample Receipt Date: 11/18/2016**  
**Client Project #: K1614043**  
**Client Sub PO #: 51K1614043**  
**State Cert #: MN200001-005**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



December 12, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

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The results relate only to the samples included in this report.



## **DISCUSSION**

This report presents the results from the analyses performed on one sample submitted by a representative of ALS Environmental. The sample was analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the amount of sample extracted.

The isotopically-labeled PCB internal standards in the sample extract were recovered at 50-86%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the sample material.

Laboratory spike samples were also prepared with the sample batch using reference material that had been fortified with native standards. The results show that the spiked native compounds were recovered at 93-121% with relative percent differences of 0.8-9.2%. These results were within the target ranges for this method. Matrix spikes were not prepared with this extraction batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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Report No.....10370561

# Appendix A

## Sample Management

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

10370561

**Project Number:** K1614043  
**Project Manager:** Howard Holmes  
**QAP:** LAB QAP

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Misc Out 1
				Date	Time	Lab ID	
K1614043-001	W16K144-01	1	Water	11/15/16	1459		X

**Test Comments**  
 Misc Out 1 - None  
 K1614043-001 1668 PCB Congeners-209 list to Pace

**Folder Comments:**

Tier II  
 1668 PCB Congeners to Pace (209 list)

*City of Passtland*

**Special Instructions/Comments**

Please provide the electronic (PDF and EDD) report to the following e-mail address:  
 ALKLS.Data@alsglobal.com.

*Also Report EDD to City of Passtland  
 Report, EDD & Invoice to Als-Kelso  
 Howard Holmes*

P - Test is On Hold P - Test is Authorized for Prep Only

Relinquished By: *Whamish* 11/17/16 0848 Received By: *Ala Pace* 11-18-16 935

Airbill Number: 2-4°C

Turnaround Requirements	Report Requirements	Invoice Information
RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD Requested FAX Date: _____ Requested Report Date: <u>11/25/16</u>	<input type="checkbox"/> I. Results Only <input checked="" type="checkbox"/> II. Results + QC Summaries <input type="checkbox"/> III. Results + QC and Calibration Summaries <input type="checkbox"/> IV. Data Validation Report with Raw Data PQL/MDL/1 <u>Y</u> EDD <u>Y</u>	PO# 51K1614043 Bill to _____

**Sample Condition Upon Receipt**

Client Name:

ALS Env.

Project #:

**WO#: 10370561**



Courier:  Fed Ex  UPS  USPS  Client

Commercial  Pace  Speedee  Other: \_\_\_\_\_

Tracking Number: 6447 9281 5228

Custody Seal on Cooler/Box Present?  Yes  No      Seals Intact?  Yes  No

Optional: Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_

Packing Material:  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_      Temp Blank?  Yes  No

Thermometer Used:  151401163  151401164  B88A912167504  B88A0143310098      Type of Ice:  Wet  Blue  None  Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.5      Cooler Temp Corrected (°C): 2.4      Biological Tissue Frozen?  Yes  No  N/A  
Temp should be above freezing to 6°C      Correction Factor: -0.1      Date and Initials of Person Examining Contents: 11-18-16 AA

USDA Regulated Soil (  N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes  No      Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>12 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**

Field Data Required?  Yes  No

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/Resolution: \_\_\_\_\_

Project Manager Review: Scott Unze

Date: 11/18/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office ( i.e. out of hold, incorrect preservative, out of temp, incorrect containers).



**Environmental**

**PURCHASE ORDER**  
FOR SUBCONTRACTED ANALYSES

Service Request: K1614043

**Date:** 11/16/2016  
**Contact:** Howard Holmes  
**Email:** howard.holmes@alsglobal.com

**Company:** Pace Analytical Services  
**Address:** 1700 Elm Street, Suite 200  
Minneapolis MN, 55414  
**Phone:** 612.607.1700

**Bill To:** ALS Environmental  
1317 South 13th Avenue  
Kelso WA, 98626

**Ship To:** ALS Environmental  
ALKLS.Data@alsglobal.com

**Phone:** 1-360-577-7222

**Phone:** 360-501-3364

**Item/Description**

None/Misc Out 1

**Quantity**

1

**Unit Price**

[REDACTED]

1650

Comments:

ALS Group USA, Corp.  
www.alsglobal.com  
An ALS Limited Company

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

### REPORT OF LABORATORY ANALYSIS

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# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1614043-01		
Lab Sample ID	10370561001		
Filename	P161212A_09		
Injected By	BAL		
Total Amount Extracted	1030 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	11/15/2016 14:59
ICAL ID	P161212A02	Received	11/18/2016 09:35
CCal Filename(s)	P161212A_01	Extracted	12/01/2016 12:00
Method Blank ID	BLANK-52958	Analyzed	12/12/2016 09:08

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.861	2.93	2.0	1.01	50
13C-4-MoCB	3	11.568	2.96	2.0	1.08	54
13C-2,2'-DiCB	4	11.844	1.50	2.0	1.01	51
13C-4,4'-DiCB	15	18.816	1.62	2.0	1.28	64
13C-2,2',6-TrCB	19	15.664	1.04	2.0	1.23	62
13C-3,4,4'-TrCB	37	26.525	1.02	2.0	1.39	69
13C-2,2',6,6'-TeCB	54	19.079	0.80	2.0	1.16	58
13C-3,4,4',5'-TeCB	81	33.590	0.75	2.0	1.71	86
13C-3,3',4,4'-TeCB	77	34.176	0.80	2.0	1.63	82
13C-2,2',4,6,6'-PeCB	104	25.133	1.53	2.0	1.05	53
13C-2,3,3',4,4'-PeCB	105	37.753	1.54	2.0	1.46	73
13C-2,3,4,4',5'-PeCB	114	37.083	1.65	2.0	1.48	74
13C-2,3',4,4',5'-PeCB	118	36.546	1.58	2.0	1.41	70
13C-2,3',4,4',5'-PeCB	123	36.177	1.63	2.0	1.44	72
13C-3,3',4,4',5'-PeCB	126	40.939	1.58	2.0	1.49	74
13C-2,2',4,4',6,6'-HxCB	155	31.125	1.27	2.0	1.22	61
13C-HxCB (156/157)	156/157	43.963	1.26	4.0	2.99	75
13C-2,3',4,4',5,5'-HxCB	167	42.789	1.28	2.0	1.55	77
13C-3,3',4,4',5,5'-HxCB	169	47.266	1.32	2.0	1.50	75
13C-2,2',3,4',5,6,6'-HpCB	188	37.016	1.03	2.0	1.18	59
13C-2,3,3',4,4',5,5'-HpCB	189	49.787	1.03	2.0	1.34	67
13C-2,2',3,3',5,5',6,6'-OxCB	202	42.487	0.95	2.0	1.42	71
13C-2,3,3',4,4',5,5',6-OxCB	205	52.352	0.92	2.0	1.39	69
13C-2,2',3,3',4,4',5,5',6-NoCB	206	54.076	0.75	2.0	1.26	63
13C-2,2',3,3',4,4',5,5',6,6'-NoCB	208	49.248	0.76	2.0	1.33	67
13C--DeCB	209	55.650	0.75	2.0	1.42	71
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	22.165	1.07	2.0	1.53	77
13C-2,3,3',5,5'-PeCB	111	34.176	1.57	2.0	1.47	74
13C-2,2',3,3',5,5',6-HpCB	178	40.135	1.03	2.0	1.53	76
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.238	1.62	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	24.127	0.78	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.376	1.58	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.699	1.27	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	51.878	0.87	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1614043-01  
 Lab Sample ID 10370561001  
 Filename P161212A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.243
2		---	---	ND	---	0.243
3		---	---	ND	---	0.243
4		---	---	ND	---	0.243
5		---	---	ND	---	0.243
6		---	---	ND	---	0.243
7		---	---	ND	---	0.243
8		15.269	1.70	0.253	---	0.243
9		---	---	ND	---	0.243
10		---	---	ND	---	0.243
11		---	---	ND	---	2.39
12	12/13	---	---	ND	---	0.487
13	12/13	---	---	ND	---	0.487
14		---	---	ND	---	0.243
15		---	---	ND	---	0.321
16		---	---	ND	---	0.243
17		---	---	ND	---	0.243
18	18/30	---	---	ND	---	0.487
19		---	---	ND	---	0.243
20	20/28	---	---	ND	---	1.26
21	21/33	---	---	ND	---	1.31
22		---	---	ND	---	0.925
23		---	---	ND	---	0.243
24		---	---	ND	---	0.243
25		---	---	ND	---	0.243
26	26/29	---	---	ND	---	0.487
27		---	---	ND	---	0.243
28	20/28	---	---	ND	---	1.26
29	26/29	---	---	ND	---	0.487
30	18/30	---	---	ND	---	0.487
31		---	---	ND	---	1.27
32		---	---	ND	---	0.243
33	21/33	---	---	ND	---	1.31
34		---	---	ND	---	0.243
35		---	---	ND	---	0.243
36		---	---	ND	---	0.243
37		---	---	ND	---	0.516
38		---	---	ND	---	0.243
39		---	---	ND	---	0.243
40	40/41/71	---	---	ND	---	1.46
41	40/41/71	---	---	ND	---	1.46
42		---	---	ND	---	0.487
43	43/73	---	---	ND	---	0.487
44	44/47/65	---	---	ND	---	1.46
45	45/51	---	---	ND	---	0.974
46		---	---	ND	---	0.487
47	44/47/65	---	---	ND	---	1.46
48		---	---	ND	---	0.487

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1614043-01  
 Lab Sample ID 10370561001  
 Filename P161212A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	0.974
50	50/53	---	---	ND	---	0.974
51	45/51	---	---	ND	---	0.974
52		---	---	ND	---	1.50
53	50/53	---	---	ND	---	0.974
54		---	---	ND	---	0.487
55		---	---	ND	---	0.487
56		---	---	ND	---	0.487
57		---	---	ND	---	0.487
58		---	---	ND	---	0.487
59	59/62/75	---	---	ND	---	1.46
60		---	---	ND	---	0.487
61	61/70/74/76	---	---	ND	---	1.95
62	59/62/75	---	---	ND	---	1.46
63		---	---	ND	---	0.487
64		---	---	ND	---	0.487
65	44/47/65	---	---	ND	---	1.46
66		---	---	ND	---	0.818
67		---	---	ND	---	0.487
68		---	---	ND	---	0.487
69	49/69	---	---	ND	---	0.974
70	61/70/74/76	---	---	ND	---	1.95
71	40/41/71	---	---	ND	---	1.46
72		---	---	ND	---	0.487
73	43/73	---	---	ND	---	0.487
74	61/70/74/76	---	---	ND	---	1.95
75	59/62/75	---	---	ND	---	1.46
76	61/70/74/76	---	---	ND	---	1.95
77		---	---	ND	---	0.487
78		---	---	ND	---	0.487
79		---	---	ND	---	0.487
80		---	---	ND	---	0.487
81		---	---	ND	---	0.487
82		---	---	ND	---	0.487
83		---	---	ND	---	0.487
84		---	---	ND	---	0.487
85	85/116/117	---	---	ND	---	1.46
86	86/87/97/108/119/125	---	---	ND	---	2.92
87	86/87/97/108/119/125	---	---	ND	---	2.92
88	88/91	---	---	ND	---	0.974
89		---	---	ND	---	0.487
90	90/101/113	---	---	ND	---	1.46
91	88/91	---	---	ND	---	0.974
92		---	---	ND	---	0.487
93	93/98/100/102	---	---	ND	---	1.95
94		---	---	ND	---	0.487
95		---	---	ND	---	0.925
96		---	---	ND	---	0.487

Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference  
 ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1614043-01  
 Lab Sample ID 10370561001  
 Filename P161212A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	2.92
98	93/98/100/102	---	---	ND	---	1.95
99		---	---	ND	---	0.487
100	93/98/100/102	---	---	ND	---	1.95
101	90/101/113	---	---	ND	---	1.46
102	93/98/100/102	---	---	ND	---	1.95
103		---	---	ND	---	0.487
104		---	---	ND	---	0.487
105		---	---	ND	---	0.487
106		---	---	ND	---	0.487
107	107/124	---	---	ND	---	0.974
108	86/87/97/108/119/125	---	---	ND	---	2.92
109		---	---	ND	---	0.487
110	110/115	---	---	ND	---	0.974
111		---	---	ND	---	0.487
112		---	---	ND	---	0.487
113	90/101/113	---	---	ND	---	1.46
114		---	---	ND	---	0.487
115	110/115	---	---	ND	---	0.974
116	85/116/117	---	---	ND	---	1.46
117	85/116/117	---	---	ND	---	1.46
118		---	---	ND	---	0.623
119	86/87/97/108/119/125	---	---	ND	---	2.92
120		---	---	ND	---	0.487
121		---	---	ND	---	0.487
122		---	---	ND	---	0.487
123		---	---	ND	---	0.487
124	107/124	---	---	ND	---	0.974
125	86/87/97/108/119/125	---	---	ND	---	2.92
126		---	---	ND	---	0.487
127		---	---	ND	---	0.487
128	128/166	---	---	ND	---	0.974
129	129/138/163	---	---	ND	---	1.46
130		---	---	ND	---	0.487
131		---	---	ND	---	0.487
132		---	---	ND	---	0.487
133		---	---	ND	---	0.487
134	134/143	---	---	ND	---	0.974
135	135/151	---	---	ND	---	0.974
136		---	---	ND	---	0.487
137		---	---	ND	---	0.487
138	129/138/163	---	---	ND	---	1.46
139	139/140	---	---	ND	---	0.974
140	139/140	---	---	ND	---	0.974
141		---	---	ND	---	0.487
142		---	---	ND	---	0.487
143	134/143	---	---	ND	---	0.974
144		---	---	ND	---	0.487

Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID      K1614043-01  
Lab Sample ID         10370561001  
Filename                P161212A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.487
146		---	---	ND	---	0.487
147	147/149	---	---	ND	---	0.974
148		---	---	ND	---	0.487
149	147/149	---	---	ND	---	0.974
150		---	---	ND	---	0.487
151	135/151	---	---	ND	---	0.974
152		---	---	ND	---	0.487
153	153/168	---	---	ND	---	0.974
154		---	---	ND	---	0.487
155		---	---	ND	---	0.487
156	156/157	---	---	ND	---	0.974
157	156/157	---	---	ND	---	0.974
158		---	---	ND	---	0.487
159		---	---	ND	---	0.487
160		---	---	ND	---	0.487
161		---	---	ND	---	0.487
162		---	---	ND	---	0.487
163	129/138/163	---	---	ND	---	1.46
164		---	---	ND	---	0.487
165		---	---	ND	---	0.487
166	128/166	---	---	ND	---	0.974
167		---	---	ND	---	0.487
168	153/168	---	---	ND	---	0.974
169		---	---	ND	---	0.487
170		---	---	ND	---	0.487
171	171/173	---	---	ND	---	0.974
172		---	---	ND	---	0.487
173	171/173	---	---	ND	---	0.974
174		---	---	ND	---	0.487
175		---	---	ND	---	0.487
176		---	---	ND	---	0.487
177		---	---	ND	---	0.487
178		---	---	ND	---	0.487
179		---	---	ND	---	0.487
180	180/193	---	---	ND	---	0.974
181		---	---	ND	---	0.487
182		---	---	ND	---	0.487
183	183/185	---	---	ND	---	0.974
184		---	---	ND	---	0.487
185	183/185	---	---	ND	---	0.974
186		---	---	ND	---	0.487
187		---	---	ND	---	0.487
188		---	---	ND	---	0.487
189		---	---	ND	---	0.487
190		---	---	ND	---	0.487
191		---	---	ND	---	0.487
192		---	---	ND	---	0.487

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1614043-01  
 Lab Sample ID        10370561001  
 Filename                P161212A\_09

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	---	---	ND	---	0.974
194		---	---	ND	---	0.730
195		---	---	ND	---	0.730
196		---	---	ND	---	0.730
197	197/200	---	---	ND	---	1.46
198	198/199	---	---	ND	---	1.46
199	198/199	---	---	ND	---	1.46
200	197/200	---	---	ND	---	1.46
201		---	---	ND	---	0.730
202		---	---	ND	---	0.730
203		---	---	ND	---	0.730
204		---	---	ND	---	0.730
205		---	---	ND	---	0.730
206		---	---	ND	---	0.730
207		---	---	ND	---	0.730
208		---	---	ND	---	0.730
209		---	---	ND	---	0.730

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

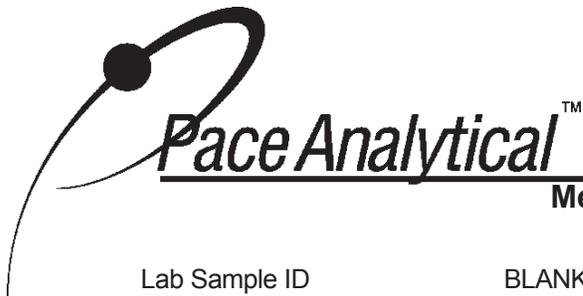
Client Sample ID           K1614043-01  
Lab Sample ID             10370561001  
Filename                    P161212A\_09

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	0.253
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	0.253

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-52958	Matrix	Water
Filename	P161211B_06	Extracted	12/01/2016 12:00
Injected By	BAL	Analyzed	12/11/2016 17:07
Total Amount Extracted	1030 mL	Dilution	5
ICAL ID	P161211B02		
CCal Filename(s)	P161211B_01		

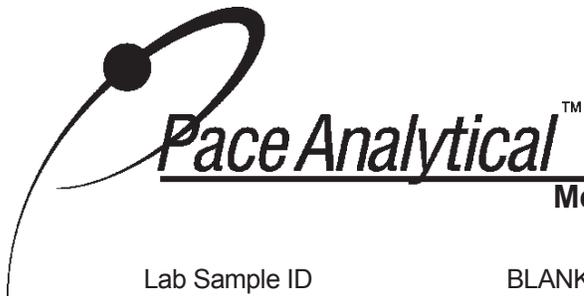
PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	8.885	3.37	2.0	0.896	45
13C-4-MoCB	3	11.604	3.17	2.0	0.985	49
13C-2,2'-DiCB	4	11.868	1.69	2.0	0.937	47
13C-4,4'-DiCB	15	18.852	1.64	2.0	1.02	51
13C-2,2',6-TrCB	19	15.581	1.03	2.0	1.08	54
13C-3,4,4'-TrCB	37	26.542	1.08	2.0	1.18	59
13C-2,2',6,6'-TeCB	54	19.097	0.78	2.0	1.03	51
13C-3,4,4',5-TeCB	81	33.624	0.81	2.0	1.47	73
13C-3,3',4,4'-TeCB	77	34.211	0.79	2.0	1.48	74
13C-2,2',4,6,6'-PeCB	104	25.150	1.59	2.0	0.914	46
13C-2,3,3',4,4'-PeCB	105	37.771	1.62	2.0	1.33	66
13C-2,3,4,4',5-PeCB	114	37.100	1.61	2.0	1.42	71
13C-2,3',4,4',5-PeCB	118	36.564	1.60	2.0	1.35	68
13C-2,3',4,4',5'-PeCB	123	36.228	1.55	2.0	1.39	70
13C-3,3',4,4',5-PeCB	126	40.957	1.62	2.0	1.44	72
13C-2,2',4,4',6,6'-HxCB	155	31.159	1.27	2.0	1.10	55
13C-HxCB (156/157)	156/157	43.981	1.24	4.0	2.74	68
13C-2,3',4,4',5,5'-HxCB	167	42.807	1.26	2.0	1.37	69
13C-3,3',4,4',5,5'-HxCB	169	47.301	1.31	2.0	1.32	66
13C-2,2',3,4',5,6,6'-HpCB	188	37.050	1.03	2.0	1.04	52
13C-2,3,3',4,4',5,5'-HpCB	189	49.810	1.05	2.0	1.33	67
13C-2,2',3,3',5,5',6,6'-OoCB	202	42.506	0.91	2.0	1.17	59
13C-2,3,3',4,4',5,5',6-OoCB	205	52.375	0.86	2.0	1.28	64
13C-2,2',3,3',4,4',5,5',6-NoCB	206	54.099	0.79	2.0	1.11	55
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	49.271	0.81	2.0	1.22	61
13C-DeCB	209	55.673	0.68	2.0	1.20	60
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	22.182	1.06	2.0	1.56	78
13C-2,3,3',5,5'-PeCB	111	34.194	1.57	2.0	1.40	70
13C-2,2',3,3',5,5',6-HpCB	178	40.169	1.09	2.0	1.42	71
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	14.263	1.57	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	24.161	0.76	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.393	1.59	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.716	1.26	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	51.901	0.93	2.0	NA	NA

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
Nn = Value obtained from additional analyses

ND = Not Detected  
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\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference  
ng's = Nanograms

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52958  
 Filename P161211B\_06

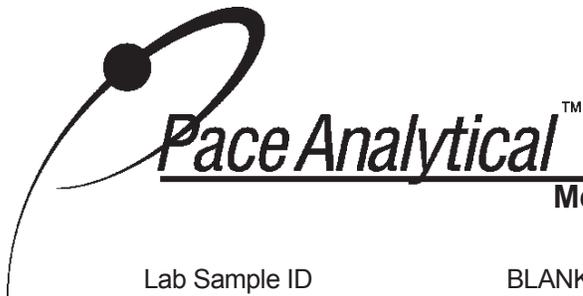
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		--	--	ND	--	0.242
2		--	--	ND	--	0.242
3		--	--	ND	--	0.242
4		--	--	ND	--	0.242
5		--	--	ND	--	0.242
6		--	--	ND	--	0.242
7		--	--	ND	--	0.242
8		--	--	ND	--	0.242
9		--	--	ND	--	0.242
10		--	--	ND	--	0.242
11		--	--	ND	--	2.37
12	12/13	--	--	ND	--	0.485
13	12/13	--	--	ND	--	0.485
14		--	--	ND	--	0.242
15		--	--	ND	--	0.242
16		--	--	ND	--	0.242
17		--	--	ND	--	0.242
18	18/30	--	--	ND	--	0.485
19		--	--	ND	--	0.242
20	20/28	--	--	ND	--	1.25
21	21/33	--	--	ND	--	1.31
22		--	--	ND	--	0.921
23		--	--	ND	--	0.242
24		--	--	ND	--	0.242
25		--	--	ND	--	0.242
26	26/29	--	--	ND	--	0.485
27		--	--	ND	--	0.242
28	20/28	--	--	ND	--	1.25
29	26/29	--	--	ND	--	0.485
30	18/30	--	--	ND	--	0.485
31		--	--	ND	--	1.26
32		--	--	ND	--	0.242
33	21/33	--	--	ND	--	1.31
34		--	--	ND	--	0.242
35		--	--	ND	--	0.242
36		--	--	ND	--	0.242
37		--	--	ND	--	0.514
38		--	--	ND	--	0.242
39		--	--	ND	--	0.242
40	40/41/71	--	--	ND	--	1.45
41	40/41/71	--	--	ND	--	1.45
42		--	--	ND	--	0.485
43	43/73	--	--	ND	--	0.485
44	44/47/65	--	--	ND	--	1.45
45	45/51	--	--	ND	--	0.969

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52958  
Filename P161211B\_06

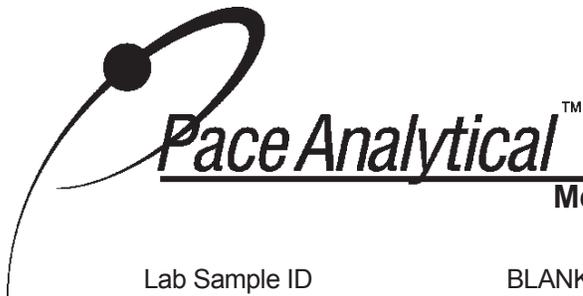
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		--	--	ND	--	0.485
47	44/47/65	--	--	ND	--	1.45
48		--	--	ND	--	0.485
49	49/69	--	--	ND	--	0.969
50	50/53	--	--	ND	--	0.969
51	45/51	--	--	ND	--	0.969
52		--	--	ND	--	1.49
53	50/53	--	--	ND	--	0.969
54		--	--	ND	--	0.485
55		--	--	ND	--	0.485
56		--	--	ND	--	0.485
57		--	--	ND	--	0.485
58		--	--	ND	--	0.485
59	59/62/75	--	--	ND	--	1.45
60		--	--	ND	--	0.485
61	61/70/74/76	--	--	ND	--	1.94
62	59/62/75	--	--	ND	--	1.45
63		--	--	ND	--	0.485
64		--	--	ND	--	0.485
65	44/47/65	--	--	ND	--	1.45
66		--	--	ND	--	0.814
67		--	--	ND	--	0.485
68		--	--	ND	--	0.485
69	49/69	--	--	ND	--	0.969
70	61/70/74/76	--	--	ND	--	1.94
71	40/41/71	--	--	ND	--	1.45
72		--	--	ND	--	0.485
73	43/73	--	--	ND	--	0.485
74	61/70/74/76	--	--	ND	--	1.94
75	59/62/75	--	--	ND	--	1.45
76	61/70/74/76	--	--	ND	--	1.94
77		--	--	ND	--	0.485
78		--	--	ND	--	0.485
79		--	--	ND	--	0.485
80		--	--	ND	--	0.485
81		--	--	ND	--	0.485
82		--	--	ND	--	0.485
83		--	--	ND	--	0.485
84		--	--	ND	--	0.485
85	85/116/117	--	--	ND	--	1.45
86	86/87/97/108/119/125	--	--	ND	--	2.91
87	86/87/97/108/119/125	--	--	ND	--	2.91
88	88/91	--	--	ND	--	0.969
89		--	--	ND	--	0.485
90	90/101/113	--	--	ND	--	1.45

Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
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X = Outside QC Limits  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52958  
 Filename P161211B\_06

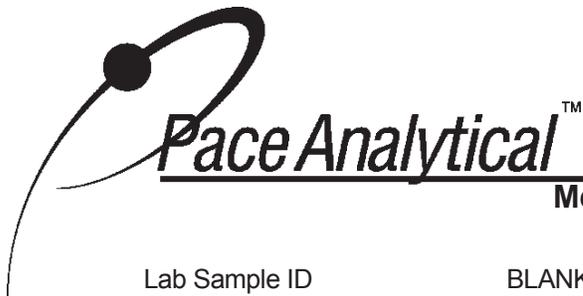
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	--	--	ND	--	0.969
92		--	--	ND	--	0.485
93	93/98/100/102	--	--	ND	--	1.94
94		--	--	ND	--	0.485
95		--	--	ND	--	0.921
96		--	--	ND	--	0.485
97	86/87/97/108/119/125	--	--	ND	--	2.91
98	93/98/100/102	--	--	ND	--	1.94
99		--	--	ND	--	0.485
100	93/98/100/102	--	--	ND	--	1.94
101	90/101/113	--	--	ND	--	1.45
102	93/98/100/102	--	--	ND	--	1.94
103		--	--	ND	--	0.485
104		--	--	ND	--	0.485
105		--	--	ND	--	0.485
106		--	--	ND	--	0.485
107	107/124	--	--	ND	--	0.969
108	86/87/97/108/119/125	--	--	ND	--	2.91
109		--	--	ND	--	0.485
110	110/115	--	--	ND	--	0.969
111		--	--	ND	--	0.485
112		--	--	ND	--	0.485
113	90/101/113	--	--	ND	--	1.45
114		--	--	ND	--	0.485
115	110/115	--	--	ND	--	0.969
116	85/116/117	--	--	ND	--	1.45
117	85/116/117	--	--	ND	--	1.45
118		--	--	ND	--	0.620
119	86/87/97/108/119/125	--	--	ND	--	2.91
120		--	--	ND	--	0.485
121		--	--	ND	--	0.485
122		--	--	ND	--	0.485
123		--	--	ND	--	0.485
124	107/124	--	--	ND	--	0.969
125	86/87/97/108/119/125	--	--	ND	--	2.91
126		--	--	ND	--	0.485
127		--	--	ND	--	0.485
128	128/166	--	--	ND	--	0.969
129	129/138/163	--	--	ND	--	1.45
130		--	--	ND	--	0.485
131		--	--	ND	--	0.485
132		--	--	ND	--	0.485
133		--	--	ND	--	0.485
134	134/143	--	--	ND	--	0.969
135	135/151	--	--	ND	--	0.969

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52958  
Filename P161211B\_06

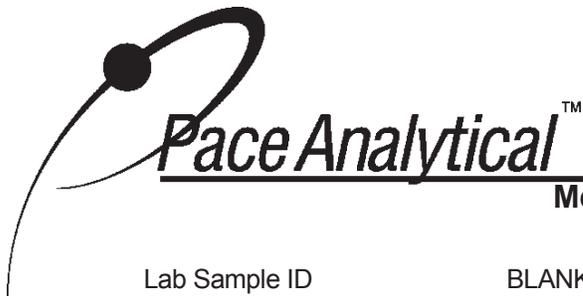
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		--	--	ND	--	0.485
137		--	--	ND	--	0.485
138	129/138/163	--	--	ND	--	1.45
139	139/140	--	--	ND	--	0.969
140	139/140	--	--	ND	--	0.969
141		--	--	ND	--	0.485
142		--	--	ND	--	0.485
143	134/143	--	--	ND	--	0.969
144		--	--	ND	--	0.485
145		--	--	ND	--	0.485
146		--	--	ND	--	0.485
147	147/149	--	--	ND	--	0.969
148		--	--	ND	--	0.485
149	147/149	--	--	ND	--	0.969
150		--	--	ND	--	0.485
151	135/151	--	--	ND	--	0.969
152		--	--	ND	--	0.485
153	153/168	--	--	ND	--	0.969
154		--	--	ND	--	0.485
155		--	--	ND	--	0.485
156	156/157	--	--	ND	--	0.969
157	156/157	--	--	ND	--	0.969
158		--	--	ND	--	0.485
159		--	--	ND	--	0.485
160		--	--	ND	--	0.485
161		--	--	ND	--	0.485
162		--	--	ND	--	0.485
163	129/138/163	--	--	ND	--	1.45
164		--	--	ND	--	0.485
165		--	--	ND	--	0.485
166	128/166	--	--	ND	--	0.969
167		--	--	ND	--	0.485
168	153/168	--	--	ND	--	0.969
169		--	--	ND	--	0.485
170		--	--	ND	--	0.485
171	171/173	--	--	ND	--	0.969
172		--	--	ND	--	0.485
173	171/173	--	--	ND	--	0.969
174		--	--	ND	--	0.485
175		--	--	ND	--	0.485
176		--	--	ND	--	0.485
177		--	--	ND	--	0.485
178		--	--	ND	--	0.485
179		--	--	ND	--	0.485
180	180/193	--	--	ND	--	0.969

Conc = Concentration  
EML = Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
B = Less than 10 times higher than method blank level  
R = Recovery outside of Method 1668A control limits  
ng/L = Nanograms per liter

ND = Not Detected  
NA = Not Applicable  
NC = Not Calculated  
\* = See Discussion  
X = Outside QC Limits  
RT = Retention Time  
I = Interference

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52958  
 Filename P161211B\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		--	--	ND	--	0.485
182		--	--	ND	--	0.485
183	183/185	--	--	ND	--	0.969
184		--	--	ND	--	0.485
185	183/185	--	--	ND	--	0.969
186		--	--	ND	--	0.485
187		--	--	ND	--	0.485
188		--	--	ND	--	0.485
189		--	--	ND	--	0.485
190		--	--	ND	--	0.485
191		--	--	ND	--	0.485
192		--	--	ND	--	0.485
193	180/193	--	--	ND	--	0.969
194		--	--	ND	--	0.727
195		--	--	ND	--	0.727
196		--	--	ND	--	0.727
197	197/200	--	--	ND	--	1.45
198	198/199	--	--	ND	--	1.45
199	198/199	--	--	ND	--	1.45
200	197/200	--	--	ND	--	1.45
201		--	--	ND	--	0.727
202		--	--	ND	--	0.727
203		--	--	ND	--	0.727
204		--	--	ND	--	0.727
205		--	--	ND	--	0.727
206		--	--	ND	--	0.727
207		--	--	ND	--	0.727
208		--	--	ND	--	0.727
209		--	--	ND	--	0.727

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID            CBLKYP  
Lab Sample ID              BLANK-52958  
Filename                     P161211B\_06

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCS-52959	Matrix	Water
Filename	P161211B_11	Dilution	5
Total Amount Extracted	1040 mL	Extracted	12/01/2016 12:00
ICAL ID	P161211B02	Analyzed	12/11/2016 22:08
CCal Filename(s)	P161211B_01	Injected By	BAL
Method Blank ID	BLANK-52958		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.13	113	2.0	1.17	58
3	1.0	1.05	105	2.0	1.15	58
4	1.0	1.04	104	2.0	1.13	56
15	1.0	1.17	117	2.0	1.17	59
19	1.0	1.07	107	2.0	1.26	63
37	1.0	1.09	109	2.0	1.34	67
54	1.0	1.14	114	2.0	1.18	59
81	1.0	1.02	102	2.0	1.59	80
77	1.0	1.00	100	2.0	1.53	76
104	1.0	1.18	118	2.0	1.05	53
105	1.0	1.10	110	2.0	1.45	73
114	1.0	1.08	108	2.0	1.50	75
118	1.0	1.16	116	2.0	1.45	73
123	1.0	1.09	109	2.0	1.45	73
126	1.0	1.09	109	2.0	1.49	74
155	1.0	1.14	114	2.0	1.21	61
156/157	2.0	2.27	113	4.0	2.99	75
167	1.0	1.11	111	2.0	1.54	77
169	1.0	1.15	115	2.0	1.51	75
188	1.0	1.20	120	2.0	1.12	56
189	1.0	1.08	108	2.0	1.41	70
202	1.0	1.09	109	2.0	1.34	67
205	1.0	1.05	105	2.0	1.37	69
206	1.0	1.13	113	2.0	1.21	61
208	1.0	1.08	108	2.0	1.30	65
209	1.0	0.932	93	2.0	1.35	67

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCSD-52960	Matrix	Water
Filename	P161211B_12	Dilution	5
Total Amount Extracted	1000 mL	Extracted	12/01/2016 12:00
ICAL ID	P161211B02	Analyzed	12/11/2016 23:08
CCal Filename(s)	P161211B_01	Injected By	BAL
Method Blank ID	BLANK-52958		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.08	108	2.0	1.19	60
3	1.0	1.15	115	2.0	1.20	60
4	1.0	1.14	114	2.0	1.15	57
15	1.0	1.08	108	2.0	1.25	63
19	1.0	1.05	105	2.0	1.29	64
37	1.0	1.11	111	2.0	1.39	70
54	1.0	1.06	106	2.0	1.21	60
81	1.0	1.04	104	2.0	1.73	87
77	1.0	1.06	106	2.0	1.71	86
104	1.0	1.13	113	2.0	1.13	57
105	1.0	1.09	109	2.0	1.55	78
114	1.0	1.11	111	2.0	1.71	85
118	1.0	1.07	107	2.0	1.67	83
123	1.0	1.12	112	2.0	1.66	83
126	1.0	1.04	104	2.0	1.67	84
155	1.0	1.09	109	2.0	1.28	64
156/157	2.0	2.24	112	4.0	3.25	81
167	1.0	1.12	112	2.0	1.67	83
169	1.0	1.11	111	2.0	1.58	79
188	1.0	1.21	121	2.0	1.14	57
189	1.0	1.06	106	2.0	1.40	70
202	1.0	1.07	107	2.0	1.36	68
205	1.0	1.10	110	2.0	1.42	71
206	1.0	1.10	110	2.0	1.28	64
208	1.0	1.10	110	2.0	1.29	64
209	1.0	0.974	97	2.0	1.47	73

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client ALS Environmental

Spike 1 ID LCS-52959  
Spike 1 Filename P161211B\_11

Spike 2 ID LCSD-52960  
Spike 2 Filename P161211B\_12

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	113	108	4.5
4-MoCB	3	105	115	9.1
2,2'-DiCB	4	104	114	9.2
4,4'-DiCB	15	117	108	8.0
2,2',6-TrCB	19	107	105	1.9
3,4,4'-TrCB	37	109	111	1.8
2,2',6,6'-TeCB	54	114	106	7.3
3,3',4,4'-TeCB	77	100	106	5.8
3,4,4',5-TeCB	81	102	104	1.9
2,2',4,6,6'-PeCB	104	118	113	4.3
2,3,3',4,4'-PeCB	105	110	109	0.9
2,3,4,4',5-PeCB	114	108	111	2.7
2,3',4,4',5-PeCB	118	116	107	8.1
2,3',4,4',5'-PeCB	123	109	112	2.7
3,3',4,4',5-PeCB	126	109	104	4.7
2,2',4,4',6,6'-HxCB	155	114	109	4.5
(156/157)	156/157	113	112	0.9
2,3',4,4',5,5'-HxCB	167	111	112	0.9
3,3',4,4',5,5'-HxCB	169	115	111	3.5
2,2',3,4',5,6,6'-HpCB	188	120	121	0.8
2,3,3',4,4',5,5'-HpCB	189	108	106	1.9
2,2',3,3',5,5',6,6'-OxCB	202	109	107	1.9
2,3,3',4,4',5,5',6-OxCB	205	105	110	4.7
2,2',3,3',4,4',5,5',6-NoCB	206	113	110	2.7
2,2',3,3',4,5,5',6,6'-NoCB	208	108	110	1.8
Decachlorobiphenyl	209	93	97	4.2

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

**REPORT OF LABORATORY ANALYSIS**

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**Water Solutions, Inc.**

55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# **Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Sampling in City Outfall Basin 16**

**To:** File  
**From:** Brian Anderson, GSI Water Solutions, Inc.  
**Date:** January 30, 2017

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in November 2016. Two stormwater grab samples (W16K206-01 and W16K206-01) were collected in Outfall Basin 16 on November 22, 2016, and submitted for analysis.

The laboratory analyses for these samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Conductivity – FO SOP 1.03a
  - pH – FO SOP 1.01a
  - Temp – FO SOP 1.05a
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- Pace Analytical Services (Pace)
  - Polychlorinated Biphenyls (PCB) Congeners – EPA 1668A

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with these source control program samples.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control (LC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## **Analysis Holding Times**

The sample was extracted and analyzed within acceptable holding times.

## **Method Blanks**

Method blanks were analyzed during the laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, and subcontracted analysis of PCB congeners. No analytes were detected in the method blanks processed during analyses.

## **Surrogate Recoveries**

Surrogate recoveries were completed during the analyses of PAHs and phthalates. Surrogate recoveries for the field sample and all associated QC samples were within control criteria.

## **Internal Standard Recoveries**

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. The laboratory reported that internal standards in the sample extracts were recovered at 40-116%. Internal standard recoveries were within the target ranges specified in the method. Because the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery, which allowed accurate values to be obtained.

## **Matrix Spike/Matrix Spike Duplicates**

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates, and one MSD was processed for PAHs and phthalate analysis. WPCL reported that chrysene recovered outside limits during analysis of PAHs and has been flagged as a high estimate (J+) for sample W16K206-01 due to either matrix interference or an inhomogeneous matrix. Remaining MS sample results were within acceptance limits and MSD sample results were within RPD limits.

## **Laboratory Control Samples**

LC samples were processed during the analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. LC sample recoveries were within laboratory control limits for all analyses.

## **Laboratory Duplicate**

WPCL processed laboratory duplicate samples during total metals analysis, TSS analysis, and mercury analysis. One of three duplicate samples for TSS was outside recovery limits, although the lab reported exceedance as not applicable because it was less than five times the reporting limit. This QC detection is also not likely to have effect on field data. RPDs were within laboratory acceptance limits for the remainder of analyses.

## **Other**

Samples were delivered to WPCL at a temperature of 8 degrees C, but qualifications have not been made as the samples were stored in a field ops refrigerator overnight and the delivery temperature may not reflect storage temperatures. Temperatures during shipping and transport of sample coolers for subcontracted analyses were less than 6° C.

WPCL reports that the continuing calibration verification was low for 1-Methylnaphthalene and 2- Methylnaphthalene and have been qualified as estimates possibly biased low (J-), or as an estimated non-detect (UJ). Additionally, continuing calibration verification was reportedly high for Butyl benzyl phthalate, Di-n-octyl phthalate, and Bis(2-ethylhexyl) phthalate, and have been qualified as estimates possibly biased high( J+) where detections were made. Qualifications were not made where analytes were not detected.

No other anomalies were reported in by WPCL or the subcontracted laboratories. A list of additional data qualifications added during validation is provided in Table 1.

**Table 1. Qualifiers Added or Modified During Validation**

City of Portland

*Outfall 16*

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
W16K206-01	Chrysene	ug/L	0.2	J	MS+
W16K206-01	1-Methylnaphthalene	ug/L	ND	UJ	CCV-
W16K206-01	2-Methylnaphthalene	ug/L	ND	UJ	CCV-
W16K206-01	Butyl benzyl phthalate	ug/L	1.8	J+	CCV+
W16K206-01	Di-n-octyl phthalate	ug/L	1.3	J+	CCV+
W16K206-01	Bis(2-ethylhexyl) phthalate	ug/L	5.8	J+	CCV+
W16K206-02	1-Methylnaphthalene	ug/L	0.4	J-	CCV-
W16K206-02	2-Methylnaphthalene	ug/L	ND	UJ	CCV-
W16K206-02	Bis(2-ethylhexyl) phthalate	ug/L	2.4	J+	CCV+

**Notes**

µg/L = micrograms per liter

**Qualifier Definitions**

J+ = Detection of analyte is considered an estimate, possibly biased high

J- = Detection of analyte is considered an estimate, possibly biased low

**Reason Code Definitions**

CCV+ = The continuing calibration verification was high and the sample results may be high estimates

CCV- = The continuing calibration verification was low and the sample results may be low estimates

MS+ = Based on high matrix spike recovery, the sample result may be an estimate due to matrix interference



City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



December 30, 2016

Linda Scheffler  
Director's Office

---

Work Order  
**W16K206**

Project  
**Portland Harbor**

Received  
11/23/16 08:14

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project:	<b>Portland Harbor</b>	Client:	Director's Office
Work Order:	<b>W16K206</b>	Project Mgr:	Linda Scheffler
Received:	11/23/16 8:14		
Submitted By:	Field Operations		

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
16_SW1	W16K206-01	Stormwater	Grab	11/22/16 15:47	11/22/16 15:47	
16_SW2	W16K206-02	Stormwater	Grab	11/22/16 16:13	11/22/16 16:13	

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field conductivity

16_SW1 : W16K206-01										
Conductivity*	27	umhos/cm			1	B16K394	11/22/16	11/22/16	FO SOP 1.03a	
16_SW2 : W16K206-02										
Conductivity*	106	umhos/cm			1	B16K394	11/22/16	11/22/16	FO SOP 1.03a	

Field pH

16_SW1 : W16K206-01										
pH*	6.3	pH Units			1	B16K394	11/22/16 15:47	11/22/16	FO SOP 1.01a	
16_SW2 : W16K206-02										
pH*	6.6	pH Units			1	B16K394	11/22/16 16:13	11/22/16	FO SOP 1.01a	

Field temperature

16_SW1 : W16K206-01										
Temperature*	12.4	°C			1	B16K394	11/22/16 15:47	11/22/16	FO SOP 1.05a	
16_SW2 : W16K206-02										
Temperature*	11.7	°C			1	B16K394	11/22/16 16:13	11/22/16	FO SOP 1.05a	

**General Chemistry**

Total Suspended Solids

16_SW1 : W16K206-01										
Total suspended solids	58	mg/L	2	2		B16K387	11/23/16	11/23/16	SM 2540D	
16_SW2 : W16K206-02										
Total suspended solids	8	mg/L	2	2		B16K387	11/23/16	11/23/16	SM 2540D	

Reported: 12/30/16 12:49

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16K206**

**Client: Director's Office**  
**Received: 11/23/16 08:14**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Total Metals**

Total Metals by ICPMS

16\_SW1 : W16K206-01

Arsenic	1.92 ug/L	0.100	0.100	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Cadmium	0.707 ug/L	0.100	0.100	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Chromium	5.74 ug/L	0.200	0.200	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Copper	48.9 ug/L	0.200	0.200	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Lead	33.7 ug/L	0.100	0.100	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Mercury	0.0601 ug/L	0.00100	0.00100	1	B16K449	11/28/16	11/29/16	WPCLSOP M-10	
Nickel	6.62 ug/L	0.200	0.200	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Zinc	149 ug/L	0.500	0.500	1	B16K442	11/28/16	11/29/16	EPA 200.8	

16\_SW2 : W16K206-02

Arsenic	0.395 ug/L	0.100	0.100	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Cadmium	0.578 ug/L	0.100	0.100	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Chromium	1.92 ug/L	0.200	0.200	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Copper	46.7 ug/L	0.200	0.200	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Lead	30.1 ug/L	0.100	0.100	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Mercury	0.0567 ug/L	0.00100	0.00100	1	B16K449	11/28/16	11/29/16	WPCLSOP M-10	
Nickel	4.73 ug/L	0.200	0.200	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B16K442	11/28/16	11/29/16	EPA 200.8	
Zinc	61.7 ug/L	0.500	0.500	1	B16K442	11/28/16	11/29/16	EPA 200.8	

Reported: 12/30/16 12:49

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

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**Project: Portland Harbor**  
**Work Order: W16K206**

**Client: Director's Office**  
**Received: 11/23/16 08:14**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

16\_SW1 : W16K206-01

Acenaphthene	ND	ug/L	0.020	0.020	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Acenaphthylene	0.036	ug/L	0.020	0.020	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Anthracene	0.044	ug/L	0.020	0.020	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Benzo(a)anthracene	0.099	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Benzo(a)pyrene	0.098	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.24	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.18	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.059	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Chrysene	0.20	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	M5
Dibenzo(a,h)anthracene	0.031	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Fluoranthene	0.38	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Fluorene	0.026	ug/L	0.020	0.020	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.096	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	V3
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	V3
Naphthalene	0.063	ug/L	0.040	0.040	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Phenanthrene	0.12	ug/L	0.020	0.020	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Pyrene	0.48	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Butyl benzyl phthalate	1.8	ug/L	1.0	0.50	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	V1
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Dimethyl phthalate	0.66	ug/L	1.0	0.50	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	J
Di-n-octyl phthalate	1.3	ug/L	1.0	0.50	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	V1
Bis(2-ethylhexyl) phthalate	5.8	ug/L	1.0	0.50	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.19	ug/L	0.229	84%	31-164	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Fluoranthene-d10	0.27	ug/L	0.229	119%	65-145	B16K453	11/29/16	11/29/16	EPA 8270-SIM	

16\_SW2 : W16K206-02

Acenaphthene	ND	ug/L	0.020	0.020	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Benzo(a)anthracene	0.019	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Benzo(a)pyrene	0.012	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Benzo(b)fluoranthene	0.065	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.034	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Benzo(k)fluoranthene	0.019	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Chrysene	0.047	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Fluoranthene	0.11	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	0.021	ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
1-Methylnaphthalene	0.041	ug/L	0.040	0.040	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	V3

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Work Order: W16K206**

**Client: Director's Office**  
**Received: 11/23/16 08:14**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

16\_SW2 : W16K206-02

2-Methylnaphthalene	ND ug/L	0.040	0.040	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	V3
Naphthalene	ND ug/L	0.040	0.040	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Phenanthrene	ND ug/L	0.020	0.020	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Pyrene	<b>0.095</b> ug/L	0.010	0.010	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Butyl benzyl phthalate	ND ug/L	1.0	0.50	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Di-n-butyl phthalate	ND ug/L	1.0	0.50	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Diethyl phthalate	ND ug/L	1.0	0.50	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Dimethyl phthalate	ND ug/L	1.0	0.50	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Di-n-octyl phthalate	ND ug/L	1.0	0.50	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	<b>2.4</b> ug/L	1.0	0.50	1	B16K453	11/29/16	11/29/16	EPA 8270-SIM	V1
<b>Surrogate</b>	<b>Result</b>	<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.17 ug/L	0.229	74%	31-164	B16K453	11/29/16	11/29/16	EPA 8270-SIM	
Fluoranthene-d10	0.25 ug/L	0.229	111%	65-145	B16K453	11/29/16	11/29/16	EPA 8270-SIM	

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Project: **Portland Harbor**  
Work Order: **W16K206**

Client: Director's Office  
Received: 11/23/16 08:14

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B16K387</b>										
<b>Blank (B16K387-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					11/23/16 : 11/23/16	
<b>LCS (B16K387-BS1)</b>										
Total suspended solids	94	mg/L			100		94% (90-110)		11/23/16 : 11/23/16	
<b>Duplicate (B16K387-DUP1) Source: W16K203-01</b>										
Total suspended solids	760	mg/L	2	2		790		4 (20)	11/23/16 : 11/23/16	
<b>Duplicate (B16K387-DUP2) Source: W16K206-01</b>										
Total suspended solids	60	mg/L	2	2		58		3 (20)	11/23/16 : 11/23/16	
<b>Duplicate (B16K387-DUP3) Source: W16K208-03</b>										
Total suspended solids	4	mg/L	2	2		8		73 (20)	11/23/16 : 11/23/16	M8

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B16K442</b>										
<b>Blank (B16K442-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					11/28/16 : 11/29/16	
Cadmium	ND	ug/L	0.100	0.100					11/28/16 : 11/29/16	
Chromium	ND	ug/L	0.200	0.200					11/28/16 : 11/29/16	
Copper	ND	ug/L	0.200	0.200					11/28/16 : 11/29/16	
Lead	ND	ug/L	0.100	0.100					11/28/16 : 11/29/16	
Nickel	ND	ug/L	0.200	0.200					11/28/16 : 11/29/16	
Silver	ND	ug/L	0.100	0.100					11/28/16 : 11/29/16	
Zinc	ND	ug/L	0.500	0.500					11/28/16 : 11/29/16	
<b>LCS (B16K442-BS1)</b>										
Arsenic	5.08	ug/L	0.100	0.100	5.00		102% (85-115)		11/28/16 : 11/29/16	
Cadmium	5.07	ug/L	0.100	0.100	5.00		101% (85-115)		11/28/16 : 11/29/16	
Chromium	5.07	ug/L	0.200	0.200	5.00		101% (85-115)		11/28/16 : 11/29/16	
Copper	5.06	ug/L	0.200	0.200	5.00		101% (85-115)		11/28/16 : 11/29/16	
Lead	4.82	ug/L	0.100	0.100	5.00		96% (85-115)		11/28/16 : 11/29/16	
Nickel	5.03	ug/L	0.200	0.200	5.00		101% (85-115)		11/28/16 : 11/29/16	
Silver	4.90	ug/L	0.100	0.100	5.00		98% (85-115)		11/28/16 : 11/29/16	
Zinc	25.8	ug/L	0.500	0.500	25.0		103% (85-115)		11/28/16 : 11/29/16	

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**Project: Portland Harbor**  
**Work Order: W16K206**

**Client: Director's Office**  
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**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B16K442**

<b>Duplicate (B16K442-DUP1)</b>		<b>Source: W16K205-01</b>								
Arsenic	0.655	ug/L	0.100	0.100		0.649		0.9 (20)	11/28/16 :11/29/16	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	11/28/16 :11/29/16	
Chromium	1.80	ug/L	0.200	0.200		1.54		16 (20)	11/28/16 :11/29/16	
Copper	6.22	ug/L	0.200	0.200		6.09		2 (20)	11/28/16 :11/29/16	
Lead	1.72	ug/L	0.100	0.100		1.67		3 (20)	11/28/16 :11/29/16	
Nickel	2.29	ug/L	0.200	0.200		2.24		2 (20)	11/28/16 :11/29/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	11/28/16 :11/29/16	
Zinc	27.9	ug/L	0.500	0.500		27.5		1 (20)	11/28/16 :11/29/16	

<b>Duplicate (B16K442-DUP2)</b>		<b>Source: W16K219-01</b>								
Arsenic	0.124	ug/L	0.100	0.100		0.129		4 (20)	11/28/16 :11/29/16	
Cadmium	ND	ug/L	0.100	0.100		ND		(20)	11/28/16 :11/29/16	
Chromium	0.471	ug/L	0.200	0.200		0.544		14 (20)	11/28/16 :11/29/16	
Copper	1.90	ug/L	0.200	0.200		1.93		1 (20)	11/28/16 :11/29/16	
Lead	0.487	ug/L	0.100	0.100		0.499		2 (20)	11/28/16 :11/29/16	
Nickel	0.331	ug/L	0.200	0.200		0.339		2 (20)	11/28/16 :11/29/16	
Silver	ND	ug/L	0.100	0.100		ND		(20)	11/28/16 :11/29/16	
Zinc	11.7	ug/L	0.500	0.500		11.8		0.9 (20)	11/28/16 :11/29/16	

<b>Matrix Spike (B16K442-MS1)</b>		<b>Source: W16K205-01</b>								
Arsenic	10.6	ug/L	0.100	0.100	10.0	0.649	100% (70-130)		11/28/16 :11/29/16	
Cadmium	10.0	ug/L	0.100	0.100	10.0	ND	100% (70-130)		11/28/16 :11/29/16	
Chromium	12.4	ug/L	0.200	0.200	10.0	1.54	109% (70-130)		11/28/16 :11/29/16	
Copper	16.0	ug/L	0.200	0.200	10.0	6.09	99% (70-130)		11/28/16 :11/29/16	
Lead	11.3	ug/L	0.100	0.100	10.0	1.67	97% (70-130)		11/28/16 :11/29/16	
Nickel	12.5	ug/L	0.200	0.200	10.0	2.24	103% (70-130)		11/28/16 :11/29/16	
Silver	9.76	ug/L	0.100	0.100	10.0	ND	98% (70-130)		11/28/16 :11/29/16	
Zinc	77.0	ug/L	0.500	0.500	50.0	27.5	99% (70-130)		11/28/16 :11/29/16	

<b>Matrix Spike (B16K442-MS2)</b>		<b>Source: W16K219-01</b>								
Arsenic	10.4	ug/L	0.100	0.100	10.0	0.129	103% (70-130)		11/28/16 :11/29/16	
Cadmium	10.1	ug/L	0.100	0.100	10.0	ND	101% (70-130)		11/28/16 :11/29/16	
Chromium	10.4	ug/L	0.200	0.200	10.0	0.544	99% (70-130)		11/28/16 :11/29/16	
Copper	12.0	ug/L	0.200	0.200	10.0	1.93	101% (70-130)		11/28/16 :11/29/16	
Lead	10.1	ug/L	0.100	0.100	10.0	0.499	96% (70-130)		11/28/16 :11/29/16	
Nickel	10.5	ug/L	0.200	0.200	10.0	0.339	102% (70-130)		11/28/16 :11/29/16	
Silver	9.73	ug/L	0.100	0.100	10.0	ND	97% (70-130)		11/28/16 :11/29/16	
Zinc	62.2	ug/L	0.500	0.500	50.0	11.8	101% (70-130)		11/28/16 :11/29/16	

**Total Metals by ICPMS - Batch B16K449**

<b>Blank (B16K449-BLK1)</b>										
Mercury	ND	ug/L	0.000900	0.000900					11/28/16 :11/29/16	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC

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**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Total Metals by ICPMS - Batch B16K449										
<b>LCS (B16K449-BS1)</b>										
Mercury	0.0101	ug/L	0.000900	0.000900	0.0100		101% (85-125)		11/28/16 :11/29/16	
<b>Duplicate (B16K449-DUP1) Source: W16K219-01</b>										
Mercury	0.00154	ug/L	0.00100	0.00100		0.00160	4 (20)		11/28/16 :11/29/16	
<b>Matrix Spike (B16K449-MS1) Source: W16K219-01</b>										
Mercury	0.0123	ug/L	0.00100	0.00100	0.0111	0.00160	96% (70-130)		11/28/16 :11/29/16	

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**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16K206**

**Client: Director's Office**  
**Received: 11/23/16 08:14**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16K453**

**Blank (B16K453-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					11/29/16 :11/29/16	
Acenaphthylene	ND	ug/L	0.020	0.020					11/29/16 :11/29/16	
Anthracene	ND	ug/L	0.020	0.020					11/29/16 :11/29/16	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					11/29/16 :11/29/16	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					11/29/16 :11/29/16	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					11/29/16 :11/29/16	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					11/29/16 :11/29/16	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					11/29/16 :11/29/16	
Chrysene	ND	ug/L	0.010	0.010					11/29/16 :11/29/16	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					11/29/16 :11/29/16	
Fluoranthene	ND	ug/L	0.010	0.010					11/29/16 :11/29/16	
Fluorene	ND	ug/L	0.020	0.020					11/29/16 :11/29/16	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					11/29/16 :11/29/16	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					11/29/16 :11/29/16	V3
2-Methylnaphthalene	ND	ug/L	0.040	0.040					11/29/16 :11/29/16	V3
Naphthalene	ND	ug/L	0.040	0.040					11/29/16 :11/29/16	
Phenanthrene	ND	ug/L	0.020	0.020					11/29/16 :11/29/16	
Pyrene	ND	ug/L	0.010	0.010					11/29/16 :11/29/16	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					11/29/16 :11/29/16	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					11/29/16 :11/29/16	
Diethyl phthalate	ND	ug/L	1.0	0.50					11/29/16 :11/29/16	
Dimethyl phthalate	ND	ug/L	1.0	0.50					11/29/16 :11/29/16	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					11/29/16 :11/29/16	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					11/29/16 :11/29/16	

**Surrogate**

2-Methylnaphthalene-d10	0.17	ug/L			0.229		75% (31-164)		11/29/16 :11/29/16	
Fluoranthene-d10	0.26	ug/L			0.229		116% (65-145)		11/29/16 :11/29/16	

**LCS (B16K453-BS1)**

Acenaphthene	0.229	ug/L	0.020	0.020	0.229		100% (67-125)		11/29/16 :11/29/16	
Acenaphthylene	0.261	ug/L	0.020	0.020	0.229		114% (64-138)		11/29/16 :11/29/16	
Anthracene	0.258	ug/L	0.020	0.020	0.229		113% (65-143)		11/29/16 :11/29/16	
Benzo(a)anthracene	0.254	ug/L	0.010	0.010	0.229		111% (80-130)		11/29/16 :11/29/16	
Benzo(a)pyrene	0.244	ug/L	0.010	0.010	0.229		107% (74-131)		11/29/16 :11/29/16	
Benzo(b)fluoranthene	0.222	ug/L	0.010	0.010	0.229		97% (67-128)		11/29/16 :11/29/16	
Benzo(g,h,i)perylene	0.260	ug/L	0.010	0.010	0.229		114% (57-137)		11/29/16 :11/29/16	
Benzo(k)fluoranthene	0.219	ug/L	0.010	0.010	0.229		96% (63-140)		11/29/16 :11/29/16	
Chrysene	0.252	ug/L	0.010	0.010	0.229		110% (80-134)		11/29/16 :11/29/16	
Dibenzo(a,h)anthracene	0.265	ug/L	0.010	0.010	0.229		116% (56-138)		11/29/16 :11/29/16	
Fluoranthene	0.243	ug/L	0.010	0.010	0.229		106% (70-150)		11/29/16 :11/29/16	
Fluorene	0.242	ug/L	0.020	0.020	0.229		106% (64-130)		11/29/16 :11/29/16	

Reported: 12/30/16 12:49

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

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ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W16K206**

**Client: Director's Office**  
**Received: 11/23/16 08:14**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16K453**

**LCS (B16K453-BS1)**

Indeno(1,2,3-cd)pyrene	0.275	ug/L	0.010	0.010	0.229		120% (58-138)		11/29/16 :11/29/16	
1-Methylnaphthalene	0.162	ug/L	0.040	0.040	0.229		71% (35-164)		11/29/16 :11/29/16	V3
2-Methylnaphthalene	0.152	ug/L	0.040	0.040	0.229		67% (29-162)		11/29/16 :11/29/16	V3
Naphthalene	0.215	ug/L	0.040	0.040	0.229		94% (53-134)		11/29/16 :11/29/16	
Phenanthrene	0.234	ug/L	0.020	0.020	0.229		102% (73-132)		11/29/16 :11/29/16	
Pyrene	0.237	ug/L	0.010	0.010	0.229		104% (69-153)		11/29/16 :11/29/16	
Butyl benzyl phthalate	3.17	ug/L	1.0	0.50	2.29		139% (55-181)		11/29/16 :11/29/16	V1
Di-n-butyl phthalate	2.65	ug/L	1.0	0.50	2.29		116% (61-183)		11/29/16 :11/29/16	
Diethyl phthalate	2.64	ug/L	1.0	0.50	2.29		116% (65-177)		11/29/16 :11/29/16	
Dimethyl phthalate	2.63	ug/L	1.0	0.50	2.29		115% (77-151)		11/29/16 :11/29/16	
Di-n-octyl phthalate	3.54	ug/L	1.0	0.50	2.29		155% (12-185)		11/29/16 :11/29/16	V1
Bis(2-ethylhexyl) phthalate	3.18	ug/L	1.0	0.50	2.29		139% (39-170)		11/29/16 :11/29/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.16	ug/L			0.229		72% (31-164)		11/29/16 :11/29/16	
Fluoranthene-d10	0.24	ug/L			0.229		105% (65-145)		11/29/16 :11/29/16	

**Matrix Spike (B16K453-MS1)**

**Source: W16K206-01**

Acenaphthene	0.269	ug/L	0.020	0.020	0.229	ND	118% (67-125)		11/29/16 :11/29/16	
Acenaphthylene	0.330	ug/L	0.020	0.020	0.229	0.0360	128% (64-138)		11/29/16 :11/29/16	
Anthracene	0.322	ug/L	0.020	0.020	0.229	0.0440	122% (65-143)		11/29/16 :11/29/16	
Benzo(a)anthracene	0.382	ug/L	0.010	0.010	0.229	0.0989	124% (80-130)		11/29/16 :11/29/16	
Benzo(a)pyrene	0.346	ug/L	0.010	0.010	0.229	0.0983	108% (74-131)		11/29/16 :11/29/16	
Benzo(b)fluoranthene	0.455	ug/L	0.010	0.010	0.229	0.240	94% (67-128)		11/29/16 :11/29/16	
Benzo(g,h,i)perylene	0.422	ug/L	0.010	0.010	0.229	0.182	105% (57-137)		11/29/16 :11/29/16	
Benzo(k)fluoranthene	0.299	ug/L	0.010	0.010	0.229	0.0589	105% (63-140)		11/29/16 :11/29/16	
Chrysene	0.507	ug/L	0.010	0.010	0.229	0.200	134% (80-134)		11/29/16 :11/29/16	M5
Dibenzo(a,h)anthracene	0.253	ug/L	0.010	0.010	0.229	0.0314	97% (56-138)		11/29/16 :11/29/16	
Fluoranthene	0.622	ug/L	0.010	0.010	0.229	0.375	108% (70-150)		11/29/16 :11/29/16	
Fluorene	0.302	ug/L	0.020	0.020	0.229	0.0257	121% (64-130)		11/29/16 :11/29/16	
Indeno(1,2,3-cd)pyrene	0.334	ug/L	0.010	0.010	0.229	0.0960	104% (58-138)		11/29/16 :11/29/16	
1-Methylnaphthalene	0.231	ug/L	0.040	0.040	0.229	ND	101% (35-164)		11/29/16 :11/29/16	V3
2-Methylnaphthalene	0.225	ug/L	0.040	0.040	0.229	ND	98% (29-162)		11/29/16 :11/29/16	V3
Naphthalene	0.315	ug/L	0.040	0.040	0.229	0.0634	110% (53-134)		11/29/16 :11/29/16	
Phenanthrene	0.382	ug/L	0.020	0.020	0.229	0.121	114% (73-132)		11/29/16 :11/29/16	
Pyrene	0.706	ug/L	0.010	0.010	0.229	0.475	101% (69-153)		11/29/16 :11/29/16	
Butyl benzyl phthalate	3.53	ug/L	1.0	0.50	2.29	1.84	74% (55-181)		11/29/16 :11/29/16	V1
Di-n-butyl phthalate	3.04	ug/L	1.0	0.50	2.29	ND	133% (61-183)		11/29/16 :11/29/16	
Diethyl phthalate	2.93	ug/L	1.0	0.50	2.29	ND	128% (65-177)		11/29/16 :11/29/16	
Dimethyl phthalate	3.45	ug/L	1.0	0.50	2.29	0.663	122% (77-151)		11/29/16 :11/29/16	
Di-n-octyl phthalate	3.12	ug/L	1.0	0.50	2.29	1.26	81% (12-185)		11/29/16 :11/29/16	V1
Bis(2-ethylhexyl) phthalate	7.61	ug/L	1.0	0.50	2.29	5.76	81% (39-170)		11/29/16 :11/29/16	V1

Reported: 12/30/16 12:49

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



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Water Pollution Control Laboratory**

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**Project: Portland Harbor**  
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**Client: Director's Office**  
**Received: 11/23/16 08:14**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B16K453**

**Matrix Spike (B16K453-MS1) Source: W16K206-01**

**Surrogate**

2-Methylnaphthalene-d10	0.20	ug/L			0.229		87% (31-164)		11/29/16 :11/29/16	
Fluoranthene-d10	0.26	ug/L			0.229		116% (65-145)		11/29/16 :11/29/16	

**Matrix Spike Dup (B16K453-MSD1) Source: W16K206-01**

Acenaphthene	0.263	ug/L	0.020	0.020	0.229	ND	115% (67-125)	2 (30)	11/29/16 :11/29/16	
Acenaphthylene	0.321	ug/L	0.020	0.020	0.229	0.0360	124% (64-138)	3 (30)	11/29/16 :11/29/16	
Anthracene	0.320	ug/L	0.020	0.020	0.229	0.0440	121% (65-143)	0.7 (30)	11/29/16 :11/29/16	
Benzo(a)anthracene	0.362	ug/L	0.010	0.010	0.229	0.0989	115% (80-130)	5 (30)	11/29/16 :11/29/16	
Benzo(a)pyrene	0.338	ug/L	0.010	0.010	0.229	0.0983	105% (74-131)	2 (30)	11/29/16 :11/29/16	
Benzo(b)fluoranthene	0.426	ug/L	0.010	0.010	0.229	0.240	81% (67-128)	7 (30)	11/29/16 :11/29/16	
Benzo(g,h,i)perylene	0.423	ug/L	0.010	0.010	0.229	0.182	105% (57-137)	0.1 (30)	11/29/16 :11/29/16	
Benzo(k)fluoranthene	0.314	ug/L	0.010	0.010	0.229	0.0589	112% (63-140)	5 (30)	11/29/16 :11/29/16	
Chrysene	0.458	ug/L	0.010	0.010	0.229	0.200	113% (80-134)	10 (30)	11/29/16 :11/29/16	
Dibenzo(a,h)anthracene	0.256	ug/L	0.010	0.010	0.229	0.0314	98% (56-138)	1 (30)	11/29/16 :11/29/16	
Fluoranthene	0.638	ug/L	0.010	0.010	0.229	0.375	115% (70-150)	3 (30)	11/29/16 :11/29/16	
Fluorene	0.284	ug/L	0.020	0.020	0.229	0.0257	113% (64-130)	6 (30)	11/29/16 :11/29/16	
Indeno(1,2,3-cd)pyrene	0.339	ug/L	0.010	0.010	0.229	0.0960	106% (58-138)	2 (30)	11/29/16 :11/29/16	
1-Methylnaphthalene	0.227	ug/L	0.040	0.040	0.229	ND	99% (35-164)	2 (30)	11/29/16 :11/29/16	V3
2-Methylnaphthalene	0.217	ug/L	0.040	0.040	0.229	ND	95% (29-162)	3 (30)	11/29/16 :11/29/16	V3
Naphthalene	0.299	ug/L	0.040	0.040	0.229	0.0634	103% (53-134)	5 (30)	11/29/16 :11/29/16	
Phenanthrene	0.380	ug/L	0.020	0.020	0.229	0.121	114% (73-132)	0.6 (30)	11/29/16 :11/29/16	
Pyrene	0.728	ug/L	0.010	0.010	0.229	0.475	110% (69-153)	3 (30)	11/29/16 :11/29/16	
Butyl benzyl phthalate	3.66	ug/L	1.0	0.50	2.29	1.84	80% (55-181)	3 (30)	11/29/16 :11/29/16	V1
Di-n-butyl phthalate	3.10	ug/L	1.0	0.50	2.29	ND	136% (61-183)	2 (30)	11/29/16 :11/29/16	
Diethyl phthalate	2.81	ug/L	1.0	0.50	2.29	ND	123% (65-177)	4 (30)	11/29/16 :11/29/16	
Dimethyl phthalate	3.43	ug/L	1.0	0.50	2.29	0.663	121% (77-151)	0.6 (30)	11/29/16 :11/29/16	
Di-n-octyl phthalate	3.00	ug/L	1.0	0.50	2.29	1.26	76% (12-185)	4 (30)	11/29/16 :11/29/16	V1
Bis(2-ethylhexyl) phthalate	7.67	ug/L	1.0	0.50	2.29	5.76	83% (39-170)	0.7 (30)	11/29/16 :11/29/16	V1
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.20	ug/L			0.229		87% (31-164)		11/29/16 :11/29/16	
Fluoranthene-d10	0.27	ug/L			0.229		119% (65-145)		11/29/16 :11/29/16	

Reported: 12/30/16 12:49

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC

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Water Pollution Control Laboratory

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ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W16K206**

Client: Director's Office  
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**Qualifiers**

- J Analyte was detected but at a concentration below the reporting limit; the result is an estimate.
- M5 Based on high matrix spike recovery, the sample result should be considered an estimate due to matrix effect and/or non-homogeneous matrix.
- M8 The matrix duplicate control limit is not applicable at concentrations less than 5 times the reporting limit.
- V1 Continuing calibration verification was high; sample results for this analyte may be high estimates.
- V3 Continuing calibration verification was low; sample results for this analyte may be low estimates.

**Definitions**

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 12/30/16 12:49

Jennifer Shackelford, Laboratory Coordinator QA/QC

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Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody



Bureau of Environmental Services

Date: 1/22/16

Work Order #: W16K206  
 Collected By: MSS, ECP

Client Name: Director's Office  
 Matrix: Stormwater  
 Project Name: Portland Harbor

Smartroll 13

Requested Analyses

Lab Number	Location ID			Sample Time	Sample Type	TSS	Total Metals (As, Cd, Cr, Cu, Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs + phthalates (low-level)	Pesticides (Low-level)	Conductivity (umhos/cm)	pH (pH units)	Temperature (Deg C)	Meter:	Meter:	Meter:	# of Containers	Remarks
	17	44																	
101	16-5W1	11/27/16	1547	G	0	0	0	0	0	0	0	27	6.3	12.4			4		
102	16-5W2	11/27/16	1613	G	0	0	0	0	0	0	0	106	6.6	11.7			4		

Relinquished By: *Scott Guller* Date: 1/23/16 Time: 0814  
 Signature: *Scott Guller*  
 Printed Name: Scott Guller

Received By: *Matt Sullivan* Date: 1/23/16 Time: 0814  
 Signature: *Matt Sullivan*  
 Printed Name: Matt Sullivan

### WPCL Cooler Receipt Form

Work Order Number: W16K206

Cooler Receipt Form Filled Out By: RK

Project: Portland Harbor

Sample transport: Kept in field ops fridge overnight.  
 Samples received on ice  Courier \_\_\_\_\_  
 Directly from field \_\_\_\_\_  
 Temperature (°C) 8

	Yes	No	NA
Is the COC present and signed?	✓		
Are sample bottles intact?	✓		
Do the COC and sample labels match?	✓		
Are the appropriate containers used?	✓		
Are samples appropriately preserved?	✓		
Do VOA vials have Headspace?			✓
Are samples received within holding times?	✓		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	<u>16001146</u>	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
<u>11-23-16</u>	<u>0830</u>	<u>RK</u>	<u>W16K206-01, 02</u>	<u>D</u>	<u>1</u>	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

December 29, 2016

**Analytical Report for Service Request No: K1614351**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W16K206**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory November 23, 2016  
For your reference, these analyses have been assigned our service request number **K1614351**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.  
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

**SUBCONTRACT ORDER**  
**City of Portland Water Pollution Control Lab**  
**W16K206**

*h11614351*

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

ALS Environmental  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

WPCL Project Name  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>	
<input checked="" type="checkbox"/> Standard	
<input type="checkbox"/> Rush _ day(s)	

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W16K206-01</b>	<b>Water</b>	<b>Sampled: 11/22/16 15:47</b>		
Out-PCB Congeners 209	12/09/16 17:00	05/21/17 15:47		
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W16K206-02</b>	<b>Water</b>	<b>Sampled: 11/22/16 16:13</b>		
Out-PCB Congeners 209	12/09/16 17:00	05/21/17 16:13		
<i>Containers Supplied:</i> G amber 1L (A)				

*Called ALS for pick up.*

<i>[Signature]</i>	Date	<i>Charles Lytle</i>	Date	<i>11/23/16</i>	<i>1152</i>
Released By		Received By			
<i>@LAB:</i>	Date	<i>Charles Lytle</i>	Date	<i>11/23/16</i>	<i>1315</i>
Released By		Received By			



PC H2

### Cooler Receipt and Preservation Form

Client WPCL Service Request K16 14351

Received: 11/23/16 Opened: 11/23/16 By: CG Unloaded: 11/23/16 By: CG

- 1. Samples were received via?  Mail  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- 2. Samples were received in: (circle)  Cooler  Box  Envelope  Other \_\_\_\_\_ NA
- 3. Were custody seals on coolers?  NA  Y  N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact?  Y  N If present, were they signed and dated?  Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
3.1	3.1			0.0	361	NA		NA

- 4. Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves \_\_\_\_\_
- 5. Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
- 6. Did all bottles arrive in good condition (unbroken)? Indicate in the table below. NA  Y  N
- 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
- 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA  Y  N
- 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
- 10. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below  NA  Y  N
- 11. Were VOA vials received without headspace? Indicate in the table below.  NA  Y  N
- 12. Was C12/Res negative? NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)

**Report Prepared for:**

Howard Holmes  
ALS Environmental  
1317 S. 13th Avenue  
Kelso WA 98626

**REPORT OF  
LABORATORY  
ANALYSIS  
FOR PCBs**

**Report Prepared Date:**

December 20, 2016

**Report Information:**

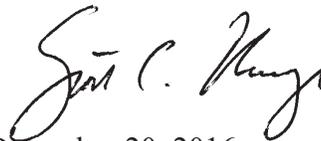
**Pace Project #: 10371444**  
**Sample Receipt Date: 11/29/2016**  
**Client Project #: K1614351**  
**Client Sub PO #: 51K1614351**  
**State Cert #: MN200001-005**

**Invoicing & Reporting Options:**

The report provided has been invoiced as a Level 2 PCB Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

**This report has been reviewed by:**



December 20, 2016

Scott Unze, Project Manager  
(612) 607-6383  
(612) 607-6444 (fax)  
scott.unze@pacelabs.com



**Report of Laboratory Analysis**

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.

## **DISCUSSION**

This report presents the results from the analyses performed on two samples submitted by a representative of ALS Environmental. The samples were analyzed for the presence or absence of polychlorobiphenyls (PCBs) using USEPA Method 1668A. Reporting limits were set to correspond to 0.25 - 0.75 ng/L and were adjusted for the amount of sample extracted.

The isotopically-labeled PCB internal standards in the sample extracts were recovered at 40-116%. All of the internal standard recoveries obtained for this project were within the target ranges specified in the method. Since the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery and accurate values were obtained.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to be free of PCB congeners at the reporting limits. This indicates that the sample preparation steps did not significantly contribute to the PCB content determined for the sample material.

Laboratory spike samples were also prepared with the sample batch using reference material that had been fortified with native standards. The results show that the spiked native compounds were recovered at 93-121% with relative percent differences of 0.8-9.2%. These results were within the target ranges for this method. Matrix spikes were not prepared with this extraction batch.

## **REPORT OF LABORATORY ANALYSIS**

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## Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

## REPORT OF LABORATORY ANALYSIS

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Report No.....10371444

# Appendix A

## Sample Management

# ALS Environmental Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

Project Number: K1614351  
 Project Manager: Howard Holmes  
 QAP: LAB QAP

Report No.....10371444\_1668A

Lab Code	Sample ID	# of Cont.	Matrix	Sample			Lab ID	CI Biphen Cong 1668A
				Date	Time	Pace		
K1614351-001	W16K206-1	1	Water	11/22/16	1547	Pace MN	X	001
K1614351-002	W16K206-2	1	Water	11/22/16	1613	Pace MN	X	002

Test Comments  
 CI Biphen Cong - 1668A  
 K1614351-001,2 209 list

Folder Comments:  
 Tier II

*For City of Portland*

<b>Special Instructions/Comments</b> Please provide the electronic (PDF and EDD) report to the following e-mail address: ALKLS.Data@alsglobal.com. <i>Report &amp; Cat PEDD to City of Portland</i> <i>Report, EDD &amp; Invoice to AS Kelso</i> <i>Howard Holmes</i>	<b>Turnaround Requirements</b> RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 STANDARD Requested FAX Date: _____ Requested Report Date: 12/09/16	<b>Report Requirements</b> I. Results Only _____ II. Results + QC Summaries <u>X</u> III. Results + QC and Calibration Summaries _____ IV. Data Validation Report with Raw Data _____ PQL/MDL/J <u>Y</u> EDD <u>Y</u>	<b>Invoice Information</b> PO# 51K1614351 Bill to _____
--	---	---	---

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Inquired By: *Hornith* 11/22/16 0913 Received By: *Al Pace* 11-25-16 950

Airbill Number: 0-200

**Sample Condition Upon Receipt**

Client Name: ALS Env.

Project #: **WO#: 10371444**



10371444

Courier:  Fed Ex  UPS  USPS  Client

Commercial  Pace  Speedee  Other: \_\_\_\_\_

Tracking Number: 6447 9281 7849

Custody Seal on Cooler/Box Present?  Yes  No      Seals Intact?  Yes  No

Optional: Proj. Due Date: \_\_\_\_\_ Proj. Name: \_\_\_\_\_

Packing Material:  Bubble Wrap  Bubble Bags  None  Other: \_\_\_\_\_      Temp Blank?  Yes  No

Thermometer Used:  151401163  151401164  B88A912167504  B88A0143310098      Type of Ice:  Wet  Blue  None  Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.2      Cooler Temp Corrected (°C): 0.2      Biological Tissue Frozen?  Yes  No  N/A

Temp should be above freezing to 6°C      Correction Factor: true      Date and Initials of Person Examining Contents: 11-29-16 AA

USDA Regulated Soil (  N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?  Yes  No      Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)?  Yes  No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name and/or Signature on COC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____	

**CLIENT NOTIFICATION/RESOLUTION**

Field Data Required?  Yes  No

Person Contacted: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Comments/Resolution: \_\_\_\_\_

Project Manager Review: Scott Unze

Date: 11/29/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).



**ALS Environmental**

# PURCHASE ORDER

FOR SUBCONTRACTED ANALYSES

Service Request: K1614351

Date: 11/26/2016  
Contact: Howard Holmes  
Email: howard.holmes@alsglobal.com

Company: Pace Analytical Services  
Address: 1700 Elm Street, Suite 200  
Minneapolis MN, 55414  
Phone: 612.607.1700

Bill To: ALS Environmental  
1317 South 13th Avenue  
Kelso WA, 98626

Ship To: ALS Environmental  
ALKLS.Data@alsglobal.com

Phone: 1-360-577-7222

Phone: 360-501-3364

Item/Description	Quantity	Unit Price
1668A/CI Biphen Cong	2	██████████

*\$650*

Comments:

ALS Group USA, Corp.  
www.alsglobal.com  
An ALS Limited Company

## Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- \* = See Discussion

### REPORT OF LABORATORY ANALYSIS

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Report No.....10371444

# Appendix B

## Sample Analysis Summary



## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1614351-001		
Lab Sample ID	10371444001		
Filename	P161219A_19		
Injected By	BAL		
Total Amount Extracted	980 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	11/22/2016 15:47
ICAL ID	P161219A11	Received	11/29/2016 09:50
CCal Filename(s)	P161219A_10	Extracted	12/01/2016 12:00
Method Blank ID	BLANK-52958	Analyzed	12/20/2016 04:01

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	10.335	3.29	2.0	0.794	40
13C-4-MoCB	3	13.246	3.26	2.0	0.834	42
13C-2,2'-DiCB	4	13.570	1.53	2.0	0.870	43
13C-4,4'-DiCB	15	20.853	1.61	2.0	1.11	56
13C-2,2',6-TrCB	19	17.558	0.99	2.0	1.07	53
13C-3,4,4'-TrCB	37	28.744	1.06	2.0	1.11	55
13C-2,2',6,6'-TeCB	54	21.215	0.83	2.0	0.982	49
13C-3,4,4',5'-TeCB	81	35.943	0.81	2.0	1.26	63
13C-3,3',4,4'-TeCB	77	36.530	0.81	2.0	1.19	60
13C-2,2',4,6,6'-PeCB	104	27.436	1.54	2.0	1.10	55
13C-2,3,3',4,4'-PeCB	105	40.174	1.58	2.0	1.16	58
13C-2,3,4,4',5'-PeCB	114	39.503	1.58	2.0	1.11	56
13C-2,3',4,4',5'-PeCB	118	38.950	1.56	2.0	1.18	59
13C-2,3',4,4',5'-PeCB	123	38.597	1.58	2.0	1.19	60
13C-3,3',4,4',5'-PeCB	126	43.343	1.54	2.0	1.07	54
13C-2,2',4,4',6,6'-HxCB	155	33.528	1.23	2.0	1.20	60
13C-HxCB (156/157)	156/157	46.433	1.27	4.0	2.15	54
13C-2,3',4,4',5,5'-HxCB	167	45.243	1.28	2.0	1.13	56
13C-3,3',4,4',5,5'-HxCB	169	49.720	1.23	2.0	0.959	48
13C-2,2',3,4',5,6,6'-HpCB	188	39.486	1.06	2.0	1.72	86
13C-2,3,3',4,4',5,5'-HpCB	189	52.276	1.00	2.0	1.41	71
13C-2,2',3,3',5,5',6,6'-OxCB	202	45.008	0.91	2.0	1.86	93
13C-2,3,3',4,4',5,5',6-OxCB	205	54.474	0.90	2.0	1.22	61
13C-2,2',3,3',4,4',5,5',6-NoCB	206	56.069	0.83	2.0	1.16	58
13C-2,2',3,3',4,4',5,5',6-NoCB	208	51.823	0.80	2.0	1.49	74
13C--DeCB	209	57.707	0.74	2.0	1.30	65
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	24.334	1.08	2.0	1.41	70
13C-2,3,3',5,5'-PeCB	111	36.563	1.54	2.0	1.29	64
13C-2,2',3,3',5,5',6-HpCB	178	42.622	1.05	2.0	1.47	73
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	16.120	1.51	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	26.363	0.80	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	33.746	1.58	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	42.169	1.28	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	54.065	0.90	2.0	NA	NA

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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1614351-001  
 Lab Sample ID 10371444001  
 Filename P161219A\_19

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.250
2		---	---	ND	---	0.250
3		---	---	ND	---	0.250
4		---	---	ND	---	0.250
5		---	---	ND	---	0.250
6		---	---	ND	---	0.250
7		---	---	ND	---	0.250
8		17.174	1.55	0.506	---	0.250
9		---	---	ND	---	0.250
10		---	---	ND	---	0.250
11		---	---	ND	---	2.45
12	12/13	---	---	ND	---	0.500
13	12/13	---	---	ND	---	0.500
14		---	---	ND	---	0.250
15		20.877	1.47	0.381	---	0.330
16		20.817	0.96	0.440	---	0.250
17		20.314	0.99	0.441	---	0.250
18	18/30	---	---	ND	---	0.500
19		---	---	ND	---	0.250
20	20/28	24.368	1.06	1.63	---	1.29
21	21/33	---	---	ND	---	1.35
22		---	---	ND	---	0.950
23		---	---	ND	---	0.250
24		---	---	ND	---	0.250
25		---	---	ND	---	0.250
26	26/29	---	---	ND	---	0.500
27		---	---	ND	---	0.250
28	20/28	24.368	1.06	(1.63)	---	1.29
29	26/29	---	---	ND	---	0.500
30	18/30	---	---	ND	---	0.500
31		24.015	1.03	1.42	---	1.30
32		21.433	1.02	0.289	---	0.250
33	21/33	---	---	ND	---	1.35
34		---	---	ND	---	0.250
35		---	---	ND	---	0.250
36		---	---	ND	---	0.250
37		28.761	1.00	0.566	---	0.530
38		---	---	ND	---	0.250
39		---	---	ND	---	0.250
40	40/41/71	---	---	ND	---	1.50
41	40/41/71	---	---	ND	---	1.50
42		---	---	ND	---	0.500
43	43/73	---	---	ND	---	0.500
44	44/47/65	---	---	ND	---	1.50
45	45/51	---	---	ND	---	1.00
46		---	---	ND	---	0.500
47	44/47/65	---	---	ND	---	1.50
48		---	---	ND	---	0.500

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1614351-001  
 Lab Sample ID 10371444001  
 Filename P161219A\_19

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.00
50	50/53	---	---	ND	---	1.00
51	45/51	---	---	ND	---	1.00
52		---	---	ND	---	1.54
53	50/53	---	---	ND	---	1.00
54		---	---	ND	---	0.500
55		---	---	ND	---	0.500
56		---	---	ND	---	0.500
57		---	---	ND	---	0.500
58		---	---	ND	---	0.500
59	59/62/75	---	---	ND	---	1.50
60		---	---	ND	---	0.500
61	61/70/74/76	---	---	ND	---	2.00
62	59/62/75	---	---	ND	---	1.50
63		---	---	ND	---	0.500
64		28.844	0.80	0.692	---	0.500
65	44/47/65	---	---	ND	---	1.50
66		---	---	ND	---	0.840
67		---	---	ND	---	0.500
68		---	---	ND	---	0.500
69	49/69	---	---	ND	---	1.00
70	61/70/74/76	---	---	ND	---	2.00
71	40/41/71	---	---	ND	---	1.50
72		---	---	ND	---	0.500
73	43/73	---	---	ND	---	0.500
74	61/70/74/76	---	---	ND	---	2.00
75	59/62/75	---	---	ND	---	1.50
76	61/70/74/76	---	---	ND	---	2.00
77		---	---	ND	---	0.500
78		---	---	ND	---	0.500
79		---	---	ND	---	0.500
80		---	---	ND	---	0.500
81		---	---	ND	---	0.500
82		---	---	ND	---	0.500
83		---	---	ND	---	0.500
84		---	---	ND	---	0.500
85	85/116/117	---	---	ND	---	1.50
86	86/87/97/108/119/125	---	---	ND	---	3.00
87	86/87/97/108/119/125	---	---	ND	---	3.00
88	88/91	---	---	ND	---	1.00
89		---	---	ND	---	0.500
90	90/101/113	---	---	ND	---	1.50
91	88/91	---	---	ND	---	1.00
92		---	---	ND	---	0.500
93	93/98/100/102	---	---	ND	---	2.00
94		---	---	ND	---	0.500
95		30.644	1.53	1.15	---	0.950
96		---	---	ND	---	0.500

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1614351-001  
Lab Sample ID 10371444001  
Filename P161219A\_19

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.00
98	93/98/100/102	---	---	ND	---	2.00
99		34.400	1.67	0.511	---	0.500
100	93/98/100/102	---	---	ND	---	2.00
101	90/101/113	---	---	ND	---	1.50
102	93/98/100/102	---	---	ND	---	2.00
103		---	---	ND	---	0.500
104		---	---	ND	---	0.500
105		40.190	1.49	0.655	---	0.500
106		---	---	ND	---	0.500
107	107/124	---	---	ND	---	1.00
108	86/87/97/108/119/125	---	---	ND	---	3.00
109		---	---	ND	---	0.500
110	110/115	35.842	1.49	1.93	---	1.00
111		---	---	ND	---	0.500
112		---	---	ND	---	0.500
113	90/101/113	---	---	ND	---	1.50
114		---	---	ND	---	0.500
115	110/115	35.842	1.49	(1.93)	---	1.00
116	85/116/117	---	---	ND	---	1.50
117	85/116/117	---	---	ND	---	1.50
118		38.966	1.49	1.43	---	0.640
119	86/87/97/108/119/125	---	---	ND	---	3.00
120		---	---	ND	---	0.500
121		---	---	ND	---	0.500
122		---	---	ND	---	0.500
123		---	---	ND	---	0.500
124	107/124	---	---	ND	---	1.00
125	86/87/97/108/119/125	---	---	ND	---	3.00
126		---	---	ND	---	0.500
127		---	---	ND	---	0.500
128	128/166	---	---	ND	---	1.00
129	129/138/163	42.186	1.27	3.15	---	1.50
130		---	---	ND	---	0.500
131		---	---	ND	---	0.500
132		39.084	1.27	1.02	---	0.500
133		---	---	ND	---	0.500
134	134/143	---	---	ND	---	1.00
135	135/151	---	---	ND	---	1.00
136		---	---	ND	---	0.500
137		---	---	ND	---	0.500
138	129/138/163	42.186	1.27	(3.15)	---	1.50
139	139/140	---	---	ND	---	1.00
140	139/140	---	---	ND	---	1.00
141		41.112	1.18	0.690	---	0.500
142		---	---	ND	---	0.500
143	134/143	---	---	ND	---	1.00
144		---	---	ND	---	0.500

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1614351-001  
 Lab Sample ID 10371444001  
 Filename P161219A\_19

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.500
146		---	---	ND	---	0.500
147	147/149	37.776	1.24	2.25	---	1.00
148		---	---	ND	---	0.500
149	147/149	37.776	1.24	(2.25)	---	1.00
150		---	---	ND	---	0.500
151	135/151	---	---	ND	---	1.00
152		---	---	ND	---	0.500
153	153/168	40.911	1.21	2.47	---	1.00
154		---	---	ND	---	0.500
155		---	---	ND	---	0.500
156	156/157	---	---	ND	---	1.00
157	156/157	---	---	ND	---	1.00
158		---	---	ND	---	0.500
159		---	---	ND	---	0.500
160		---	---	ND	---	0.500
161		---	---	ND	---	0.500
162		---	---	ND	---	0.500
163	129/138/163	42.186	1.27	(3.15)	---	1.50
164		---	---	ND	---	0.500
165		---	---	ND	---	0.500
166	128/166	---	---	ND	---	1.00
167		---	---	ND	---	0.500
168	153/168	40.911	1.21	(2.47)	---	1.00
169		---	---	ND	---	0.500
170		49.150	1.01	0.973	---	0.500
171	171/173	---	---	ND	---	1.00
172		---	---	ND	---	0.500
173	171/173	---	---	ND	---	1.00
174		44.455	1.10	1.16	---	0.500
175		---	---	ND	---	0.500
176		---	---	ND	---	0.500
177		44.907	1.07	0.635	---	0.500
178		---	---	ND	---	0.500
179		---	---	ND	---	0.500
180	180/193	47.875	1.05	2.45	---	1.00
181		---	---	ND	---	0.500
182		---	---	ND	---	0.500
183	183/185	---	---	ND	---	1.00
184		---	---	ND	---	0.500
185	183/185	---	---	ND	---	1.00
186		---	---	ND	---	0.500
187		43.577	1.07	1.42	---	0.500
188		---	---	ND	---	0.500
189		---	---	ND	---	0.500
190		---	---	ND	---	0.500
191		---	---	ND	---	0.500
192		---	---	ND	---	0.500

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1614351-001  
 Lab Sample ID        10371444001  
 Filename                P161219A\_19

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	47.875	1.05	(2.45)	---	1.00
194		---	---	ND	---	0.750
195		---	---	ND	---	0.750
196		---	---	ND	---	0.750
197	197/200	---	---	ND	---	1.50
198	198/199	---	---	ND	---	1.50
199	198/199	---	---	ND	---	1.50
200	197/200	---	---	ND	---	1.50
201		---	---	ND	---	0.750
202		---	---	ND	---	0.750
203		---	---	ND	---	0.750
204		---	---	ND	---	0.750
205		---	---	ND	---	0.750
206		---	---	ND	---	0.750
207		---	---	ND	---	0.750
208		---	---	ND	---	0.750
209		---	---	ND	---	0.750

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1614351-001  
Lab Sample ID             10371444001  
Filename                    P161219A\_19

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	0.887
Total Trichloro Biphenyls	4.79
Total Tetrachloro Biphenyls	0.692
Total Pentachloro Biphenyls	5.67
Total Hexachloro Biphenyls	9.58
Total Heptachloro Biphenyls	6.65
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	28.3

ND = Not Detected

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## Method 1668A Polychlorobiphenyl Sample Analysis Results

Client - ALS Environmental

Client's Sample ID	K1614351-002		
Lab Sample ID	10371444002		
Filename	P161219A_20		
Injected By	BAL		
Total Amount Extracted	942 mL	Matrix	Water
% Moisture	NA	Dilution	5
Dry Weight Extracted	NA	Collected	11/22/2016 16:13
ICAL ID	P161219A11	Received	11/29/2016 09:50
CCal Filename(s)	P161219A_10	Extracted	12/01/2016 12:00
Method Blank ID	BLANK-52958	Analyzed	12/20/2016 05:03

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
<b>Labeled Analytes</b>						
13C-2-MoCB	1	10.323	3.11	2.0	1.14	57
13C-4-MoCB	3	13.246	3.28	2.0	1.27	63
13C-2,2'-DiCB	4	13.569	1.52	2.0	1.32	66
13C-4,4'-DiCB	15	20.840	1.62	2.0	1.49	75
13C-2,2',6-TrCB	19	17.509	0.98	2.0	1.49	75
13C-3,4,4'-TrCB	37	28.760	1.07	2.0	1.37	68
13C-2,2',6,6'-TeCB	54	21.197	0.77	2.0	1.20	60
13C-3,4,4',5'-TeCB	81	35.942	0.77	2.0	1.44	72
13C-3,3',4,4'-TeCB	77	36.529	0.78	2.0	1.35	68
13C-2,2',4,6,6'-PeCB	104	27.419	1.57	2.0	1.36	68
13C-2,3,3',4,4'-PeCB	105	40.173	1.57	2.0	1.40	70
13C-2,3,4,4',5'-PeCB	114	39.519	1.53	2.0	1.35	67
13C-2,3',4,4',5'-PeCB	118	38.949	1.60	2.0	1.43	71
13C-2,3',4,4',5'-PeCB	123	38.613	1.56	2.0	1.44	72
13C-3,3',4,4',5'-PeCB	126	43.342	1.57	2.0	1.26	63
13C-2,2',4,4',6,6'-HxCB	155	33.544	1.24	2.0	1.58	79
13C-HxCB (156/157)	156/157	46.433	1.25	4.0	2.62	66
13C-2,3',4,4',5,5'-HxCB	167	45.259	1.26	2.0	1.37	68
13C-3,3',4,4',5,5'-HxCB	169	49.736	1.25	2.0	1.15	58
13C-2,2',3,4',5,6,6'-HpCB	188	39.502	1.06	2.0	2.22	111
13C-2,3,3',4,4',5,5'-HpCB	189	52.276	1.09	2.0	1.76	88
13C-2,2',3,3',5,5',6,6'-OxCB	202	45.008	0.90	2.0	2.33	116
13C-2,3,3',4,4',5,5',6-OxCB	205	54.474	0.91	2.0	1.46	73
13C-2,2',3,3',4,4',5,5',6-NoCB	206	56.069	0.81	2.0	1.44	72
13C-2,2',3,3',4,4',5,5',6-NoCB	208	51.823	0.80	2.0	1.82	91
13C--DeCB	209	57.707	0.70	2.0	1.59	79
<b>Cleanup Standards</b>						
13C-2,4,4'-TrCB	28	24.333	1.06	2.0	1.45	73
13C-2,3,3',5,5'-PeCB	111	36.563	1.60	2.0	1.36	68
13C-2,2',3,3',5,5',6-HpCB	178	42.621	1.06	2.0	1.57	79
<b>Recovery Standards</b>						
13C-2,5-DiCB	9	16.107	1.56	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	26.362	0.81	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	33.745	1.62	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	42.168	1.29	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OxCB	194	54.064	0.92	2.0	NA	NA

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
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## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1614351-002  
 Lab Sample ID 10371444002  
 Filename P161219A\_20

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		---	---	ND	---	0.250
2		---	---	ND	---	0.250
3		---	---	ND	---	0.250
4		---	---	ND	---	0.250
5		---	---	ND	---	0.250
6		---	---	ND	---	0.250
7		---	---	ND	---	0.250
8		---	---	ND	---	0.250
9		---	---	ND	---	0.250
10		---	---	ND	---	0.250
11		---	---	ND	---	2.45
12	12/13	---	---	ND	---	0.500
13	12/13	---	---	ND	---	0.500
14		---	---	ND	---	0.250
15		---	---	ND	---	0.330
16		---	---	ND	---	0.250
17		---	---	ND	---	0.250
18	18/30	---	---	ND	---	0.500
19		---	---	ND	---	0.250
20	20/28	---	---	ND	---	1.29
21	21/33	---	---	ND	---	1.35
22		---	---	ND	---	0.950
23		---	---	ND	---	0.250
24		---	---	ND	---	0.250
25		---	---	ND	---	0.250
26	26/29	---	---	ND	---	0.500
27		---	---	ND	---	0.250
28	20/28	---	---	ND	---	1.29
29	26/29	---	---	ND	---	0.500
30	18/30	---	---	ND	---	0.500
31		---	---	ND	---	1.30
32		---	---	ND	---	0.250
33	21/33	---	---	ND	---	1.35
34		---	---	ND	---	0.250
35		---	---	ND	---	0.250
36		---	---	ND	---	0.250
37		---	---	ND	---	0.530
38		---	---	ND	---	0.250
39		---	---	ND	---	0.250
40	40/41/71	---	---	ND	---	1.50
41	40/41/71	---	---	ND	---	1.50
42		---	---	ND	---	0.500
43	43/73	---	---	ND	---	0.500
44	44/47/65	---	---	ND	---	1.50
45	45/51	---	---	ND	---	1.00
46		---	---	ND	---	0.500
47	44/47/65	---	---	ND	---	1.50
48		---	---	ND	---	0.500

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
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**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID K1614351-002  
Lab Sample ID 10371444002  
Filename P161219A\_20

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
49	49/69	---	---	ND	---	1.00
50	50/53	---	---	ND	---	1.00
51	45/51	---	---	ND	---	1.00
52		---	---	ND	---	1.54
53	50/53	---	---	ND	---	1.00
54		---	---	ND	---	0.500
55		---	---	ND	---	0.500
56		---	---	ND	---	0.500
57		---	---	ND	---	0.500
58		---	---	ND	---	0.500
59	59/62/75	---	---	ND	---	1.50
60		---	---	ND	---	0.500
61	61/70/74/76	---	---	ND	---	2.00
62	59/62/75	---	---	ND	---	1.50
63		---	---	ND	---	0.500
64		28.844	0.78	0.628	---	0.500
65	44/47/65	---	---	ND	---	1.50
66		---	---	ND	---	0.840
67		---	---	ND	---	0.500
68		---	---	ND	---	0.500
69	49/69	---	---	ND	---	1.00
70	61/70/74/76	---	---	ND	---	2.00
71	40/41/71	---	---	ND	---	1.50
72		---	---	ND	---	0.500
73	43/73	---	---	ND	---	0.500
74	61/70/74/76	---	---	ND	---	2.00
75	59/62/75	---	---	ND	---	1.50
76	61/70/74/76	---	---	ND	---	2.00
77		---	---	ND	---	0.500
78		---	---	ND	---	0.500
79		---	---	ND	---	0.500
80		---	---	ND	---	0.500
81		---	---	ND	---	0.500
82		---	---	ND	---	0.500
83		---	---	ND	---	0.500
84		---	---	ND	---	0.500
85	85/116/117	---	---	ND	---	1.50
86	86/87/97/108/119/125	---	---	ND	---	3.00
87	86/87/97/108/119/125	---	---	ND	---	3.00
88	88/91	---	---	ND	---	1.00
89		---	---	ND	---	0.500
90	90/101/113	---	---	ND	---	1.50
91	88/91	---	---	ND	---	1.00
92		---	---	ND	---	0.500
93	93/98/100/102	---	---	ND	---	2.00
94		---	---	ND	---	0.500
95		30.643	1.59	1.01	---	0.950
96		---	---	ND	---	0.500

Conc = Concentration  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

Client Sample ID           K1614351-002  
Lab Sample ID             10371444002  
Filename                    P161219A\_20

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
97	86/87/97/108/119/125	---	---	ND	---	3.00
98	93/98/100/102	---	---	ND	---	2.00
99		34.399	1.55	0.633	---	0.500
100	93/98/100/102	---	---	ND	---	2.00
101	90/101/113	---	---	ND	---	1.50
102	93/98/100/102	---	---	ND	---	2.00
103		---	---	ND	---	0.500
104		---	---	ND	---	0.500
105		40.190	1.46	0.784	---	0.500
106		---	---	ND	---	0.500
107	107/124	---	---	ND	---	1.00
108	86/87/97/108/119/125	---	---	ND	---	3.00
109		---	---	ND	---	0.500
110	110/115	35.858	1.56	1.94	---	1.00
111		---	---	ND	---	0.500
112		---	---	ND	---	0.500
113	90/101/113	---	---	ND	---	1.50
114		---	---	ND	---	0.500
115	110/115	35.858	1.56	(1.94)	---	1.00
116	85/116/117	---	---	ND	---	1.50
117	85/116/117	---	---	ND	---	1.50
118		38.982	1.51	1.63	---	0.640
119	86/87/97/108/119/125	---	---	ND	---	3.00
120		---	---	ND	---	0.500
121		---	---	ND	---	0.500
122		---	---	ND	---	0.500
123		---	---	ND	---	0.500
124	107/124	---	---	ND	---	1.00
125	86/87/97/108/119/125	---	---	ND	---	3.00
126		---	---	ND	---	0.500
127		---	---	ND	---	0.500
128	128/166	---	---	ND	---	1.00
129	129/138/163	42.202	1.23	2.39	---	1.50
130		---	---	ND	---	0.500
131		---	---	ND	---	0.500
132		39.100	1.16	0.836	---	0.500
133		---	---	ND	---	0.500
134	134/143	---	---	ND	---	1.00
135	135/151	---	---	ND	---	1.00
136		---	---	ND	---	0.500
137		---	---	ND	---	0.500
138	129/138/163	42.202	1.23	(2.39)	---	1.50
139	139/140	---	---	ND	---	1.00
140	139/140	---	---	ND	---	1.00
141		---	---	ND	---	0.500
142		---	---	ND	---	0.500
143	134/143	---	---	ND	---	1.00
144		---	---	ND	---	0.500

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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID K1614351-002  
 Lab Sample ID 10371444002  
 Filename P161219A\_20

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
145		---	---	ND	---	0.500
146		---	---	ND	---	0.500
147	147/149	37.775	1.22	1.49	---	1.00
148		---	---	ND	---	0.500
149	147/149	37.775	1.22	(1.49)	---	1.00
150		---	---	ND	---	0.500
151	135/151	---	---	ND	---	1.00
152		---	---	ND	---	0.500
153	153/168	40.911	1.22	1.69	---	1.00
154		---	---	ND	---	0.500
155		---	---	ND	---	0.500
156	156/157	---	---	ND	---	1.00
157	156/157	---	---	ND	---	1.00
158		---	---	ND	---	0.500
159		---	---	ND	---	0.500
160		---	---	ND	---	0.500
161		---	---	ND	---	0.500
162		---	---	ND	---	0.500
163	129/138/163	42.202	1.23	(2.39)	---	1.50
164		---	---	ND	---	0.500
165		---	---	ND	---	0.500
166	128/166	---	---	ND	---	1.00
167		---	---	ND	---	0.500
168	153/168	40.911	1.22	(1.69)	---	1.00
169		---	---	ND	---	0.500
170		---	---	ND	---	0.500
171	171/173	---	---	ND	---	1.00
172		---	---	ND	---	0.500
173	171/173	---	---	ND	---	1.00
174		44.454	1.04	0.628	---	0.500
175		---	---	ND	---	0.500
176		---	---	ND	---	0.500
177		---	---	ND	---	0.500
178		---	---	ND	---	0.500
179		---	---	ND	---	0.500
180	180/193	47.875	1.04	1.27	---	1.00
181		---	---	ND	---	0.500
182		---	---	ND	---	0.500
183	183/185	---	---	ND	---	1.00
184		---	---	ND	---	0.500
185	183/185	---	---	ND	---	1.00
186		---	---	ND	---	0.500
187		43.577	1.08	0.790	---	0.500
188		---	---	ND	---	0.500
189		---	---	ND	---	0.500
190		---	---	ND	---	0.500
191		---	---	ND	---	0.500
192		---	---	ND	---	0.500

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
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**Method 1668A Polychlorobiphenyl  
 Sample Analysis Results**

Client Sample ID      K1614351-002  
 Lab Sample ID        10371444002  
 Filename                P161219A\_20

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
193	180/193	47.875	1.04	(1.27)	---	1.00
194		---	---	ND	---	0.750
195		---	---	ND	---	0.750
196		---	---	ND	---	0.750
197	197/200	---	---	ND	---	1.50
198	198/199	---	---	ND	---	1.50
199	198/199	---	---	ND	---	1.50
200	197/200	---	---	ND	---	1.50
201		---	---	ND	---	0.750
202		---	---	ND	---	0.750
203		---	---	ND	---	0.750
204		---	---	ND	---	0.750
205		---	---	ND	---	0.750
206		---	---	ND	---	0.750
207		---	---	ND	---	0.750
208		---	---	ND	---	0.750
209		---	---	ND	---	0.750

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 Nn = Value obtained from additional analyses

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 NC = Not Calculated  
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**Method 1668A Polychlorobiphenyl  
Sample Analysis Results**

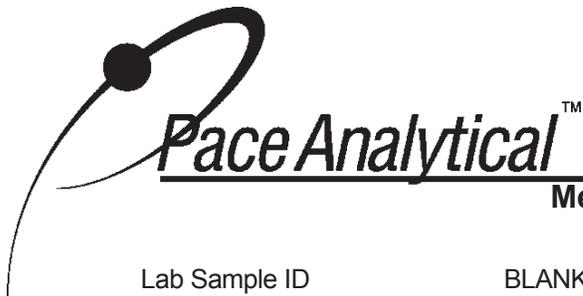
Client Sample ID           K1614351-002  
Lab Sample ID             10371444002  
Filename                    P161219A\_20

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	0.628
Total Pentachloro Biphenyls	6.00
Total Hexachloro Biphenyls	6.40
Total Heptachloro Biphenyls	2.69
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	15.7

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID	BLANK-52958	Matrix	Water
Filename	P161211B_06	Extracted	12/01/2016 12:00
Injected By	BAL	Analyzed	12/11/2016 17:07
Total Amount Extracted	1030 mL	Dilution	5
ICAL ID	P161211B02		
CCal Filename(s)	P161211B_01		

PCB Isomer	IUPAC	RT	Ratio	ng's Added	ng's Found	% Recovery
------------	-------	----	-------	------------	------------	------------

Labeled Analytes

13C-2-MoCB	1	8.885	3.37	2.0	0.896	45
13C-4-MoCB	3	11.604	3.17	2.0	0.985	49
13C-2,2'-DiCB	4	11.868	1.69	2.0	0.937	47
13C-4,4'-DiCB	15	18.852	1.64	2.0	1.02	51
13C-2,2',6-TrCB	19	15.581	1.03	2.0	1.08	54
13C-3,4,4'-TrCB	37	26.542	1.08	2.0	1.18	59
13C-2,2',6,6'-TeCB	54	19.097	0.78	2.0	1.03	51
13C-3,4,4',5-TeCB	81	33.624	0.81	2.0	1.47	73
13C-3,3',4,4'-TeCB	77	34.211	0.79	2.0	1.48	74
13C-2,2',4,6,6'-PeCB	104	25.150	1.59	2.0	0.914	46
13C-2,3,3',4,4'-PeCB	105	37.771	1.62	2.0	1.33	66
13C-2,3,4,4',5-PeCB	114	37.100	1.61	2.0	1.42	71
13C-2,3',4,4',5-PeCB	118	36.564	1.60	2.0	1.35	68
13C-2,3',4,4',5'-PeCB	123	36.228	1.55	2.0	1.39	70
13C-3,3',4,4',5-PeCB	126	40.957	1.62	2.0	1.44	72
13C-2,2',4,4',6,6'-HxCB	155	31.159	1.27	2.0	1.10	55
13C-HxCB (156/157)	156/157	43.981	1.24	4.0	2.74	68
13C-2,3',4,4',5,5'-HxCB	167	42.807	1.26	2.0	1.37	69
13C-3,3',4,4',5,5'-HxCB	169	47.301	1.31	2.0	1.32	66
13C-2,2',3,4',5,6,6'-HpCB	188	37.050	1.03	2.0	1.04	52
13C-2,3,3',4,4',5,5'-HpCB	189	49.810	1.05	2.0	1.33	67
13C-2,2',3,3',5,5',6,6'-OoCB	202	42.506	0.91	2.0	1.17	59
13C-2,3,3',4,4',5,5',6-OoCB	205	52.375	0.86	2.0	1.28	64
13C-2,2',3,3',4,4',5,5',6-NoCB	206	54.099	0.79	2.0	1.11	55
13C-2,2',3,3',4,5,5',6,6'-NoCB	208	49.271	0.81	2.0	1.22	61
13C-DeCB	209	55.673	0.68	2.0	1.20	60

Cleanup Standards

13C-2,4,4'-TrCB	28	22.182	1.06	2.0	1.56	78
13C-2,3,3',5,5'-PeCB	111	34.194	1.57	2.0	1.40	70
13C-2,2',3,3',5,5',6-HpCB	178	40.169	1.09	2.0	1.42	71

Recovery Standards

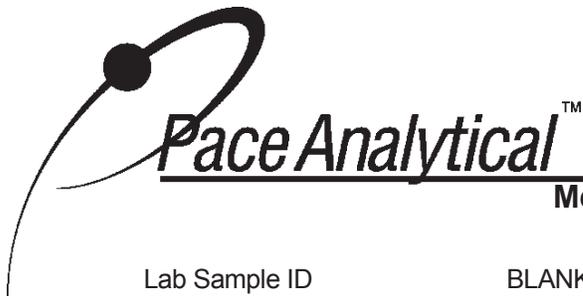
13C-2,5-DiCB	9	14.263	1.57	2.0	NA	NA
13C-2,2',5,5'-TeCB	52	24.161	0.76	2.0	NA	NA
13C-2,2',4,5,5'-PeCB	101	31.393	1.59	2.0	NA	NA
13C-2,2',3,4,4',5'-HxCB	138	39.716	1.26	2.0	NA	NA
13C-2,2',3,3',4,4',5,5'-OoCB	194	51.901	0.93	2.0	NA	NA

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52958  
 Filename P161211B\_06

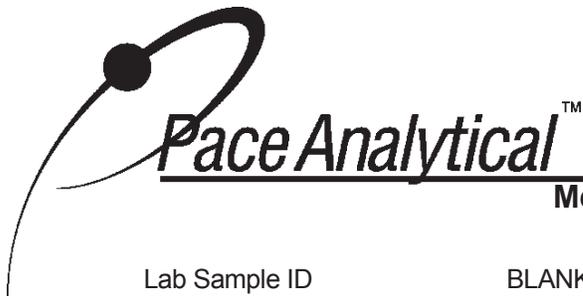
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
1		--	--	ND	--	0.242
2		--	--	ND	--	0.242
3		--	--	ND	--	0.242
4		--	--	ND	--	0.242
5		--	--	ND	--	0.242
6		--	--	ND	--	0.242
7		--	--	ND	--	0.242
8		--	--	ND	--	0.242
9		--	--	ND	--	0.242
10		--	--	ND	--	0.242
11		--	--	ND	--	2.37
12	12/13	--	--	ND	--	0.485
13	12/13	--	--	ND	--	0.485
14		--	--	ND	--	0.242
15		--	--	ND	--	0.242
16		--	--	ND	--	0.242
17		--	--	ND	--	0.242
18	18/30	--	--	ND	--	0.485
19		--	--	ND	--	0.242
20	20/28	--	--	ND	--	1.25
21	21/33	--	--	ND	--	1.31
22		--	--	ND	--	0.921
23		--	--	ND	--	0.242
24		--	--	ND	--	0.242
25		--	--	ND	--	0.242
26	26/29	--	--	ND	--	0.485
27		--	--	ND	--	0.242
28	20/28	--	--	ND	--	1.25
29	26/29	--	--	ND	--	0.485
30	18/30	--	--	ND	--	0.485
31		--	--	ND	--	1.26
32		--	--	ND	--	0.242
33	21/33	--	--	ND	--	1.31
34		--	--	ND	--	0.242
35		--	--	ND	--	0.242
36		--	--	ND	--	0.242
37		--	--	ND	--	0.514
38		--	--	ND	--	0.242
39		--	--	ND	--	0.242
40	40/41/71	--	--	ND	--	1.45
41	40/41/71	--	--	ND	--	1.45
42		--	--	ND	--	0.485
43	43/73	--	--	ND	--	0.485
44	44/47/65	--	--	ND	--	1.45
45	45/51	--	--	ND	--	0.969

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 X = Outside QC Limits  
 RT = Retention Time  
 I = Interference

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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52958  
 Filename P161211B\_06

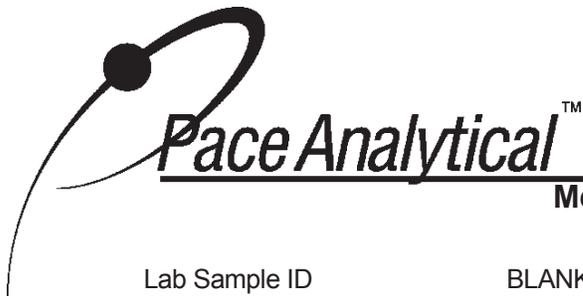
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
46		--	--	ND	--	0.485
47	44/47/65	--	--	ND	--	1.45
48		--	--	ND	--	0.485
49	49/69	--	--	ND	--	0.969
50	50/53	--	--	ND	--	0.969
51	45/51	--	--	ND	--	0.969
52		--	--	ND	--	1.49
53	50/53	--	--	ND	--	0.969
54		--	--	ND	--	0.485
55		--	--	ND	--	0.485
56		--	--	ND	--	0.485
57		--	--	ND	--	0.485
58		--	--	ND	--	0.485
59	59/62/75	--	--	ND	--	1.45
60		--	--	ND	--	0.485
61	61/70/74/76	--	--	ND	--	1.94
62	59/62/75	--	--	ND	--	1.45
63		--	--	ND	--	0.485
64		--	--	ND	--	0.485
65	44/47/65	--	--	ND	--	1.45
66		--	--	ND	--	0.814
67		--	--	ND	--	0.485
68		--	--	ND	--	0.485
69	49/69	--	--	ND	--	0.969
70	61/70/74/76	--	--	ND	--	1.94
71	40/41/71	--	--	ND	--	1.45
72		--	--	ND	--	0.485
73	43/73	--	--	ND	--	0.485
74	61/70/74/76	--	--	ND	--	1.94
75	59/62/75	--	--	ND	--	1.45
76	61/70/74/76	--	--	ND	--	1.94
77		--	--	ND	--	0.485
78		--	--	ND	--	0.485
79		--	--	ND	--	0.485
80		--	--	ND	--	0.485
81		--	--	ND	--	0.485
82		--	--	ND	--	0.485
83		--	--	ND	--	0.485
84		--	--	ND	--	0.485
85	85/116/117	--	--	ND	--	1.45
86	86/87/97/108/119/125	--	--	ND	--	2.91
87	86/87/97/108/119/125	--	--	ND	--	2.91
88	88/91	--	--	ND	--	0.969
89		--	--	ND	--	0.485
90	90/101/113	--	--	ND	--	1.45

Conc = Concentration  
 EML = Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
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 R = Recovery outside of Method 1668A control limits  
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 NC = Not Calculated  
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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Lab Sample ID BLANK-52958  
Filename P161211B\_06

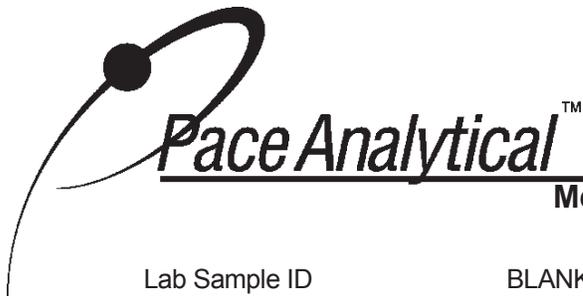
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
91	88/91	--	--	ND	--	0.969
92		--	--	ND	--	0.485
93	93/98/100/102	--	--	ND	--	1.94
94		--	--	ND	--	0.485
95		--	--	ND	--	0.921
96		--	--	ND	--	0.485
97	86/87/97/108/119/125	--	--	ND	--	2.91
98	93/98/100/102	--	--	ND	--	1.94
99		--	--	ND	--	0.485
100	93/98/100/102	--	--	ND	--	1.94
101	90/101/113	--	--	ND	--	1.45
102	93/98/100/102	--	--	ND	--	1.94
103		--	--	ND	--	0.485
104		--	--	ND	--	0.485
105		--	--	ND	--	0.485
106		--	--	ND	--	0.485
107	107/124	--	--	ND	--	0.969
108	86/87/97/108/119/125	--	--	ND	--	2.91
109		--	--	ND	--	0.485
110	110/115	--	--	ND	--	0.969
111		--	--	ND	--	0.485
112		--	--	ND	--	0.485
113	90/101/113	--	--	ND	--	1.45
114		--	--	ND	--	0.485
115	110/115	--	--	ND	--	0.969
116	85/116/117	--	--	ND	--	1.45
117	85/116/117	--	--	ND	--	1.45
118		--	--	ND	--	0.620
119	86/87/97/108/119/125	--	--	ND	--	2.91
120		--	--	ND	--	0.485
121		--	--	ND	--	0.485
122		--	--	ND	--	0.485
123		--	--	ND	--	0.485
124	107/124	--	--	ND	--	0.969
125	86/87/97/108/119/125	--	--	ND	--	2.91
126		--	--	ND	--	0.485
127		--	--	ND	--	0.485
128	128/166	--	--	ND	--	0.969
129	129/138/163	--	--	ND	--	1.45
130		--	--	ND	--	0.485
131		--	--	ND	--	0.485
132		--	--	ND	--	0.485
133		--	--	ND	--	0.485
134	134/143	--	--	ND	--	0.969
135	135/151	--	--	ND	--	0.969

Conc = Concentration  
EML =Method Specified Reporting Limit (1668A)  
EMPC = Estimated Maximum Possible Concentration  
A = Limit of Detection based on signal to noise  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52958  
 Filename P161211B\_06

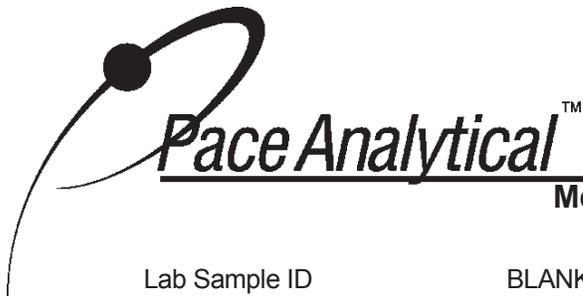
IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
136		--	--	ND	--	0.485
137		--	--	ND	--	0.485
138	129/138/163	--	--	ND	--	1.45
139	139/140	--	--	ND	--	0.969
140	139/140	--	--	ND	--	0.969
141		--	--	ND	--	0.485
142		--	--	ND	--	0.485
143	134/143	--	--	ND	--	0.969
144		--	--	ND	--	0.485
145		--	--	ND	--	0.485
146		--	--	ND	--	0.485
147	147/149	--	--	ND	--	0.969
148		--	--	ND	--	0.485
149	147/149	--	--	ND	--	0.969
150		--	--	ND	--	0.485
151	135/151	--	--	ND	--	0.969
152		--	--	ND	--	0.485
153	153/168	--	--	ND	--	0.969
154		--	--	ND	--	0.485
155		--	--	ND	--	0.485
156	156/157	--	--	ND	--	0.969
157	156/157	--	--	ND	--	0.969
158		--	--	ND	--	0.485
159		--	--	ND	--	0.485
160		--	--	ND	--	0.485
161		--	--	ND	--	0.485
162		--	--	ND	--	0.485
163	129/138/163	--	--	ND	--	1.45
164		--	--	ND	--	0.485
165		--	--	ND	--	0.485
166	128/166	--	--	ND	--	0.969
167		--	--	ND	--	0.485
168	153/168	--	--	ND	--	0.969
169		--	--	ND	--	0.485
170		--	--	ND	--	0.485
171	171/173	--	--	ND	--	0.969
172		--	--	ND	--	0.485
173	171/173	--	--	ND	--	0.969
174		--	--	ND	--	0.485
175		--	--	ND	--	0.485
176		--	--	ND	--	0.485
177		--	--	ND	--	0.485
178		--	--	ND	--	0.485
179		--	--	ND	--	0.485
180	180/193	--	--	ND	--	0.969

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

ND = Not Detected  
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 NC = Not Calculated  
 \* = See Discussion  
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**Method 1668A Polychlorobiphenyl  
 Blank Analysis Results**

Lab Sample ID BLANK-52958  
 Filename P161211B\_06

IUPAC	Co-elutions	RT	Ratio	Concentration ng/L	EMPC ng/L	EML ng/L
181		--	--	ND	--	0.485
182		--	--	ND	--	0.485
183	183/185	--	--	ND	--	0.969
184		--	--	ND	--	0.485
185	183/185	--	--	ND	--	0.969
186		--	--	ND	--	0.485
187		--	--	ND	--	0.485
188		--	--	ND	--	0.485
189		--	--	ND	--	0.485
190		--	--	ND	--	0.485
191		--	--	ND	--	0.485
192		--	--	ND	--	0.485
193	180/193	--	--	ND	--	0.969
194		--	--	ND	--	0.727
195		--	--	ND	--	0.727
196		--	--	ND	--	0.727
197	197/200	--	--	ND	--	1.45
198	198/199	--	--	ND	--	1.45
199	198/199	--	--	ND	--	1.45
200	197/200	--	--	ND	--	1.45
201		--	--	ND	--	0.727
202		--	--	ND	--	0.727
203		--	--	ND	--	0.727
204		--	--	ND	--	0.727
205		--	--	ND	--	0.727
206		--	--	ND	--	0.727
207		--	--	ND	--	0.727
208		--	--	ND	--	0.727
209		--	--	ND	--	0.727

Conc = Concentration  
 EML =Method Specified Reporting Limit (1668A)  
 EMPC = Estimated Maximum Possible Concentration  
 A = Limit of Detection based on signal to noise  
 B = Less than 10 times higher than method blank level  
 R = Recovery outside of Method 1668A control limits  
 ng/L = Nanograms per liter

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**Method 1668A Polychlorobiphenyl  
Blank Analysis Results**

Client Sample ID            CBLKYP  
Lab Sample ID              BLANK-52958  
Filename                     P161211B\_06

<b>Congener Group</b>	<b>Concentration ng/L</b>
Total Monochloro Biphenyls	ND
Total Dichloro Biphenyls	ND
Total Trichloro Biphenyls	ND
Total Tetrachloro Biphenyls	ND
Total Pentachloro Biphenyls	ND
Total Hexachloro Biphenyls	ND
Total Heptachloro Biphenyls	ND
Total Octachloro Biphenyls	ND
Total Nonachloro Biphenyls	ND
Decachloro Biphenyls	ND
Total PCBs	ND

ND = Not Detected

**REPORT OF LABORATORY ANALYSIS**

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### Method 1668A Polychlorobiphenyls Laboratory Control Spike Analysis Results

Lab Sample ID	LCS-52959	Matrix	Water
Filename	P161211B_11	Dilution	5
Total Amount Extracted	1040 mL	Extracted	12/01/2016 12:00
ICAL ID	P161211B02	Analyzed	12/11/2016 22:08
CCal Filename(s)	P161211B_01	Injected By	BAL
Method Blank ID	BLANK-52958		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.13	113	2.0	1.17	58
3	1.0	1.05	105	2.0	1.15	58
4	1.0	1.04	104	2.0	1.13	56
15	1.0	1.17	117	2.0	1.17	59
19	1.0	1.07	107	2.0	1.26	63
37	1.0	1.09	109	2.0	1.34	67
54	1.0	1.14	114	2.0	1.18	59
81	1.0	1.02	102	2.0	1.59	80
77	1.0	1.00	100	2.0	1.53	76
104	1.0	1.18	118	2.0	1.05	53
105	1.0	1.10	110	2.0	1.45	73
114	1.0	1.08	108	2.0	1.50	75
118	1.0	1.16	116	2.0	1.45	73
123	1.0	1.09	109	2.0	1.45	73
126	1.0	1.09	109	2.0	1.49	74
155	1.0	1.14	114	2.0	1.21	61
156/157	2.0	2.27	113	4.0	2.99	75
167	1.0	1.11	111	2.0	1.54	77
169	1.0	1.15	115	2.0	1.51	75
188	1.0	1.20	120	2.0	1.12	56
189	1.0	1.08	108	2.0	1.41	70
202	1.0	1.09	109	2.0	1.34	67
205	1.0	1.05	105	2.0	1.37	69
206	1.0	1.13	113	2.0	1.21	61
208	1.0	1.08	108	2.0	1.30	65
209	1.0	0.932	93	2.0	1.35	67

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
 NA = Not Applicable  
 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
 I = Interference

## REPORT OF LABORATORY ANALYSIS

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**Method 1668A Polychlorobiphenyls  
Laboratory Control Spike Analysis Results**

Lab Sample ID	LCSD-52960	Matrix	Water
Filename	P161211B_12	Dilution	5
Total Amount Extracted	1000 mL	Extracted	12/01/2016 12:00
ICAL ID	P161211B02	Analyzed	12/11/2016 23:08
CCal Filename(s)	P161211B_01	Injected By	BAL
Method Blank ID	BLANK-52958		

PCB Isomer	Native Analytes			Labeled Analytes		
	Spiked (ng)	Found (ng)	% Recovery	Spiked (ng)	Found (ng)	% Recovery
1	1.0	1.08	108	2.0	1.19	60
3	1.0	1.15	115	2.0	1.20	60
4	1.0	1.14	114	2.0	1.15	57
15	1.0	1.08	108	2.0	1.25	63
19	1.0	1.05	105	2.0	1.29	64
37	1.0	1.11	111	2.0	1.39	70
54	1.0	1.06	106	2.0	1.21	60
81	1.0	1.04	104	2.0	1.73	87
77	1.0	1.06	106	2.0	1.71	86
104	1.0	1.13	113	2.0	1.13	57
105	1.0	1.09	109	2.0	1.55	78
114	1.0	1.11	111	2.0	1.71	85
118	1.0	1.07	107	2.0	1.67	83
123	1.0	1.12	112	2.0	1.66	83
126	1.0	1.04	104	2.0	1.67	84
155	1.0	1.09	109	2.0	1.28	64
156/157	2.0	2.24	112	4.0	3.25	81
167	1.0	1.12	112	2.0	1.67	83
169	1.0	1.11	111	2.0	1.58	79
188	1.0	1.21	121	2.0	1.14	57
189	1.0	1.06	106	2.0	1.40	70
202	1.0	1.07	107	2.0	1.36	68
205	1.0	1.10	110	2.0	1.42	71
206	1.0	1.10	110	2.0	1.28	64
208	1.0	1.10	110	2.0	1.29	64
209	1.0	0.974	97	2.0	1.47	73

R = Recovery outside of method 1668A control limits  
 Nn = Result obtained from alternate analysis  
 ND = Not Detected  
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 NC = Not Calculated  
 \* = See Discussion  
 ng = Nanograms  
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**Method 1668A**

**Spike Recovery Relative Percent Difference (RPD) Results**

Client ALS Environmental

Spike 1 ID LCS-52959  
Spike 1 Filename P161211B\_11

Spike 2 ID LCSD-52960  
Spike 2 Filename P161211B\_12

Compound	IUPAC	Spike 1 %REC	Spike 2 %REC	%RPD
2-MoCB	1	113	108	4.5
4-MoCB	3	105	115	9.1
2,2'-DiCB	4	104	114	9.2
4,4'-DiCB	15	117	108	8.0
2,2',6-TrCB	19	107	105	1.9
3,4,4'-TrCB	37	109	111	1.8
2,2',6,6'-TeCB	54	114	106	7.3
3,3',4,4'-TeCB	77	100	106	5.8
3,4,4',5-TeCB	81	102	104	1.9
2,2',4,6,6'-PeCB	104	118	113	4.3
2,3,3',4,4'-PeCB	105	110	109	0.9
2,3,4,4',5-PeCB	114	108	111	2.7
2,3',4,4',5-PeCB	118	116	107	8.1
2,3',4,4',5'-PeCB	123	109	112	2.7
3,3',4,4',5-PeCB	126	109	104	4.7
2,2',4,4',6,6'-HxCB	155	114	109	4.5
(156/157)	156/157	113	112	0.9
2,3',4,4',5,5'-HxCB	167	111	112	0.9
3,3',4,4',5,5'-HxCB	169	115	111	3.5
2,2',3,4',5,6,6'-HpCB	188	120	121	0.8
2,3,3',4,4',5,5'-HpCB	189	108	106	1.9
2,2',3,3',5,5',6,6'-OxCB	202	109	107	1.9
2,3,3',4,4',5,5',6-OxCB	205	105	110	4.7
2,2',3,3',4,4',5,5',6-NoCB	206	113	110	2.7
2,2',3,3',4,5,5',6,6'-NoCB	208	108	110	1.8
Decachlorobiphenyl	209	93	97	4.2

%REC = Percent Recovered

RPD = The difference between the two values divided by the mean value

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**Water Solutions, Inc.**

55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# **Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Sampling in City Outfall Basins 44, 45, and M2**

**To:** File  
**From:** Brian Anderson, GSI Water Solutions, Inc.  
**Date:** March 21, 2017

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in February 2017. On February 8, 2017, stormwater grab samples were collected from Outfall Basins 44, 45, and M2, and a field duplicate sample was collected from Outfall Basin 44, and submitted for analysis. Sample laboratory identification numbers are presented in Table 1.

The laboratory analyses for these samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Conductivity – FO SOP 1.03a
  - pH – FO SOP 1.01a
  - Temp – FO SOP 1.05a
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- ALS Environmental - Houston HRMS
  - Polychlorinated Biphenyls (PCB) Congeners – EPA 1668A

- ALS Environmental – Kelso Laboratory
  - Organochlorine Pesticides by EPA Method 8081 (Sample 44\_SW20 only)

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with these source control program samples.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control and duplicate laboratory control (LC/DLC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for field duplicate and laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## **Analysis Holding Times**

Samples were extracted and analyzed within the acceptable holding times.

## **Method Blanks**

Method blanks were analyzed during the laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, and subcontracted analysis of organochlorine pesticides and PCB congeners. Method blanks processed during analysis of TSS, total metals, total mercury, PAHs & phthalates, or PCB Congeners were free of detections. Beta BHC was detected in the method blank during analysis of organochlorine pesticides; the result was above the method detection limit but below the laboratory reporting limit and has therefore been assigned an estimated concentration qualifier (J). Beta BHC was not detected in field samples analyzed for the same constituent, thus additional qualifications have not been made.

## **Surrogate Recoveries**

Surrogate recoveries were completed during the analyses of organochlorine pesticides and PAHs. Surrogate recoveries for the field samples, field duplicate, and all associated QC samples were within control criteria.

## **Internal Standard Recoveries**

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. The laboratory reported that internal standards in the sample extracts were recovered at 37-91%. These internal standard recoveries were within the target ranges specified in the method. Because the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery, which allowed accurate values to be obtained.

## **Matrix Spike/Matrix Spike Duplicates**

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates. MS recoveries were within acceptance limits for these analytes. One MSD sample was processed with the MS sample for PAHs and phthalates. RPD values were within the 30% control limit.

## **Laboratory Control / Duplicate Laboratory Control Samples**

LC samples were processed during the analyses of TSS, total metals, total mercury, PAHs and phthalates, organochlorine pesticides, and PCB congeners. DLC samples were processed during the analysis of organochlorine pesticides and PCB congeners. LC and DLC samples processed for PCB congeners were analyzed in place of matrix spike and matrix spike duplicates. LC/DLC sample recoveries and associated RPDs were within laboratory control limits for previously mentioned analyses.

## **Laboratory Duplicates**

WPCL processed three laboratory duplicate samples during TSS analysis, and one duplicate each for total metals and mercury analysis. RPDs were within laboratory acceptance limits for TSS and total metals analysis, but total mercury duplicate results were outside of the RPD 20% limit at 30%. Affected data have been qualified as estimated (J).

## **Field Duplicate**

One field duplicate (W17B063-04) was collected for parent sample W17B063-01 (44\_SW20). Results and RPDs for both samples are summarized in Table 2. Due to elevated reporting limits in some PCB congeners, some samples resulted in detection in one sample and non-detect in its conjugate. In this instance, RPD percentages were calculated using the method detection limit of the non-detect sample compared against the detected value in the complimentary sample. RPD values outside control limits have been qualified as estimated values (J) and are included in Table 3.

## Other

Samples were delivered to WPCL at a temperature of 7 degrees C, which is above the required holding temperature, but short times between sample collection and delivery to laboratory, and the fact that the temperature indicates the chilling process has begun, do not warrant qualification of sample data.

ALS Environmental reported that the ion abundance ratio between the primary and secondary ions were outside of theoretical acceptance limits for several PCB congeners and a laboratory qualifier, K, has been added. A "K" flag indicates an estimated maximum possible concentration for the associated compound. The reported concentrations have been flagged as estimates (J).

For PCB congener analysis, an LC/LCD sample was analyzed in lieu of an MS/MSD for the extraction batch. ALS reports that the batch quality was met.

For organochlorine pesticides analysis there was insufficient sample volume for MS and MSD analysis. To substitute, the laboratory analyzed LC and DLC samples for quality control. The reporting limits were also elevated for several analytes in both samples analyzed for Organochlorine pesticides (W17B063-01 & W17B063-04). The chromatogram indicated the presence of non-target background components. This interference prevented adequate resolution of the target compounds at the reporting limit. No organochlorine pesticides were detected in field samples, thus affected reporting limits have been qualified by the laboratory as estimated.

No other anomalies were reported by WPCL or the subcontracted laboratories. A list of additional data qualifications added during data review is provided in Table 3.

**Table 1. Field Samples Submitted with Corresponding Laboratory Identifications**

City of Portland  
Outfalls 44, 45, and M2

Field Sample ID	Sample Date	BES Sample ID	Analytes	Notes
44_SW20	2/8/2017	W17B063-01	Cond, Temp, pH, TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Pest	
45_SW1	2/8/2017	W17B063-02	Cond, Temp, pH, TSS, Tot Met, Tot Hg, PCB Cong, PAHs	
M2_SW1	2/8/2017	W17B063-03	Cond, Temp, pH, TSS, Tot Met, Tot Hg, PCB Cong, PAHs	
Dup	2/8/2017	W17B063-04	Cond, Temp, pH, TSS, Tot Met, Tot Hg, PCB Cong, PAHs, Pest	Field Duplicate Sample; parent sample is 44_SW20

**Notes**

BES = City of Portland Bureau of Environmental Services

TSS = Total Suspended Solids

Tot Met = Total Metals

Tot Hg = Total Mercury

PCB Cong = PCB Congeners

PAHs = PAHs + phthalates

Pest = Organochlorine Pesticides

Cond = Conductivity

Temp = temperature

**Table 2. Field Duplicate Relative Percent Difference Values**

City of Portland

Outfalls 44, 45, and M2

Sample IDs	Analyte*	Unit	Reporting Limit	Primary Sample (W17B063-01)	Field Duplicate	Relative Percent Difference	Notes
<b>Total Suspended Solids</b>							
W17B063-01 & W17B063-04	TSS	mg/L	2	29	31	7%	
<b>Total Metals</b>							
W17B063-01 & W17B063-04	Arsenic	ug/L	0.1	0.467	0.478	2%	
	Cadmium	ug/L	0.1	0.154	0.164	6%	
	Chromium	ug/L	0.2	2.48	2.63	6%	
	Copper	ug/L	0.2	10.4	10.4	0%	
	Nickel	ug/L	0.2	1.66	1.7	2%	
	Lead	ug/L	0.1	7.46	7.69	3%	
	Zinc	ug/L	0.500	70.8	72.5	2%	
<b>Total Mercury</b>							
	Mercury	ug/L	0.0	0.0102	0.00882	15%	
<b>PAHs and phthalates</b>							
W17B063-01 & W17B063-04	Acenaphthylene	ug/L	0.02	0.026	0.029	11%	
	Anthracene	ug/L	0.02	0.032	0.037	14%	
	Benzo(a)anthracene	ug/L	0.01	0.047	0.045	4%	
	Benzo(a)pyrene	ug/L	0.01	0.043	0.042	2%	
	Benzo(b)fluoranthene	ug/L	0.01	0.075	0.085	13%	
	Benzo(g,h,i)perylene	ug/L	0.01	0.068	0.07	3%	
	Benzo(k)fluoranthene	ug/L	0.01	0.026	0.019	31%	
	Bis(2-ethylhexyl) phthalate	ug/L	1	4.1	4	2%	
	Chrysene	ug/L	0.01	0.057	0.057	0%	
	Dibenzo(a,h)anthracene	ug/L	0.01	0.01	ND	0%	
	Fluoranthene	ug/L	0.01	0.14	0.15	7%	
	Indeno(1,2,3-cd)pyrene	ug/L	0.01	0.028	0.03	7%	
	Phenanthrene	ug/L	0.02	0.07	0.069	1%	
	Pyrene	ug/L	0.01	0.17	0.18	6%	
<b>PCB Congeners</b>							
	Total Dichloro Biphenyls	pg/L	19.400	487	392	22%	
	Total Heptachloro Biphenyls	pg/L	19.400	2140	2250	5%	
	Total Hexachloro Biphenyls	pg/L	19.400	4270	3960	8%	
	Total Nonachloro Biphenyls	pg/L	21.400	85.8	58.7	38%	
	Total Octachloro Biphenyls	pg/L	19.400	654	539	19%	
	PCB_105	pg/L	37.400	212	200	6%	
	PCB_011	pg/L	97.000	411	361	13%	
	PCB_118	pg/L	32.900	379	410	8%	
	PCB_130	pg/L	48.500	40.9	39.5	3%	
	PCB_132	pg/L	48.500	315	302	4%	
	PCB_136	pg/L	48.500	116	116	0%	
	PCB_137	pg/L	48.500	35.7	47.8	29%	
	PCB_141	pg/L	48.500	191	150	24%	
	PCB_144	pg/L	48.500	32.7	44.2	30%	
	PCB_146	pg/L	48.500	123	114	8%	
	PCB_015	pg/L	19.400	49.6	31.5	45%	1
	PCB_158	pg/L	48.500	97.1	69.7	33%	
	PCB_164	pg/L	48.500	71.2	68.3	4%	
	PCB_167	pg/L	22.700	ND	36.3	46%	1
	PCB_170	pg/L	48.500	232	272	16%	
	PCB_174	pg/L	48.500	333	378	13%	
	PCB_176	pg/L	48.500	37.5	37.8	1%	
	PCB_177	pg/L	48.500	192	187	3%	
	PCB_178	pg/L	48.500	62.5	69.4	10%	
	PCB_179	pg/L	48.500	149	125	18%	
	PCB_187	pg/L	48.500	378	419	10%	
	PCB_190	pg/L	48.500	38.6	37.2	4%	
	PCB_194	pg/L	48.500	148	123	18%	

**Table 2. Field Duplicate Relative Percent Difference Values**

City of Portland  
Outfalls 44, 45, and M2

Sample IDs	Analyte*	Unit	Reporting Limit	Primary Sample (W17B063-01)	Field Duplicate	Relative Percent Difference	Notes
W17B063-01 & W17B063-04	PCB_195	pg/L	48.500	62.9	45	33%	
	PCB_196	pg/L	48.500	75.1	84.2	11%	
	PCB_201	pg/L	48.500	20	ND	25%	
	PCB_202	pg/L	19.400	48.5	ND	63%	1
	PCB_203	pg/L	48.500	109	107	2%	
	PCB_206	pg/L	49.400	85.8	58.7	38%	
	PCB_031	pg/L	58.700	125	86.8	36%	
	PCB_037	pg/L	58.000	ND	78.1	30%	
	PCB_052	pg/L	53.300	211	203	4%	
	PCB_056	pg/L	49.500	114	83.1	31%	
	PCB_060	pg/L	48.500	ND	46.5	4%	
	PCB_064	pg/L	48.500	70.1	62.1	12%	
	PCB_066	pg/L	48.500	190	157	19%	
	PCB_077	pg/L	42.000	49.8	ND	28%	
	PCB_008	pg/L	48.500	26	ND	52%	1
	PCB_082	pg/L	48.500	73	ND	48%	1
	PCB_092	pg/L	48.500	82	57.3	35%	
	PCB_110/115	pg/L	97.000	714	591	19%	
	PCB_128/166	pg/L	97.000	150	139	8%	
	PCB_129/138/163	pg/L	194.000	1330	1170	13%	
	PCB_135/151/154	pg/L	97.000	275	272	1%	
	PCB_147/149	pg/L	97.000	738	674	9%	
	PCB_153/168	pg/L	97.000	655	641	2%	
	PCB_156/157	pg/L	38.800	102	79.5	25%	
	PCB_171/173	pg/L	97.000	91.3	96.3	5%	
	PCB_180/193	pg/L	97.000	630	623	1%	
	PCB_183/185	pg/L	97.000	193	197	2%	
	PCB_198/199	pg/L	97.000	191	179	6%	
	PCB_020/028	pg/L	59.600	122	125	2%	
	PCB_044/047/065	pg/L	97.000	157	158	1%	
	PCB_049/069	pg/L	97.000	77.9	82.3	5%	
	PCB_061/070/074/076	pg/L	194.000	377	323	15%	
	PCB_083/099	pg/L	97.000	222	194	13%	
	PCB_085/116/117	pg/L	97.000	90.5	63.7	35%	
	PCB_086/087/097/109/119/125	pg/L	194.000	356	296	18%	
	PCB_088/091	pg/L	48.500	86.1	87.4	1%	
	PCB_090/101/113	pg/L	194.000	463	381	19%	
	PCB_093/095/100	pg/L	194.000	344	322	7%	
	Total Pentachloro Biphenyls	pg/L	194.000	3020	2600	15%	
	Total Tetrachloro Biphenyls	pg/L	194.000	1250	1110	12%	
	Total PCB Congeners	pg/L	194.000	12300	11400	8%	
Total Trichloro Biphenyls	pg/L	48.500	247	290	16%		

**Notes**

ug/L = micrograms per liter  
pg/L = picograms per liter  
RPD = relative percent difference

1 RPD exceeds acceptance criteria. Results are flagged as estimates.

\* Analytes not detected above the reporting limit in primary sample or field duplicate sample are not included in Table 2.

**Table 3. Qualifiers Added or Modified During Validation**

City of Portland  
Outfalls 44, 45, and M2

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
W17B063-01	PCB_130	pg/L	40.9	J	Ion Ratio +J
W17B063-01	PCB_144	pg/L	32.7	J	Ion Ratio +J
W17B063-01	PCB_158	pg/L	97.1	J	Ion Ratio
W17B063-01	PCB_170	pg/L	232	J	Ion Ratio
W17B063-01	PCB_190	pg/L	38.6	J	Ion Ratio +J
W17B063-01	PCB_201	pg/L	20	J	Ion Ratio +J
W17B063-01	PCB_203	pg/L	109	J	Ion Ratio
W17B063-01	PCB_206	pg/L	85.8	J	Ion Ratio
W17B063-01	PCB_064	pg/L	70.1	J	Ion Ratio
W17B063-01	PCB_092	pg/L	82	J	Ion Ratio
W17B063-01	PCB_171/173	pg/L	91.3	J	Ion Ratio +J
W17B063-01	PCB_088/091	pg/L	86.1	J	Ion Ratio
W17B063-01	PCB_015	pg/L	49.6	J	RPD
W17B063-01	PCB_167	pg/L	22.7	UJ	RPD
W17B063-01	PCB_202	pg/L	48.5	J	RPD
W17B063-01	PCB_008	pg/L	26	J	RPD
W17B063-01	PCB_082	pg/L	73	J	RPD
W17B063-02	PCB_178	pg/L	50	J	Ion Ratio +J
W17B063-02	PCB_190	pg/L	32.4	J	Ion Ratio +J
W17B063-02	PCB_202	pg/L	30	J	Ion Ratio
W17B063-02	PCB_203	pg/L	91.5	J	Ion Ratio
W17B063-02	PCB_206	pg/L	62.7	J	Ion Ratio
W17B063-02	PCB_208	pg/L	33.4	J	Ion Ratio
W17B063-02	PCB_066	pg/L	52.5	J	Ion Ratio
W17B063-02	PCB_085/116/117	pg/L	49.2	J	Ion Ratio +J
W17B063-02	Mercury	µg/L	0.00755	J	LD
W17B063-03	PCB_105	pg/L	60.2	J	Ion Ratio
W17B063-03	PCB_132	pg/L	48.9	J	Ion Ratio
W17B063-03	PCB_141	pg/L	37.1	J	Ion Ratio +J
W17B063-03	PCB_146	pg/L	25.9	J	Ion Ratio +J
W17B063-03	PCB_179	pg/L	31.7	J	Ion Ratio +J
W17B063-03	PCB_187	pg/L	74.6	J	Ion Ratio
W17B063-03	PCB_135/151/154	pg/L	40.5	J	Ion Ratio +J
W17B063-03	PCB_044/047/065	pg/L	41.8	J	Ion Ratio +J
W17B063-03	PCB_083/099	pg/L	43.3	J	Ion Ratio +J
W17B063-03	PCB_090/101/113	pg/L	84.9	J	Ion Ratio +J
W17B063-03	PCB_093/095/100	pg/L	72.4	J	Ion Ratio +J
W17B063-04	PCB_136	pg/L	116	J	Ion Ratio
W17B063-04	PCB_141	pg/L	150	J	Ion Ratio
W17B063-04	PCB_146	pg/L	114	J	Ion Ratio
W17B063-04	PCB_158	pg/L	69.7	J	Ion Ratio
W17B063-04	PCB_176	pg/L	37.8	J	Ion Ratio +J
W17B063-04	PCB_179	pg/L	125	J	Ion Ratio
W17B063-04	PCB_194	pg/L	123	J	Ion Ratio
W17B063-04	PCB_195	pg/L	45	J	Ion Ratio +J
W17B063-04	PCB_206	pg/L	58.7	J	Ion Ratio
W17B063-04	PCB_031	pg/L	86.8	J	Ion Ratio
W17B063-04	PCB_037	pg/L	78.1	J	Ion Ratio
W17B063-04	PCB_056	pg/L	83.1	J	Ion Ratio
W17B063-04	PCB_060	pg/L	46.5	J	Ion Ratio +J
W17B063-04	PCB_064	pg/L	62.1	J	Ion Ratio
W17B063-04	PCB_092	pg/L	57.3	J	Ion Ratio
W17B063-04	PCB_156/157	pg/L	79.5	J	Ion Ratio
W17B063-04	PCB_183/185	pg/L	197	J	Ion Ratio
W17B063-04	PCB_015	pg/L	31.5	J	RPD
W17B063-04	PCB_167	pg/L	36.3	J	RPD
W17B063-04	PCB_202	pg/L	25.2	UJ	RPD
W17B063-04	PCB_008	pg/L	50.6	UJ	RPD
W17B063-04	PCB_082	pg/L	50.6	UJ	RPD

**Notes**

µg/L = micrograms per liter

pg/L = picograms per liter

**Qualifier Definitions**

J = Detection of analyte is considered an estimate

UJ = estimated detection limit

**Reason Code Definitions**

Ion ratio = The ion abundance ratio between the primary and secondary ions were outside of theoretical acceptance limits; reported results should be considered estimates

Ion ratio + J = In addition to ion abundance ratios outside of theoretical limits, the value has been flagged as estimated by the laboratory because the detection is below the reporting limit, yet above the detection limit

LD = Relative percent difference of laboratory duplicate was outside of control criteria; sample concentration is considered an estimate

RPD = The RPD between the results in the sample and sample duplicate exceeded control criteria



City of Portland  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



March 16, 2017

Linda Scheffler  
Director's Office

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Work Order  
**W17B063**

Project  
**Portland Harbor**

Received  
02/08/17 11:48

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project: <b>Portland Harbor</b>	Client: Director's Office
Work Order: <b>W17B063</b>	Project Mgr: Linda Scheffler
Received: 2/8/17 11:48	
Submitted By: Field Operations	

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
44_SW20	W17B063-01	Stormwater	Grab	02/08/17 09:47	02/08/17 09:47	
45_SW1	W17B063-02	Stormwater	Grab	02/08/17 10:10	02/08/17 10:10	
M2_SW1	W17B063-03	Stormwater	Grab	02/08/17 10:59	02/08/17 10:59	
FIELDUP	W17B063-04	Stormwater	Grab	02/08/17 00:00	02/08/17 00:00	

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field conductivity

44_SW20 : W17B063-01										
Conductivity*	29	umhos/cm	0		1	B17B139	02/08/17	02/08/17	FO SOP 1.03a	
45_SW1 : W17B063-02										
Conductivity*	29	umhos/cm	0		1	B17B139	02/08/17	02/08/17	FO SOP 1.03a	
M2_SW1 : W17B063-03										
Conductivity*	45	umhos/cm	0		1	B17B139	02/08/17	02/08/17	FO SOP 1.03a	

Field pH

44_SW20 : W17B063-01										
pH*	6.4	pH Units	0.0		1	B17B139	02/08/17 09:47	02/08/17	FO SOP 1.01a	
45_SW1 : W17B063-02										
pH*	6.6	pH Units	0.0		1	B17B139	02/08/17 10:10	02/08/17	FO SOP 1.01a	
M2_SW1 : W17B063-03										
pH*	6.6	pH Units	0.0		1	B17B139	02/08/17 10:59	02/08/17	FO SOP 1.01a	

Field temperature

44_SW20 : W17B063-01										
Temperature*	4.9	°C	0.0		1	B17B139	02/08/17 09:47	02/08/17	FO SOP 1.05a	
45_SW1 : W17B063-02										
Temperature*	4.5	°C	0.0		1	B17B139	02/08/17 10:10	02/08/17	FO SOP 1.05a	
M2_SW1 : W17B063-03										
Temperature*	6.1	°C	0.0		1	B17B139	02/08/17 10:59	02/08/17	FO SOP 1.05a	

Reported: 03/16/17 13:31

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W17B063**

**Client: Director's Office**  
**Received: 02/08/17 11:48**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**General Chemistry**

**Total Suspended Solids**

44\_SW20 : W17B063-01

Total suspended solids                      **29** mg/L                      2                      2                      B17B154    02/09/17                      02/09/17    SM 2540D

45\_SW1 : W17B063-02

Total suspended solids                      **47** mg/L                      2                      2                      B17B154    02/09/17                      02/09/17    SM 2540D

M2\_SW1 : W17B063-03

Total suspended solids                      **45** mg/L                      2                      2                      B17B154    02/09/17                      02/09/17    SM 2540D

FIELDUP : W17B063-04

Total suspended solids                      **31** mg/L                      2                      2                      B17B154    02/09/17                      02/09/17    SM 2540D

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Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W17B063**

**Client: Director's Office**  
**Received: 02/08/17 11:48**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Total Metals**

Total Metals by ICPMS

44\_SW20 : W17B063-01

Arsenic	0.467	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Cadmium	0.154	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Chromium	2.48	ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Copper	10.4	ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Lead	7.46	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Mercury	0.0102	ug/L	0.00100	0.00100	1	B17B219	02/14/17	02/14/17	WPCLSOP M-10	
Nickel	1.66	ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Zinc	70.8	ug/L	0.500	0.500	1	B17B149	02/09/17	02/10/17	EPA 200.8	

45\_SW1 : W17B063-02

Arsenic	0.731	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Cadmium	0.249	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Chromium	6.68	ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Copper	10.1	ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Lead	11.6	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Mercury	0.00755	ug/L	0.00100	0.00100	1	B17B219	02/14/17	02/14/17	WPCLSOP M-10	M1
Nickel	4.92	ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Zinc	299	ug/L	1.50	1.50	3	B17B149	02/09/17	02/10/17	EPA 200.8	

M2\_SW1 : W17B063-03

Arsenic	0.680	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Cadmium	0.104	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Chromium	2.13	ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Copper	6.81	ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Lead	3.50	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Mercury	0.00457	ug/L	0.00100	0.00100	1	B17B219	02/14/17	02/14/17	WPCLSOP M-10	
Nickel	1.55	ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Zinc	63.7	ug/L	0.500	0.500	1	B17B149	02/09/17	02/10/17	EPA 200.8	

FIELDUP : W17B063-04

Arsenic	0.478	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Cadmium	0.164	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Chromium	2.63	ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Copper	10.4	ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Lead	7.69	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Mercury	0.00882	ug/L	0.00100	0.00100	1	B17B219	02/14/17	02/14/17	WPCLSOP M-10	
Nickel	1.70	ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Silver	ND	ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Zinc	72.5	ug/L	0.500	0.500	1	B17B149	02/09/17	02/10/17	EPA 200.8	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

44\_SW20 : W17B063-01

Acenaphthene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Acenaphthylene	0.026	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Anthracene	0.032	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(a)anthracene	0.047	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(a)pyrene	0.043	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(b)fluoranthene	0.075	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.068	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(k)fluoranthene	0.026	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Chrysene	0.057	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.010	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluoranthene	0.14	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene*	0.028	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Phenanthrene	0.070	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Pyrene	0.17	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	4.1	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.22	ug/L	0.229	98%	31-164	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluoranthene-d10	0.24	ug/L	0.229	104%	65-145	B17B134	02/08/17	02/08/17	EPA 8270-SIM	

45\_SW1 : W17B063-02

Acenaphthene	0.029	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Acenaphthylene	0.11	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Anthracene	0.069	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(a)anthracene	0.079	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(a)pyrene	0.12	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(b)fluoranthene	0.21	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.17	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(k)fluoranthene	0.057	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Chrysene	0.13	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.025	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluoranthene	0.26	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluorene	0.033	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene*	0.11	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	

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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

45\_SW1 : W17B063-02

2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Phenanthrene	0.12	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Pyrene	0.31	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.5	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.23	ug/L	0.229	101%	31-164	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluoranthene-d10	0.26	ug/L	0.229	114%	65-145	B17B134	02/08/17	02/08/17	EPA 8270-SIM	

M2\_SW1 : W17B063-03

Acenaphthene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(a)anthracene	0.023	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(a)pyrene	0.034	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(b)fluoranthene	0.071	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.083	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(k)fluoranthene	0.018	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Chrysene	0.048	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.011	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluoranthene	0.087	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene*	0.034	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Naphthalene	0.041	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Phenanthrene	0.090	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Pyrene	0.16	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	2.3	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.24	ug/L	0.229	104%	31-164	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluoranthene-d10	0.25	ug/L	0.229	110%	65-145	B17B134	02/08/17	02/08/17	EPA 8270-SIM	

FIELD DUP : W17B063-04

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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

FIELD DUP : W17B063-04

Acenaphthene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Acenaphthylene	0.029	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Anthracene	0.037	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(a)anthracene	0.045	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(a)pyrene	0.042	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(b)fluoranthene	0.085	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.070	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(k)fluoranthene	0.019	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Chrysene	0.057	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluoranthene	0.15	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene*	0.030	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Phenanthrene	0.069	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Pyrene	0.18	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	4.0	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.23	ug/L	0.229	99%	31-164	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluoranthene-d10	0.26	ug/L	0.229	114%	65-145	B17B134	02/08/17	02/08/17	EPA 8270-SIM	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W17B063**

Client: Director's Office  
Received: 02/08/17 11:48

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B17B154</b>										
<b>Blank (B17B154-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					02/09/17 :02/09/17	
<b>LCS (B17B154-BS1)</b>										
Total suspended solids	100	mg/L			100		100% (90-110)		02/09/17 :02/09/17	
<b>Duplicate (B17B154-DUP1) Source: W17B062-01</b>										
Total suspended solids	ND	mg/L	2	2		ND	(20)		02/09/17 :02/09/17	
<b>Duplicate (B17B154-DUP2) Source: W17B071-01</b>										
Total suspended solids	15	mg/L	2	2		14	7 (20)		02/09/17 :02/09/17	
<b>Duplicate (B17B154-DUP3) Source: W17B076-03</b>										
Total suspended solids	22	mg/L	2	2		21	5 (20)		02/09/17 :02/09/17	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B17B149</b>										
<b>Blank (B17B149-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					02/09/17 :02/10/17	
Cadmium	ND	ug/L	0.100	0.100					02/09/17 :02/10/17	
Chromium	ND	ug/L	0.200	0.200					02/09/17 :02/10/17	
Copper	ND	ug/L	0.200	0.200					02/09/17 :02/10/17	
Lead	ND	ug/L	0.100	0.100					02/09/17 :02/10/17	
Nickel	ND	ug/L	0.200	0.200					02/09/17 :02/10/17	
Silver	ND	ug/L	0.100	0.100					02/09/17 :02/10/17	
Zinc	ND	ug/L	0.500	0.500					02/09/17 :02/10/17	
<b>LCS (B17B149-BS1)</b>										
Arsenic	10.4	ug/L	0.100	0.100	10.0		104% (85-115)		02/09/17 :02/10/17	
Cadmium	10.0	ug/L	0.100	0.100	10.0		100% (85-115)		02/09/17 :02/10/17	
Chromium	10.3	ug/L	0.200	0.200	10.0		103% (85-115)		02/09/17 :02/10/17	
Copper	10.5	ug/L	0.200	0.200	10.0		105% (85-115)		02/09/17 :02/10/17	
Lead	10.2	ug/L	0.100	0.100	10.0		102% (85-115)		02/09/17 :02/10/17	
Nickel	10.2	ug/L	0.200	0.200	10.0		102% (85-115)		02/09/17 :02/10/17	
Silver	9.35	ug/L	0.100	0.100	10.0		93% (85-115)		02/09/17 :02/10/17	
Zinc	52.1	ug/L	0.500	0.500	50.0		104% (85-115)		02/09/17 :02/10/17	

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**Project: Portland Harbor**  
**Work Order: W17B063**

**Client: Director's Office**  
**Received: 02/08/17 11:48**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B17B149**

**Duplicate (B17B149-DUP1)**

**Source: W17B063-01**

Arsenic	0.481	ug/L	0.100	0.100		0.467		3 (20)	02/09/17 :02/10/17	
Cadmium	0.166	ug/L	0.100	0.100		0.154		8 (20)	02/09/17 :02/10/17	
Chromium	2.56	ug/L	0.200	0.200		2.48		3 (20)	02/09/17 :02/10/17	
Copper	10.3	ug/L	0.200	0.200		10.4		0.9 (20)	02/09/17 :02/10/17	
Lead	7.62	ug/L	0.100	0.100		7.46		2 (20)	02/09/17 :02/10/17	
Nickel	1.63	ug/L	0.200	0.200		1.66		2 (20)	02/09/17 :02/10/17	
Silver	ND	ug/L	0.100	0.100		ND		(20)	02/09/17 :02/10/17	
Zinc	71.3	ug/L	0.500	0.500		70.8		0.7 (20)	02/09/17 :02/10/17	

**Matrix Spike (B17B149-MS1)**

**Source: W17B063-01**

Arsenic	10.4	ug/L	0.100	0.100	10.0	0.467	99% (70-130)		02/09/17 :02/10/17	
Cadmium	10.1	ug/L	0.100	0.100	10.0	0.154	99% (70-130)		02/09/17 :02/10/17	
Chromium	12.8	ug/L	0.200	0.200	10.0	2.48	104% (70-130)		02/09/17 :02/10/17	
Copper	20.6	ug/L	0.200	0.200	10.0	10.4	101% (70-130)		02/09/17 :02/10/17	
Lead	18.3	ug/L	0.100	0.100	10.0	7.46	109% (70-130)		02/09/17 :02/10/17	
Nickel	11.6	ug/L	0.200	0.200	10.0	1.66	100% (70-130)		02/09/17 :02/10/17	
Silver	8.34	ug/L	0.100	0.100	10.0	ND	83% (70-130)		02/09/17 :02/10/17	
Zinc	122	ug/L	0.500	0.500	50.0	70.8	103% (70-130)		02/09/17 :02/10/17	

**Total Metals by ICPMS - Batch B17B219**

**Blank (B17B219-BLK1)**

Mercury	ND	ug/L	0.000900	0.000900					02/14/17 :02/14/17	
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**LCS (B17B219-BS1)**

Mercury	0.0102	ug/L	0.000900	0.000900	0.0100		102% (85-125)		02/14/17 :02/14/17	
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**Duplicate (B17B219-DUP1)**

**Source: W17B063-02**

Mercury	0.0103	ug/L	0.00100	0.00100		0.00755		30 (20)	02/14/17 :02/14/17	M1
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**Matrix Spike (B17B219-MS1)**

**Source: W17B063-02**

Mercury	0.0289	ug/L	0.00100	0.00100	0.0222	0.00755	96% (70-130)		02/14/17 :02/14/17	
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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W17B063**

**Client: Director's Office**  
**Received: 02/08/17 11:48**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B17B134**

**Blank (B17B134-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					02/08/17 :02/08/17	
Acenaphthylene	ND	ug/L	0.020	0.020					02/08/17 :02/08/17	
Anthracene	ND	ug/L	0.020	0.020					02/08/17 :02/08/17	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Chrysene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Fluoranthene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Fluorene	ND	ug/L	0.020	0.020					02/08/17 :02/08/17	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					02/08/17 :02/08/17	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					02/08/17 :02/08/17	
Naphthalene	ND	ug/L	0.040	0.040					02/08/17 :02/08/17	
Phenanthrene	ND	ug/L	0.020	0.020					02/08/17 :02/08/17	
Pyrene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					02/08/17 :02/08/17	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					02/08/17 :02/08/17	
Diethyl phthalate	ND	ug/L	1.0	0.50					02/08/17 :02/08/17	
Dimethyl phthalate	ND	ug/L	1.0	0.50					02/08/17 :02/08/17	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					02/08/17 :02/08/17	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					02/08/17 :02/08/17	

**Surrogate**

2-Methylnaphthalene-d10	0.22	ug/L			0.229		96% (31-164)		02/08/17 :02/08/17	
Fluoranthene-d10	0.26	ug/L			0.229		114% (65-145)		02/08/17 :02/08/17	

**LCS (B17B134-BS1)**

Acenaphthene	0.214	ug/L	0.020	0.020	0.229		94% (67-125)		02/08/17 :02/08/17	
Acenaphthylene	0.219	ug/L	0.020	0.020	0.229		96% (64-138)		02/08/17 :02/08/17	
Anthracene	0.203	ug/L	0.020	0.020	0.229		89% (65-143)		02/08/17 :02/08/17	
Benzo(a)anthracene	0.219	ug/L	0.010	0.010	0.229		96% (80-130)		02/08/17 :02/08/17	
Benzo(a)pyrene	0.230	ug/L	0.010	0.010	0.229		101% (74-131)		02/08/17 :02/08/17	
Benzo(b)fluoranthene	0.231	ug/L	0.010	0.010	0.229		101% (67-128)		02/08/17 :02/08/17	
Benzo(g,h,i)perylene	0.214	ug/L	0.010	0.010	0.229		94% (57-137)		02/08/17 :02/08/17	
Benzo(k)fluoranthene	0.224	ug/L	0.010	0.010	0.229		98% (63-140)		02/08/17 :02/08/17	
Chrysene	0.231	ug/L	0.010	0.010	0.229		101% (80-134)		02/08/17 :02/08/17	
Dibenzo(a,h)anthracene	0.208	ug/L	0.010	0.010	0.229		91% (56-138)		02/08/17 :02/08/17	
Fluoranthene	0.222	ug/L	0.010	0.010	0.229		97% (70-150)		02/08/17 :02/08/17	
Fluorene	0.220	ug/L	0.020	0.020	0.229		96% (64-130)		02/08/17 :02/08/17	

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**Project: Portland Harbor**  
**Work Order: W17B063**

**Client: Director's Office**  
**Received: 02/08/17 11:48**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B17B134**

**LCS (B17B134-BS1)**

Indeno(1,2,3-cd)pyrene	0.210	ug/L	0.010	0.010	0.229		92% (58-138)		02/08/17 :02/08/17	
1-Methylnaphthalene	0.215	ug/L	0.040	0.040	0.229		94% (35-164)		02/08/17 :02/08/17	
2-Methylnaphthalene	0.210	ug/L	0.040	0.040	0.229		92% (29-162)		02/08/17 :02/08/17	
Naphthalene	0.204	ug/L	0.040	0.040	0.229		89% (53-134)		02/08/17 :02/08/17	
Phenanthrene	0.220	ug/L	0.020	0.020	0.229		96% (73-132)		02/08/17 :02/08/17	
Pyrene	0.218	ug/L	0.010	0.010	0.229		96% (69-153)		02/08/17 :02/08/17	
Butyl benzyl phthalate	2.65	ug/L	1.0	0.50	2.29		116% (55-181)		02/08/17 :02/08/17	
Di-n-butyl phthalate	2.46	ug/L	1.0	0.50	2.29		107% (61-183)		02/08/17 :02/08/17	
Diethyl phthalate	2.52	ug/L	1.0	0.50	2.29		110% (65-177)		02/08/17 :02/08/17	
Dimethyl phthalate	2.57	ug/L	1.0	0.50	2.29		113% (77-151)		02/08/17 :02/08/17	
Di-n-octyl phthalate	2.47	ug/L	1.0	0.50	2.29		108% (12-185)		02/08/17 :02/08/17	
Bis(2-ethylhexyl) phthalate	2.37	ug/L	1.0	0.50	2.29		104% (39-170)		02/08/17 :02/08/17	
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.23	ug/L			0.229		101% (31-164)		02/08/17 :02/08/17	
Fluoranthene-d10	0.24	ug/L			0.229		104% (65-145)		02/08/17 :02/08/17	

**Matrix Spike (B17B134-MS1)**

**Source: W17B026-03**

Acenaphthene	0.217	ug/L	0.020	0.020	0.229	ND	95% (67-125)		02/08/17 :02/08/17	
Acenaphthylene	0.239	ug/L	0.020	0.020	0.229	ND	105% (64-138)		02/08/17 :02/08/17	
Anthracene	0.225	ug/L	0.020	0.020	0.229	ND	98% (65-143)		02/08/17 :02/08/17	
Benzo(a)anthracene	0.245	ug/L	0.010	0.010	0.229	0.0217	98% (80-130)		02/08/17 :02/08/17	
Benzo(a)pyrene	0.239	ug/L	0.010	0.010	0.229	0.0246	94% (74-131)		02/08/17 :02/08/17	
Benzo(b)fluoranthene	0.264	ug/L	0.010	0.010	0.229	0.0543	92% (67-128)		02/08/17 :02/08/17	
Benzo(g,h,i)perylene	0.238	ug/L	0.010	0.010	0.229	0.0531	81% (57-137)		02/08/17 :02/08/17	
Benzo(k)fluoranthene	0.217	ug/L	0.010	0.010	0.229	0.0160	88% (63-140)		02/08/17 :02/08/17	
Chrysene	0.263	ug/L	0.010	0.010	0.229	0.0303	102% (80-134)		02/08/17 :02/08/17	
Dibenzo(a,h)anthracene	0.185	ug/L	0.010	0.010	0.229	ND	81% (56-138)		02/08/17 :02/08/17	
Fluoranthene	0.309	ug/L	0.010	0.010	0.229	0.0851	98% (70-150)		02/08/17 :02/08/17	
Fluorene	0.229	ug/L	0.020	0.020	0.229	ND	100% (64-130)		02/08/17 :02/08/17	
Indeno(1,2,3-cd)pyrene	0.207	ug/L	0.010	0.010	0.229	0.0251	79% (58-138)		02/08/17 :02/08/17	
1-Methylnaphthalene	0.212	ug/L	0.040	0.040	0.229	ND	93% (35-164)		02/08/17 :02/08/17	
2-Methylnaphthalene	0.210	ug/L	0.040	0.040	0.229	ND	92% (29-162)		02/08/17 :02/08/17	
Naphthalene	0.218	ug/L	0.040	0.040	0.229	ND	95% (53-134)		02/08/17 :02/08/17	
Phenanthrene	0.277	ug/L	0.020	0.020	0.229	0.0531	98% (73-132)		02/08/17 :02/08/17	
Pyrene	0.317	ug/L	0.010	0.010	0.229	0.0949	97% (69-153)		02/08/17 :02/08/17	
Butyl benzyl phthalate	2.73	ug/L	1.0	0.50	2.29	ND	120% (55-181)		02/08/17 :02/08/17	
Di-n-butyl phthalate	2.76	ug/L	1.0	0.50	2.29	ND	121% (61-183)		02/08/17 :02/08/17	
Diethyl phthalate	2.66	ug/L	1.0	0.50	2.29	ND	117% (65-177)		02/08/17 :02/08/17	
Dimethyl phthalate	2.61	ug/L	1.0	0.50	2.29	ND	114% (77-151)		02/08/17 :02/08/17	
Di-n-octyl phthalate	2.29	ug/L	1.0	0.50	2.29	ND	100% (12-185)		02/08/17 :02/08/17	
Bis(2-ethylhexyl) phthalate	2.39	ug/L	1.0	0.50	2.29	ND	104% (39-170)		02/08/17 :02/08/17	

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**Project: Portland Harbor**  
**Work Order: W17B063**

**Client: Director's Office**  
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**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B17B134**

**Matrix Spike (B17B134-MS1)**

**Source: W17B026-03**

**Surrogate**

2-Methylnaphthalene-d10	0.23	ug/L			0.229		99% (31-164)		02/08/17 :02/08/17	
Fluoranthene-d10	0.26	ug/L			0.229		113% (65-145)		02/08/17 :02/08/17	

**Matrix Spike Dup (B17B134-MSD1)**

**Source: W17B026-03**

Acenaphthene	0.222	ug/L	0.020	0.020	0.229	ND	97% (67-125)	2 (30)	02/08/17 :02/08/17	
Acenaphthylene	0.238	ug/L	0.020	0.020	0.229	ND	104% (64-138)	0.7 (30)	02/08/17 :02/08/17	
Anthracene	0.220	ug/L	0.020	0.020	0.229	ND	96% (65-143)	2 (30)	02/08/17 :02/08/17	
Benzo(a)anthracene	0.253	ug/L	0.010	0.010	0.229	0.0217	101% (80-130)	3 (30)	02/08/17 :02/08/17	
Benzo(a)pyrene	0.241	ug/L	0.010	0.010	0.229	0.0246	95% (74-131)	1 (30)	02/08/17 :02/08/17	
Benzo(b)fluoranthene	0.268	ug/L	0.010	0.010	0.229	0.0543	94% (67-128)	2 (30)	02/08/17 :02/08/17	
Benzo(g,h,i)perylene	0.230	ug/L	0.010	0.010	0.229	0.0531	77% (57-137)	4 (30)	02/08/17 :02/08/17	
Benzo(k)fluoranthene	0.215	ug/L	0.010	0.010	0.229	0.0160	87% (63-140)	0.8 (30)	02/08/17 :02/08/17	
Chrysene	0.267	ug/L	0.010	0.010	0.229	0.0303	104% (80-134)	1 (30)	02/08/17 :02/08/17	
Dibenzo(a,h)anthracene	0.163	ug/L	0.010	0.010	0.229	ND	71% (56-138)	13 (30)	02/08/17 :02/08/17	
Fluoranthene	0.370	ug/L	0.010	0.010	0.229	0.0851	125% (70-150)	18 (30)	02/08/17 :02/08/17	
Fluorene	0.222	ug/L	0.020	0.020	0.229	ND	97% (64-130)	3 (30)	02/08/17 :02/08/17	
Indeno(1,2,3-cd)pyrene	0.193	ug/L	0.010	0.010	0.229	0.0251	73% (58-138)	7 (30)	02/08/17 :02/08/17	
1-Methylnaphthalene	0.211	ug/L	0.040	0.040	0.229	ND	92% (35-164)	0.5 (30)	02/08/17 :02/08/17	
2-Methylnaphthalene	0.210	ug/L	0.040	0.040	0.229	ND	92% (29-162)	0 (30)	02/08/17 :02/08/17	
Naphthalene	0.225	ug/L	0.040	0.040	0.229	ND	98% (53-134)	3 (30)	02/08/17 :02/08/17	
Phenanthrene	0.298	ug/L	0.020	0.020	0.229	0.0531	107% (73-132)	7 (30)	02/08/17 :02/08/17	
Pyrene	0.378	ug/L	0.010	0.010	0.229	0.0949	124% (69-153)	17 (30)	02/08/17 :02/08/17	
Butyl benzyl phthalate	2.71	ug/L	1.0	0.50	2.29	ND	119% (55-181)	0.7 (30)	02/08/17 :02/08/17	
Di-n-butyl phthalate	2.70	ug/L	1.0	0.50	2.29	ND	118% (61-183)	2 (30)	02/08/17 :02/08/17	
Diethyl phthalate	2.49	ug/L	1.0	0.50	2.29	ND	109% (65-177)	7 (30)	02/08/17 :02/08/17	
Dimethyl phthalate	2.60	ug/L	1.0	0.50	2.29	ND	114% (77-151)	0.5 (30)	02/08/17 :02/08/17	
Di-n-octyl phthalate	1.88	ug/L	1.0	0.50	2.29	ND	82% (12-185)	20 (30)	02/08/17 :02/08/17	
Bis(2-ethylhexyl) phthalate	2.12	ug/L	1.0	0.50	2.29	ND	93% (39-170)	12 (30)	02/08/17 :02/08/17	

**Surrogate**

2-Methylnaphthalene-d10	0.22	ug/L			0.229		97% (31-164)		02/08/17 :02/08/17	
Fluoranthene-d10	0.26	ug/L			0.229		113% (65-145)		02/08/17 :02/08/17	

Reported: 03/16/17 13:31

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



City of Portland  
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W17B063**

Client: Director's Office  
Received: 02/08/17 11:48

**Qualifiers**

M1 Matrix duplicate precision measurement indicates non-homogeneous sample matrix. Sample result should be considered an estimate.

**Definitions**

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 03/16/17 13:31

Jennifer Shackelford, Laboratory Coordinator QA/QC

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

Water Pollution Control Laboratory  
 6543 N. Burlington Ave.  
 Portland, Oregon 97203-4552  
 Sample Custodian: (503) 823-5696  
 General Lab: (503) 823-5681



City of Portland  
 Chain-of-Custody



Bureau of Environmental Services

Date: 2/8/17

Work Order #: W178063

Collected By: KEB ASA

Client Name: Director's Office  
 Matrix: Stormwater  
 Project Name: Portland Harbor

Requested Analyses *Connect roll 3*

Lab Number	2016 Stormwater Outfall Monitoring COC		Requested Analyses										# of Containers	Remarks	
	Location ID	Sample Date	Sample Time	Sample Type	TSS	Total Metals (As, Cd, Cr, Cu, Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs + phthalates (low-level)	Pesticides (Low-level)	Conductivity (umhos/cm)	pH (pH units)			Temperature (Deg C)
01	44-sw20	2/8/17	0947	G	0	0	0	0	0	0	29	6.4	4.9	5	
02	45-sw1	↓	1010	G	0	0	0	0	0	0	29	6.6	4.5	4	
03	m2-sw1	↓	1059	G	0	0	0	0	0	0	45	6.9	6.1	4	
04	Dup	2/8/17		G	0	0	0	0	0	0				5	

Inquired By: *Andrew Arnsberg* Date: 2/8/17  
 Signature: *Andrew Arnsberg*  
 Relinquished By: *Andrew Arnsberg* Date: 2/8/17  
 Signature: *Andrew Arnsberg*  
 Received By: *Andrew Arnsberg* Date: 2/8/17  
 Signature: *Andrew Arnsberg*  
 Printed Name: Andrew Arnsberg Time: 1148  
 Printed Name: Andrew Arnsberg Time: 1148





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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

March 15, 2017

**Analytical Report for Service Request No: K1701324**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W17B063**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory February 09, 2017  
For your reference, these analyses have been assigned our service request number **K1701324**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

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## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



# Case Narrative

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS ENVIRONMENTAL

**Client:** Portland, City of  
**Project:** Portland Harbor/ W17B063  
**Sample Matrix:** Water

**Service Request No.:** K1701324  
**Date Received:** 02/09/17

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

#### Sample Receipt

Four water samples were received for analysis at ALS Environmental on 02/09/17. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### Organochlorine Pesticides by EPA Method 8081

##### **Calibration Verification Exceptions:**

The upper control criterion was exceeded for 4,4'-DDT in the associated Continuing Calibration Verification (CCV). The field samples analyzed in this sequence did not contain the analyte in question. Since the apparent problem indicated a potential high bias, the data quality was not affected. No further corrective action was required.

##### **Matrix Spike Recovery Exceptions:**

Insufficient sample volume was received to perform a Matrix Spike/Matrix Spike Duplicate (MS/MSD). A Laboratory Control Sample/Duplicate Laboratory Control Sample (LCS/DLCS) was analyzed and reported in lieu of the MS/MSD for these samples.

##### **Elevated Detection Limits:**

The reporting limit is elevated for several analytes in both field samples. The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compounds at the reporting limit. The results are flagged to indicate the matrix interference.

No other anomalies associated with the analysis of these samples were observed.

#### Chlorinated Biphenyl Congeners by EPA Method 1668C

The analysis for PCB Congeners was performed at ALS Environmental, Texas Laboratory. The data for this analysis is included in the corresponding section of this report.

Approved by \_\_\_\_\_





# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

**SUBCONTRACT ORDER**

City of Portland Water Pollution Control Lab

**W17B063**

*K1701304*

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 Phone: 503-823-5600  
 Fax: 503-823-5656  
 Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

ALS Environmental  
 1317 S. 13th Avenue  
 Kelso, WA 98626  
 Phone : (360) 577-7222  
 Fax: (360) 636-1068

WPCL Project Name  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>	
<input checked="" type="checkbox"/> Standard	
<input type="checkbox"/> Rush _ day(s)	

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W17B063-01</b>	<b>Water</b>	<b>Sampled:02/08/17 09:47</b>		
Out-Pesticides Chlor LL	02/23/17 17:00	02/15/17 09:47		Report to MDL
Out-PCB Congeners 209	02/23/17 17:00	08/07/17 09:47		
<i>Containers Supplied:</i>				
G amber 1L (A)	G amber 1L (B)			
<b>Sample ID: W17B063-02</b>	<b>Water</b>	<b>Sampled:02/08/17 10:10</b>		
Out-PCB Congeners 209	02/23/17 17:00	08/07/17 10:10		
<i>Containers Supplied:</i>				
G amber 1L (A)				
<b>Sample ID: W17B063-03</b>	<b>Water</b>	<b>Sampled:02/08/17 10:59</b>		
Out-PCB Congeners 209	02/23/17 17:00	08/07/17 10:59		
<i>Containers Supplied:</i>				
G amber 1L (A)				
<b>Sample ID: W17B063-04</b>	<b>Water</b>	<b>Sampled:02/08/17 00:00</b>		
Out-Pesticides Chlor LL	02/23/17 17:00	02/15/17 00:00		Report to MDL
Out-PCB Congeners 209	02/23/17 17:00	08/07/17 00:00		
<i>Containers Supplied:</i>				
G amber 1L (A)	G amber 1L (B)			

	<i>2/19/17</i>	<i>11:30</i>	<i>Deepti ALS</i>	<i>2/9/17</i>	<i>11:30</i>
Released By	Date		Received By	Date	
			<i>Kullasman</i>	<i>2/9/17</i>	<i>1330</i>
Released By	Date		Received By	Date	



PC H2

### Cooler Receipt and Preservation Form

Client WPCC Service Request K17 01304  
 Received: 2/9/17 Opened: 2/9/17 By: CG Unloaded: 2/9/17 By: CG

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered  
 2. Samples were received in: (circle) Cooler Box Envelope Other NA  
 3. Were custody seals on coolers? NA Y N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
5.4	5.3	✓	✓	-0.1	356	NA	NA	NA

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves No cooling/NA  
 5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N  
 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N  
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed  
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N  
 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N  
 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N  
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N  
 11. Were VOA vials received without headspace? Indicate in the table below. NA Y N  
 12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Organochlorine Pesticides

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Collected:** 02/08/2017  
**Date Received:** 02/09/2017

**Organochlorine Pesticides**

**Sample Name:** W17B063-01  
**Lab Code:** K1701324-001  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	1.1	0.20	1	02/15/17	02/23/17	KWG1701135	
beta-BHC	ND	Ui	1.1	1.1	1	02/15/17	02/23/17	KWG1701135	
gamma-BHC (Lindane)	ND	Ui	1.1	0.52	1	02/15/17	02/23/17	KWG1701135	
delta-BHC	ND	U	1.1	0.21	1	02/15/17	02/23/17	KWG1701135	
Heptachlor	ND	U	1.1	0.14	1	02/15/17	02/23/17	KWG1701135	
Aldrin	ND	U	1.1	0.21	1	02/15/17	02/23/17	KWG1701135	
Heptachlor Epoxide	ND	U	1.1	0.71	1	02/15/17	02/23/17	KWG1701135	
gamma-Chlordane†	ND	U	1.1	0.22	1	02/15/17	02/23/17	KWG1701135	
Endosulfan I	ND	U	1.1	0.16	1	02/15/17	02/23/17	KWG1701135	
alpha-Chlordane	ND	Ui	1.1	0.22	1	02/15/17	02/23/17	KWG1701135	
Dieldrin	ND	Ui	1.1	1.1	1	02/15/17	02/23/17	KWG1701135	
4,4'-DDE	ND	U	1.1	0.12	1	02/15/17	02/23/17	KWG1701135	
Endrin	ND	U	1.1	0.19	1	02/15/17	02/23/17	KWG1701135	
Endosulfan II	ND	U	1.1	0.21	1	02/15/17	02/23/17	KWG1701135	
4,4'-DDD	ND	U	1.1	0.29	1	02/15/17	02/23/17	KWG1701135	
Endrin Aldehyde	ND	Ui	2.6	2.6	1	02/15/17	02/23/17	KWG1701135	
Endosulfan Sulfate	ND	Ui	1.1	0.99	1	02/15/17	02/23/17	KWG1701135	
4,4'-DDT	ND	U	1.1	0.31	1	02/15/17	02/23/17	KWG1701135	
Endrin Ketone	ND	U	1.1	0.29	1	02/15/17	02/23/17	KWG1701135	
Methoxychlor	ND	Ui	2.3	2.3	1	02/15/17	02/23/17	KWG1701135	
Toxaphene	ND	Ui	110	110	1	02/15/17	02/23/17	KWG1701135	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	104	20-106	02/23/17	Acceptable
Decachlorobiphenyl	84	19-127	02/23/17	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments: \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Collected:** 02/08/2017  
**Date Received:** 02/09/2017

**Organochlorine Pesticides**

**Sample Name:** W17B063-04  
**Lab Code:** K1701324-004  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	1.1	0.20	1	02/15/17	02/24/17	KWG1701135	
beta-BHC	ND	Ui	1.9	1.9	1	02/15/17	02/24/17	KWG1701135	
gamma-BHC (Lindane)	ND	Ui	1.1	0.35	1	02/15/17	02/24/17	KWG1701135	
delta-BHC	ND	U	1.1	0.21	1	02/15/17	02/24/17	KWG1701135	
Heptachlor	ND	U	1.1	0.14	1	02/15/17	02/24/17	KWG1701135	
Aldrin	ND	U	1.1	0.21	1	02/15/17	02/24/17	KWG1701135	
Heptachlor Epoxide	ND	U	1.1	0.72	1	02/15/17	02/24/17	KWG1701135	
gamma-Chlordane†	ND	U	1.1	0.22	1	02/15/17	02/24/17	KWG1701135	
Endosulfan I	ND	U	1.1	0.16	1	02/15/17	02/24/17	KWG1701135	
alpha-Chlordane	ND	U	1.1	0.18	1	02/15/17	02/24/17	KWG1701135	
Dieldrin	ND	Ui	1.1	0.85	1	02/15/17	02/24/17	KWG1701135	
4,4'-DDE	ND	Ui	1.1	0.46	1	02/15/17	02/24/17	KWG1701135	
Endrin	ND	U	1.1	0.19	1	02/15/17	02/24/17	KWG1701135	
Endosulfan II	ND	Ui	1.1	0.25	1	02/15/17	02/24/17	KWG1701135	
4,4'-DDD	ND	U	1.1	0.29	1	02/15/17	02/24/17	KWG1701135	
Endrin Aldehyde	ND	Ui	2.5	2.5	1	02/15/17	02/24/17	KWG1701135	
Endosulfan Sulfate	ND	Ui	1.3	1.3	1	02/15/17	02/24/17	KWG1701135	
4,4'-DDT	ND	U	1.1	0.31	1	02/15/17	02/24/17	KWG1701135	
Endrin Ketone	ND	U	1.1	0.29	1	02/15/17	02/24/17	KWG1701135	
Methoxychlor	ND	U	1.1	0.23	1	02/15/17	02/24/17	KWG1701135	
Toxaphene	ND	U	52	20	1	02/15/17	02/24/17	KWG1701135	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	99	20-106	02/24/17	Acceptable
Decachlorobiphenyl	83	19-127	02/24/17	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments: \_\_\_\_\_

Analytical Results

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA

**Organochlorine Pesticides**

**Sample Name:** Method Blank  
**Lab Code:** KWG1701135-5  
**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	1.0	0.19	1	02/15/17	02/24/17	KWG1701135	
beta-BHC	0.53	JP	1.0	0.47	1	02/15/17	02/24/17	KWG1701135	
gamma-BHC (Lindane)	ND	U	1.0	0.22	1	02/15/17	02/24/17	KWG1701135	
delta-BHC	ND	U	1.0	0.20	1	02/15/17	02/24/17	KWG1701135	
Heptachlor	ND	U	1.0	0.13	1	02/15/17	02/24/17	KWG1701135	
Aldrin	ND	U	1.0	0.20	1	02/15/17	02/24/17	KWG1701135	
Heptachlor Epoxide	ND	U	1.0	0.69	1	02/15/17	02/24/17	KWG1701135	
gamma-Chlordane†	ND	U	1.0	0.21	1	02/15/17	02/24/17	KWG1701135	
Endosulfan I	ND	U	1.0	0.15	1	02/15/17	02/24/17	KWG1701135	
alpha-Chlordane	ND	U	1.0	0.17	1	02/15/17	02/24/17	KWG1701135	
Dieldrin	ND	U	1.0	0.23	1	02/15/17	02/24/17	KWG1701135	
4,4'-DDE	ND	U	1.0	0.11	1	02/15/17	02/24/17	KWG1701135	
Endrin	ND	U	1.0	0.18	1	02/15/17	02/24/17	KWG1701135	
Endosulfan II	ND	U	1.0	0.20	1	02/15/17	02/24/17	KWG1701135	
4,4'-DDD	ND	U	1.0	0.28	1	02/15/17	02/24/17	KWG1701135	
Endrin Aldehyde	ND	U	1.0	0.22	1	02/15/17	02/24/17	KWG1701135	
Endosulfan Sulfate	ND	U	1.0	0.84	1	02/15/17	02/24/17	KWG1701135	
4,4'-DDT	ND	U	1.0	0.30	1	02/15/17	02/24/17	KWG1701135	
Endrin Ketone	ND	U	1.0	0.28	1	02/15/17	02/24/17	KWG1701135	
Methoxychlor	ND	U	1.0	0.22	1	02/15/17	02/24/17	KWG1701135	
Toxaphene	ND	U	50	19	1	02/15/17	02/24/17	KWG1701135	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	72	20-106	02/24/17	Acceptable
Decachlorobiphenyl	66	19-127	02/24/17	Acceptable

† Analyte Comments

gamma-Chlordane For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments: \_\_\_\_\_

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324

**Surrogate Recovery Summary  
 Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** Percent  
**Level:** Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>	<u>Sur2</u>
W17B063-01	K1701324-001	104	84
W17B063-04	K1701324-004	99	83
Method Blank	KWG1701135-5	72	66
Lab Control Sample	KWG1701135-1	75	68
Duplicate Lab Control Sample	KWG1701135-2	71	56

**Surrogate Recovery Control Limits (%)**

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Sur1 = Tetrachloro-m-xylene	20-106
Sur2 = Decachlorobiphenyl	19-127

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Results flagged with an asterisk (\*) indicate values outside control criteria.  
 Results flagged with a pound (#) indicate the control criteria is not applicable.

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Extracted:** 02/15/2017  
**Date Analyzed:** 02/24/2017

**Lab Control Spike/Duplicate Lab Control Spike Summary**  
**Organochlorine Pesticides**

**Extraction Method:** EPA 3535A  
**Analysis Method:** 8081B

**Units:** ng/L  
**Basis:** NA  
**Level:** Low  
**Extraction Lot:** KWG1701135

Analyte Name	Lab Control Sample KWG1701135-1 Lab Control Spike			Duplicate Lab Control Sample KWG1701135-2 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
alpha-BHC	7.40	10.0	74	7.07	10.0	71	36-122	5	30
beta-BHC	7.78	10.0	78	7.70	10.0	77	42-125	1	30
gamma-BHC (Lindane)	7.35	10.0	74	7.26	10.0	73	44-117	1	30
delta-BHC	6.77	10.0	68	6.63	10.0	66	48-123	2	30
Heptachlor	7.55	10.0	76	7.46	10.0	75	40-115	1	30
Aldrin	7.36	10.0	74	7.35	10.0	74	10-102	0	30
Heptachlor Epoxide	7.31	10.0	73	7.08	10.0	71	49-109	3	30
gamma-Chlordane	7.57	10.0	76	6.94	10.0	69	47-113	9	30
Endosulfan I	6.94	10.0	69	7.02	10.0	70	35-115	1	30
alpha-Chlordane	7.10	10.0	71	6.95	10.0	69	45-115	2	30
Dieldrin	7.64	10.0	76	7.72	10.0	77	50-115	1	30
4,4'-DDE	6.32	10.0	63	6.25	10.0	63	41-116	1	30
Endrin	7.47	10.0	75	7.14	10.0	71	48-126	5	30
Endosulfan II	7.16	10.0	72	6.65	10.0	67	28-128	7	30
4,4'-DDD	8.12	10.0	81	7.82	10.0	78	33-132	4	30
Endrin Aldehyde	7.77	10.0	78	7.33	10.0	73	27-104	6	30
Endosulfan Sulfate	7.25	10.0	72	7.09	10.0	71	38-118	2	30
4,4'-DDT	9.18	10.0	92	8.75	10.0	88	42-143	5	30
Endrin Ketone	5.76	10.0	58	5.94	10.0	59	30-124	3	30
Methoxychlor	7.86	10.0	79	8.39	10.0	84	43-143	6	30
Toxaphene	242	400	60	255	400	64	36-137	5	30

Results flagged with an asterisk (\*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
T: +1 713 266 1599  
F: +1 713 266 1599  
[www.alsglobal.com](http://www.alsglobal.com)

February 28, 2017.

Service Request No: K1701324

Howard Holmes.

ALS Environmental  
1317 South 13<sup>th</sup> Avenue  
Kelso, WA 98626

**Laboratory Result for: City of Portland.**

Dear Howard:

Enclosed are the results of the sample(s) submitted to our laboratory on February 15, 2017. For Your reference, these analyses have been assigned our service request number: **K1701324**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and considered in their entirety, and ALS Environmental is not responsible for use of less than the final complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. In accordance to the TNI 2009 Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Please contact me if you have any questions. My direct line is 281-575-2279. You may also contact me via email at [Arthi.Kodur@alsglobal.com](mailto:Arthi.Kodur@alsglobal.com)

Respectfully submitted,

**ALS Group USA Corp., dba ALS Environmental**

Arthi Kodur  
Project Manager

Page 1 of \_\_\_\_\_



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS ENVIRONMENTAL

**Client:** City of Portland  
**Project:** Portland Harbor  
**Sample Matrix:** Water

**Service Request No.:** K1701324  
**Date Received:** 2/15/17

### ALS ENVIRONMENTAL NARRATIVE

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt

Four waters were received for analysis at ALS Environmental – Houston HRMS on 2/15/17.

The date of receipt currently references the date ALS Environmental-Kelso received the samples (2/9/17) and not the date ALS Environmental-Houston HRMS received the samples (2/15/17).

The samples were received at 0.9°C in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### Data Validation Notes and Discussion

##### Precision and Accuracy

EQ1700064: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of an MS/DMS for this extraction batch. The batch quality was met.

##### K flags

EMPC - When the ion abundance ratios associated with a particular compound are outside the QC limits, samples are flagged with a 'K' flag. A 'K' flag indicates an estimated maximum possible concentration for the associated compound.

K1701324-002: 28L not meet ion ratio and not within 15 % CCAL 16L, 37L < 2.5 SN.

K1701324-003: 19L, 28L, 52L not meet ion ratio and not within 15 % CCAL

##### Detection Limits

Detection limits are calculated for each congener in each sample by measuring the height of the noise level for each quantitation ion for the associated labeled standard. The concentration equivalent to 2.5 times the height of the noise is then calculated using the appropriate response factor and the weight of the sample. The calculated concentration equals the detection limit.

Where the EDL is greater than the MRL, the MRL will increase to equal the EDL.

**The TEO Summary results for each sample have been calculated by ALS ENVIRONMENTAL/Houston to include:**

- WHO-2005 TEFs, The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds (M. Van den Berg et al., Toxicological Sciences 93(2):223-241, 2006)
- Non-detected compounds are not included in the 'Total'

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063

**Service Request:**K1701324

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
K1701324-001	W17B063-01	2/8/2017	0947
K1701324-002	W17B063-02	2/8/2017	1010
K1701324-003	W17B063-03	2/8/2017	1059
K1701324-004	W17B063-04	2/8/2017	0000

# Service Request Summary

6 1000 ml-Glass Bottle NM AMBER Teflon Liner Unpreserved  
 Location: E-Disposed, K-Disposed  
 Pressure Gas:

**Folder #:** K1701324  
**Client Name:** Portland, City of  
**Project Name:** Portland Harbor  
**Project Number:** W17B063

**Report To:** Jennifer Shackelford  
 City of Portland  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 USA

**Phone Number:** 503-823-5614  
**Cell Number:**  
**Fax Number:** 503-823-4500  
**E-mail:** jennifer.shackelford@portlandoregon.gov

**Project Chemist:** Howard Holmes  
**Originating Lab:** KELSO  
**Logged By:** KSMITH  
**Date Received:** 02/09/17  
**Internal Due Date:** 2/28/2017  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y  
**Report to MDL?:** Y  
**P.O. Number:** 30004890  
**EDD:** City Of Portland

Lab Samp No.	Client Samp No	Matrix	Collected	KELSO	HOUSTON
K1701324-001	W17B063-01	Water	02/08/17 0947	II	II
K1701324-002	W17B063-02	Water	02/08/17 1010		II
K1701324-003	W17B063-03	Water	02/08/17 1059		II
K1701324-004	W17B063-04	Water	02/08/17 0000	II	II

**Folder Comments:**  
 Tier II

## Service Request Summary

6 1000 ml-Glass Bottle NM AMBER Teflon Liner Unpreserved  
Location: E-Disposed, K-Disposed  
Pressure Gas:

Project Chemist: Howard Holmes  
Originating Lab: KELSO  
Logged By: KSMITH  
Date Received: 02/09/17  
Internal Due Date: 2/28/2017  
QAP: LAB QAP  
Qualifier Set: Lab Standard  
Formset: Lab Standard  
Merged?: Y  
Report to MDL?: Y  
P.O. Number: 30004890  
EDD: City Of Portland

**Folder #:** K1701324  
**Client Name:** Portland, City of  
**Project Name:** Portland Harbor  
**Project Number:** W17B063  
**Report To:** Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203  
USA  
**Phone Number:** 503-823-5614  
**Cell Number:**  
**Fax Number:** 503-823-4500  
**E-mail:** jennifer.shackelford@portlandoregon.gov

### **Test Comments:**

<b>Group</b>	<b>Test/Method</b>	<b>Samples</b>	<b>Comments</b>
Semivoa GC	Pest OC ULL/8081B	2	LJ 12822
Semivoa GCMS	CI Biphen Cong/1668A	1	209 Congeners rcvd 2/15/17
Semivoa GCMS	CI Biphen Cong/1668A	3	209 Congeners

## Data Qualifiers

### HRMS Qualifier Set

- B Indicates the associated analyte was found in the method blank at >1/10th the reported value.
- E Estimated value. The reported concentration is above the calibration range of the instrument.
- H Sample extracted and/or analyzed out of suggested holding time.
- J Estimated value. The reported concentration is below the MRL.
- K The ion abundance ratio between the primary and secondary ions were outside of theoretical acceptance limits. The concentration of this analyte should be considered as an estimate.
- P Chlorodiphenyl ether interference was present at the retention time of the target analyte. Reported result should be considered an estimate.
- Q Monitored lock-mass indicates matrix-interference. Reported result is estimated.
- S Signal saturated detector. Result reported from dilution.
- U Compound was analyzed for, but was not detected (ND).
- X See Case Narrative.
- Y Isotopically Labeled Standard recovery outside of acceptance limits. In all cases, the signal-to-nois ratios are greater than 10:1, making the recoveries acceptable.
  - i The MDL/MRL have been elevated due to a matrix interference.

# ALS Laboratory Group

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## Acronyms

Cal	Calibration
Conc	CONCEntration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient

### State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
American Association for Laboratory Accreditation	2897.01	11/30/2017
Arizona Department of Health Services	AZ0793	5/27/2017
Arkansas Department of Environmental Quality	14-038-0	6/16/2017
Florida Department of Health	E87611	6/30/2017
Hawaii Department of Health	TX02694	4/30/2017
Illinois Environmental Protection Agency	200057	5/9/2017
Kansas Department of Health and Environment	E-10406	7/31/2017
Louisiana Department of Environmental Quality	03048	6/30/2017
Maine Center for Disease Control and Prevention	2014019	6/5/2018
Maryland Department of the Environment	343	6/30/2017
Michigan Department of Environmental Quality	9971	6/5/2018
Minnesota Department of Health	840911	12/31/2017
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2017
Nevada Department of Conservation and Natural Resources	TX014112013-2	7/31/2017
New Jersey Department of Environmental Protection	NLC140001	6/30/2017
New Mexico Environment Department	TX02694	4/17/2017
New York Department of Health	11707	4/1/2017
Oklahoma Department of Environmental Quality	2014 124	8/21/2017
Oregon Environmental Laboratory Accreditation Program	TX200002	3/24/2017
Pennsylvania Department of Environmental Protection	68-03441	6/30/2017
Tennessee Department of Environment and Conservation	04016	6/30/2017
Texas Commission on Environmental Quality	TX104704216-14-5	6/30/2017
United States Department of Agriculture	P330-14-00067	6/19/2018
Utah Department of Health Environmental Laboratory Certification	TX02694	7/31/2017
West Virginia Department of Environmental Protection	347	6/30/2017

ALS ENVIRONMENTAL – Houston  
Data Processing/Form Production and Peer Review Signatures

SR# Unique ID

K 1791324

DB-5MSUI

SPB-Octyl

**First Level - Data Processing - to be filled by person generating the forms**

Date:	Analyst:	Samples:
02/28/17	JC	-001, -002, -003, -004

**Second Level - Data Review – to be filled by person doing peer review**

Date:	Analyst:	Samples:
02/28/17	LKL	001 - 004



# Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

# Intra-Network Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

Project Name: Portland Harbor  
 Project Number: W17B063  
 Project Manager: Jennifer Shaekelford  
 Company: City of Portland  
 QAP: LAB QAP

K1701324

City of Portland  
Portland Harbor

5



Lab Code	Client Sample ID	# of Cont.	Matrix	Sample		Date Received	Send To
				Date	Time		
K1701324-001	W17B063-01	1	Water	2/8/17	0947	2/9/17	HOUSTON
K1701324-002	W17B063-02	1	Water	2/8/17	1010	2/9/17	HOUSTON
K1701324-003	W17B063-03	1	Water	2/8/17	1059	2/9/17	HOUSTON
K1701324-004	W17B063-04	1	Water	2/8/17	0000	2/9/17	HOUSTON

Cl Biphen Cong 1668A

**Test Comments**

Cl Biphen Cong - 1668A K1701324-001,2,3,4

**Folder Comments:**

Tier II

209 Congeners

**Special Instructions/Comments**

Please provide the electronic (PDF and EDD) report to the following e-mail address:  
 ALKLS.Data@alsglobal.com.

**Turnaround Requirements**

       RUSH (Surcharges Apply)

PLEASE CIRCLE WORK DAYS

1 2 3 4 5

       STANDARD

Requested FAX Date: \_\_\_\_\_

Requested Report Date: 02/24/17

**Report Requirements**

       I. Results Only

  X   II. Results + QC Summaries

       III. Results + QC and Calibration Summaries

       IV. Data Validation Report with Raw Data

PQL/MDL/J   Y  

EDD   Y  

**Invoice Information**

PO#

51K1701324

Bill to

Checked \_\_\_\_\_

Received By: 2/14/17

Received By: 2/15/17 8:35

Airbill Number: \_\_\_\_\_

Client/Project ALS Kelso

 Thermometer ID SMO 4

 Date/Time Received: 2/15/17 8:35

 Initials: AL

 Date/Time Logged in: 2/15/17

 Initials AL

 1. Method of delivery:  US Mail  Fed Ex  UPS  DHL  Courier  Client

 2. Samples received in:  Cooler  Box  Envelope  Other

 3. Were custody seals on coolers?  Yes  No  
 Were they intact?  Yes  No  N/A  
 Were they signed and dated?  Yes  No  N/A

 If yes, how many and where?  

No Seals

 4. Packing Material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Sleeves  Other

 5. Foreign or Regulated Soil?  Yes  No Location of Sampling: \_\_\_\_\_

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
7227 2428 2131		2/15/17	9:33	AL	19/0.9	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

- 5. Were custody papers properly filled out (ink, signed, dated, etc)?  Yes  No
- 7. Did all bottles arrive in good condition (not broken, no signs of leakage)?  Yes  No
- 3. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)?  Yes  No
- 9. Were appropriate bottles/containers and volumes received for the requested tests?  Yes  No
- 10. Did sample labels and tags agree with custody documents?  Yes  No

Notes, Discrepancies, & Resolutions:

Service request Label:

**K1701324** **5**  
 City of Portland  
 Portland Harbor  




## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

# Preparation Information Benchsheet

**Prep Run#:** 281737      **Prep WorkFlow:** OrgExtAq(365)      **Status:** Prepped  
**Team:** Semivoa GCMS/JGHOSH      **Prep Method:** Method Sep Funnel/Jar      **Prep Date/Time:** 2/16/17 08:00 AM

#	Lab Code	Client ID	B#	Method /Test	pH	CI	Matrix	Amt. Ext.	Sample Description
1	EQ1700064-01	MB		1668A/CI Biphphen Cong	5	x	Liquid	1000mL	
2	EQ1700064-02	LCS		1668A/CI Biphphen Cong	5	x	Liquid	1000mL	
3	EQ1700064-03	DLCS		1668A/CI Biphphen Cong	5	x	Liquid	1000mL	
4	K1701324-001	W17B063-01	.02	1668A/CI Biphphen Cong	5	x	Water	1031mL	Light brown liquid
5	K1701324-002	W17B063-02	.01	1668A/CI Biphphen Cong	5	x	Water	974mL	Light brown liquid; cloudy
6	K1701324-003	W17B063-03	.01	1668A/CI Biphphen Cong	5	x	Water	1028mL	Light brown liquid
7	K1701324-004	W17B063-04	.02	1668A/CI Biphphen Cong	5	x	Water	989mL	Off white liquid
8	K1701325-001	W17B060-01	.01	1668A/CI Biphphen Cong	5	x	Water	1018mL	Dark brown liquid
9	K1701325-002	W17B060-02	.01	1668A/CI Biphphen Cong	5	x	Water	995mL	Clear liquid

### Spiking Solutions

**Name:** 1668A Labeled Working Standard      **Inventory ID:** 178765      **Logbook Ref:** 178765 TW 1/19/20 2-4NG/ML      **Expires On:** 07/18/2017

EQ1700064-01	1,000.00µL	EQ1700064-02	1,000.00µL	EQ1700064-03	1,000.00µL	K1701324-001	1,000.00µL	K1701324-002	1,000.00µL	K1701324-003	1,000.00µL
K1701324-004	1,000.00µL	K1701325-001	1,000.00µL	K1701325-002	1,000.00µL						

**Name:** 1668 A/C PCB Congener (209) Working Matrix      **Inventory ID:** 179224      **Logbook Ref:** 179224 TW 02/8/17 10-30NG/ML      **Expires On:** 08/07/2017

EQ1700064-02	100.00µL	EQ1700064-03	100.00µL								
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**Name:** 1668A Clean Up Working Standard      **Inventory ID:** 179322      **Logbook Ref:** 179322 2/14/17 CID20.0ng/ml      **Expires On:** 08/13/2017

EQ1700064-01	100.00µL	EQ1700064-02	100.00µL	EQ1700064-03	100.00µL	K1701324-001	100.00µL	K1701324-002	100.00µL	K1701324-003	100.00µL
K1701324-004	100.00µL	K1701325-001	100.00µL	K1701325-002	100.00µL						

### Preparation Materials

Sensafé Free Chlorine WTR	LM 3/19/15 (79756)	Glass Wool	CID 12/22/16 (178182)	Hexanes 95%	CID 1/16/17 (178630)
CHK					
Dichloromethane (Methylene Chloride) 99.9% MeCl <sub>2</sub>	JP 1/10/16 (178535)	Sodium Hydroxide Reagent Grade NaOH	CID 5/23/2016 (172624)	Sodium Sulfate Anhydrous Reagent Grade Na <sub>2</sub> SO <sub>4</sub>	AL 122816 300107005-09 (178440)
Tridecane (n-Tridecane) sulfuric acid	AL 1/25/17 (178887) CID 10/11/16 (176335)	ColorpHast pH-Indicator Strips	AL 8/17/16 (175089)	Silica Gel	CID 1/9/17 (178503)

### Preparation Steps

Step:	Step:	Step:	Step:	Step:	Step:
Extraction	Acid Clean	Silica Gel Clean	Silica Gel Clean	Final Volume	
Started: 2/16/17 08:00	Started: 2/20/17 10:30	Started: 2/21/17 08:00	Started: 2/21/17 08:00	Started: 2/22/17 15:20	
Finished: 2/16/17 14:15	Finished: 2/20/17 11:05	Finished: 2/21/17 09:35	Finished: 2/21/17 09:35	Finished: 2/22/17 15:40	
By: JGHOSH	By: CDIAZ	By: CDIAZ	By: CDIAZ	By: CDIAZ	Comments
Comments	Comments	Comments	Comments	Comments	

# Preparation Information Benchsheet

Prep Run#: 281737  
Team: Semivoa GCMS/JGHOSH

Prep WorkFlow: OrgExtAq(365)  
Prep Method: Method Sep Funnel/Jar

Status: Prepped  
Prep Date/Time: 2/16/17 08:00 AM

Comments:

Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_

Number of Custody

Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_

Received By: \_\_\_\_\_ Date: \_\_\_\_\_

Extracts Examined  
Yes No



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-01  
**Lab Code:** K1701324-001

**Service Request:** K1701324  
**Date Collected:** 02/08/17 09:47  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1031mL  
**Data File Name:** P303469  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 15:31  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 1	ND	U	81.3	81.3			1
PCB 2	ND	U	92.9	92.9			1
PCB 3	ND	U	81.8	81.8			1
PCB 4	ND	U	77.6	77.6			1
PCB 10	ND	U	44.6	48.5			1
PCB 9	ND	U	13.2	19.4			1
PCB 7	ND	U	12.1	19.4			1
PCB 6	ND	U	12.4	19.4			1
PCB 5	ND	U	12.8	19.4			1
PCB 8	26.0J		12.6	48.5	-	1.182	1
PCB 14	ND	U	12.5	19.4			1
PCB 11	411		12.9	97.0	-	0.972	1
PCBs 12 + 13	ND	U	12.8	48.5			1
PCB 15	49.6		9.84	19.4	-	1.001	1
PCB 19	ND	U	78.1	78.1			1
PCBs 18 + 30	ND	U	55.7	55.7			1
PCB 17	ND	U	66.7	66.7			1
PCB 27	ND	U	46.4	46.4			1
PCB 24	ND	U	48.1	48.1			1
PCB 16	ND	U	75.6	75.6			1
PCB 32	ND	U	44.3	44.3			1
PCB 34	ND	U	61.3	61.3			1
PCB 23	ND	U	60.3	60.3			1
PCBs 26 + 29	ND	U	62.8	62.8			1
PCB 25	ND	U	58.9	58.9			1
PCB 31	125		58.7	58.7	1.20	0.854	1
PCBs 20 + 28	122		59.6	59.6	1.07	0.864	1
PCBs 21 + 33	ND	U	62.9	62.9			1
PCB 22	ND	U	60.5	60.5			1
PCB 36	ND	U	60.1	60.1			1
PCB 39	ND	U	56.3	56.3			1
PCB 38	ND	U	61.7	61.7			1
PCB 35	ND	U	62.2	62.2			1
PCB 37	ND	U	58.0	58.0			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-01  
**Lab Code:** K1701324-001

**Service Request:** K1701324  
**Date Collected:** 02/08/17 09:47  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1031mL  
**Data File Name:** P303469  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 15:31  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 54	ND	U	45.2	45.2			1
PCBs 50 + 53	ND	U	55.5	97.0			1
PCBs 45 + 51	ND	U	57.5	57.5			1
PCB 46	ND	U	65.8	65.8			1
PCB 52	211		53.3	53.3	0.73	1.001	1
PCBs 43 + 73	ND	U	47.9	48.5			1
PCBs 49 + 69	77.9J		48.6	97.0	0.87	1.019	1
PCB 48	ND	U	53.0	53.0			1
PCBs 44 + 47 + 65	157		50.3	97.0	0.89	1.037	1
PCBs 59 + 62 + 75	ND	U	40.6	97.0			1
PCB 42	ND	U	57.5	97.0			1
PCBs 41 + 71 + 40	ND	U	53.0	97.0			1
PCB 64	70.1K		39.9	48.5	0.56	1.083	1
PCB 72	ND	U	38.4	48.5			1
PCB 68	ND	U	37.1	48.5			1
PCB 57	ND	U	39.1	48.5			1
PCB 58	ND	U	39.4	48.5			1
PCB 67	ND	U	39.8	48.5			1
PCB 63	ND	U	37.6	48.5			1
PCBs 70 + 61 + 74 + 76	377		39.1	194	0.75	1.173	1
PCB 66	190		37.6	48.5	0.71	1.184	1
PCB 55	ND	U	40.2	48.5			1
PCB 56	114		49.5	49.5	0.78	0.916	1
PCB 60	ND	U	45.9	48.5			1
PCB 80	ND	U	42.0	48.5			1
PCB 79	ND	U	42.5	48.5			1
PCB 78	ND	U	43.9	48.5			1
PCB 81	ND	U	41.2	41.2			1
PCB 77	49.8		42.0	42.0	0.71	1.000	1
PCB 104	ND	U	51.0	51.0			1
PCB 96	ND	U	39.3	48.5			1
PCB 103	ND	U	45.2	48.5			1
PCB 94	ND	U	53.0	53.0			1
PCBs 95 + 93 + 100	344		48.6	194	1.44	1.105	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-01  
**Lab Code:** K1701324-001

**Service Request:** K1701324  
**Date Collected:** 02/08/17 09:47  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1031mL  
**Data File Name:** P303469  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 15:31  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCBs 98 + 102	ND	U	47.8	194			1
PCBs 88 + 91	86.1K		48.3	48.5	2.14	1.144	1
PCB 84	ND	U	54.3	54.3			1
PCB 89	ND	U	51.3	51.3			1
PCB 121	ND	U	30.6	48.5			1
PCB 92	82.0K		41.4	48.5	1.20	0.984	1
PCBs 90 + 101 + 113	463		33.7	194	1.60	1.000	1
PCBs 83 + 99	222		38.4	97.0	1.70	1.017	1
PCB 112	ND	U	31.1	48.5			1
PCBs 86 + 87 + 97 + 109 + 119 + 125	356		33.3	194	1.52	1.036	1
PCBs 85 + 116 + 117	90.5J		32.0	97.0	1.56	1.054	1
PCBs 110 + 115	714		28.3	97.0	1.45	1.059	1
PCB 82	73.0		44.5	48.5	1.39	1.069	1
PCB 111	ND	U	26.6	48.5			1
PCB 120	ND	U	26.7	48.5			1
PCBs 108 + 124	ND	U	42.1	97.0			1
PCB 107	ND	U	40.7	48.5			1
PCB 123	ND	U	35.1	35.1			1
PCB 106	ND	U	42.4	48.5			1
PCB 118	379		32.9	32.9	1.47	1.001	1
PCB 122	ND	U	45.9	48.5			1
PCB 114	ND	U	36.0	36.0			1
PCB 105	212		37.4	37.4	1.34	1.000	1
PCB 127	ND	U	41.3	48.5			1
PCB 126	ND	U	38.1	38.1			1
PCB 155	ND	U	21.3	21.3			1
PCB 152	ND	U	19.3	48.5			1
PCB 150	ND	U	19.8	48.5			1
PCB 136	116		20.2	48.5	1.22	1.027	1
PCB 145	ND	U	19.8	48.5			1
PCB 148	ND	U	24.2	48.5			1
PCBs 135 + 151 + 154	275		23.2	97.0	1.28	1.093	1
PCB 144	32.7JK		23.4	48.5	1.00	1.109	1
PCBs 147 + 149	738		27.2	97.0	1.18	0.903	1
PCB 134	ND	U	39.6	97.0			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-01  
**Lab Code:** K1701324-001

**Service Request:** K1701324  
**Date Collected:** 02/08/17 09:47  
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**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1031mL  
**Data File Name:** P303469  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 15:31  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 143	ND	U	26.0	97.0			1
PCBs 139 + 140	ND	U	26.7	97.0			1
PCB 131	ND	U	32.4	48.5			1
PCB 142	ND	U	29.3	48.5			1
PCB 132	315		28.7	48.5	1.12	0.933	1
PCB 133	ND	U	29.1	48.5			1
PCB 165	ND	U	22.1	48.5			1
PCB 146	123		24.3	48.5	1.13	0.956	1
PCB 161	ND	U	21.5	48.5			1
PCBs 153 + 168	655		21.6	97.0	1.24	0.971	1
PCB 141	191		26.9	48.5	1.30	0.977	1
PCB 130	40.9JK		29.8	48.5	0.93	0.986	1
PCB 137	35.7J		25.5	48.5	1.31	0.990	1
PCB 164	71.2		21.2	48.5	1.06	0.994	1
PCBs 129 + 138 + 163	1330		33.0	194	1.17	1.001	1
PCB 160	ND	U	13.2	194			1
PCB 158	97.1K		19.2	48.5	1.04	1.009	1
PCBs 128 + 166	150		23.1	97.0	1.37	1.032	1
PCB 159	ND	U	31.3	48.5			1
PCB 162	ND	U	30.1	48.5			1
PCB 167	ND	U	22.7	22.7			1
PCBs 156 + 157	102		36.0	38.8	1.32	0.999	1
PCB 169	ND	U	23.1	23.1			1
PCB 188	ND	U	21.2	21.2			1
PCB 179	149		18.6	48.5	1.01	1.011	1
PCB 184	ND	U	17.5	48.5			1
PCB 176	37.5J		18.9	48.5	1.01	1.033	1
PCB 186	ND	U	19.2	48.5			1
PCB 178	62.5		23.6	48.5	0.93	1.076	1
PCB 175	ND	U	22.5	48.5			1
PCB 187	378		21.8	48.5	0.94	1.098	1
PCB 182	ND	U	23.2	48.5			1
PCBs 183 + 185	193		43.3	97.0	1.15	1.113	1
PCB 174	333		44.3	48.5	1.10	1.121	1
PCB 177	192		45.0	48.5	1.04	1.132	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-01  
**Lab Code:** K1701324-001

**Service Request:** K1701324  
**Date Collected:** 02/08/17 09:47  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1031mL  
**Data File Name:** P303469  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 15:31  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 181	ND	U	40.5	48.5			1
PCBs 171 + 173	91.3	JK	44.2	97.0	1.25	1.147	1
PCB 172	ND	U	41.9	48.5			1
PCB 192	ND	U	33.2	48.5			1
PCBs 180 + 193	630		34.4	97.0	1.03	0.918	1
PCB 191	ND	U	30.8	48.5			1
PCB 170	232	K	40.6	48.5	0.88	0.943	1
PCB 190	38.6	JK	29.3	48.5	0.67	0.953	1
PCB 189	ND	U	28.8	28.8			1
PCB 202	48.5		17.0	19.4	0.82	1.000	1
PCB 201	20.0	JK	16.9	48.5	1.56	1.020	1
PCB 204	ND	U	17.2	48.5			1
PCB 197	ND	U	16.2	97.0			1
PCB 200	ND	U	16.7	97.0			1
PCBs 198 + 199	191		20.9	97.0	0.77	1.103	1
PCB 196	75.1		20.0	48.5	0.82	0.923	1
PCB 203	109	K	18.6	48.5	0.75	0.927	1
PCB 195	62.9		20.9	48.5	0.86	0.951	1
PCB 194	148		18.7	48.5	0.93	0.992	1
PCB 205	ND	U	19.0	19.4			1
PCB 208	ND	U	22.0	22.0			1
PCB 207	ND	U	21.4	48.5			1
PCB 206	85.8	K	49.4	49.4	0.91	1.000	1
PCB 209	ND	U	16.1	19.4			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-01  
**Lab Code:** K1701324-001

**Service Request:** K1701324  
**Date Collected:** 02/08/17 09:47  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1031mL  
**Data File Name:** P303469  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 15:31  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total MonoCB	ND	U	81.3	81.3			1
Total DiCB	487		9.84	19.4			1
Total TriCB	247		44.3	48.5			1
Total TetraCB	1250		37.1	194			1
Total PentaCB	3020		26.6	194			1
Total HexaCB	4270		13.2	19.4			1
Total HeptaCB	2140		17.5	19.4			1
Total OctaCB	654		16.2	19.4			1
Total NonaCB	85.8		21.4	21.4			1
Total PCBs	12300		9.84	194			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-01  
**Lab Code:** K1701324-001

**Service Request:** K1701324  
**Date Collected:** 02/08/17 09:47  
**Date Received:** 02/09/17 13:30  
**Units:** Percent  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1031mL  
**Data File Name:** P303469  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 15:31  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
PCB 1L	2000	742.022	37		15-150	2.81	0.745
PCB 3L	2000	875.280	44		15-150	3.01	0.873
PCB 4L	2000	793.120	40		25-150	1.54	0.889
PCB 15L	2000	1241.827	62		25-150	1.48	1.220
PCB 19L	2000	1294.925	65		25-150	1.11	1.067
PCB 37L	2000	1262.279	63		25-150	0.95	1.081
PCB 54L	2000	754.695	38		25-150	0.82	0.836
PCB 81L	2000	1483.237	74		25-150	0.66	1.321
PCB 77L	2000	1638.312	82		25-150	0.86	1.342
PCB 104L	2000	888.504	44		25-150	1.64	0.830
PCB 123L	2000	1369.770	68		25-150	1.58	1.132
PCB 118L	2000	1398.454	70		25-150	1.54	1.142
PCB 114L	2000	1393.574	70		25-150	1.64	1.157
PCB 105L	2000	1378.690	69		25-150	1.63	1.177
PCB 126L	2000	1533.651	77		25-150	1.64	1.264
PCB 155L	2000	947.241	47		25-150	1.34	0.806
PCB 167L	2000	1213.261	61		25-150	1.26	1.068
PCBs 156L + 157L	4000	2486.001	62		25-150	1.26	1.097
PCB 169L	2000	1267.429	63		25-150	1.25	1.171
PCB 188L	2000	1282.378	64		25-150	1.04	0.736
PCB 189L	2000	1623.620	81		25-150	1.08	0.963
PCB 202L	2000	1446.401	72		25-150	0.93	0.834
PCB 205L	2000	1321.307	66		25-150	0.91	1.008
PCB 208L	2000	1116.515	56		25-150	0.82	0.953
PCB 206L	2000	1259.613	63		25-150	0.79	1.039
PCB 209L	2000	1198.560	60		25-150	1.20	1.067
PCB 28L	2000	1366.852	68		30-135	1.03	0.933
PCB 111L	2000	1561.951	78		30-135	1.53	1.075
PCB 178L	2000	1386.396	69		30-135	1.04	1.009

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-01  
**Lab Code:** K1701324-001

**Service Request:** K1701324  
**Date Collected:** 02/08/17 09:47  
**Date Received:** 02/09/17 13:30

**Units:** pg/L  
**Basis:** NA

**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Toxicity Equivalency Quotient**

<b>Analyte Name</b>	<b>Result</b>	<b>DL</b>	<b>MRL</b>	<b>Dilution Factor</b>	<b>TEF</b>	<b>TEF - Adjusted Concentration</b>
PCB 81	ND	41.2	41.2	1	0.0003	
PCB 77	<b>49.8</b>	42.0	42.0	1	0.0001	0.00498
PCB 123	ND	35.1	35.1	1	0.00003	
PCB 118	<b>379</b>	32.9	32.9	1	0.00003	0.0114
PCB 114	ND	36.0	36.0	1	0.00003	
PCB 105	<b>212</b>	37.4	37.4	1	0.00003	0.00636
PCB 126	ND	38.1	38.1	1	0.1	
PCB 167	ND	22.7	22.7	1	0.00003	
PCBs 156 + 157	<b>102</b>	36.0	38.8	1	0.00003	0.00306
PCB 169	ND	23.1	23.1	1	0.03	
PCB 189	ND	28.8	28.8	1	0.00003	
<b>Total TEQ</b>						<b>0.0258</b>

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-02  
**Lab Code:** K1701324-002

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:10  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 974mL  
**Data File Name:** P303470  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 16:42  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 1	ND	U	72.2	72.2			1
PCB 2	ND	U	85.2	85.2			1
PCB 3	ND	U	77.1	77.1			1
PCB 4	ND	U	64.0	64.0			1
PCB 10	ND	U	39.5	51.3			1
PCB 9	ND	U	14.5	20.5			1
PCB 7	ND	U	13.3	20.5			1
PCB 6	ND	U	13.6	20.5			1
PCB 5	ND	U	14.1	20.5			1
PCB 8	ND	U	13.8	51.3			1
PCB 14	ND	U	13.7	20.5			1
PCB 11	525		14.1	103	-	0.972	1
PCBs 12 + 13	ND	U	14.0	51.3			1
PCB 15	ND	U	11.5	20.5			1
PCB 19	ND	U	70.0	70.0			1
PCBs 18 + 30	ND	U	51.2	51.3			1
PCB 17	ND	U	61.2	61.2			1
PCB 27	ND	U	42.6	42.6			1
PCB 24	ND	U	44.2	44.2			1
PCB 16	ND	U	69.4	69.4			1
PCB 32	ND	U	40.7	40.7			1
PCB 34	ND	U	63.3	63.3			1
PCB 23	ND	U	62.2	62.2			1
PCBs 26 + 29	ND	U	64.8	64.8			1
PCB 25	ND	U	60.7	60.7			1
PCB 31	ND	U	60.6	60.6			1
PCBs 20 + 28	ND	U	61.5	61.5			1
PCBs 21 + 33	ND	U	64.8	64.8			1
PCB 22	ND	U	62.4	62.4			1
PCB 36	ND	U	62.0	62.0			1
PCB 39	ND	U	58.1	58.1			1
PCB 38	ND	U	63.6	63.6			1
PCB 35	ND	U	64.2	64.2			1
PCB 37	ND	U	60.5	60.5			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-02  
**Lab Code:** K1701324-002

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:10  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 974mL  
**Data File Name:** P303470  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 16:42  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 54	ND	U	50.9	50.9			1
PCBs 50 + 53	ND	U	50.0	103			1
PCBs 45 + 51	ND	U	51.8	51.8			1
PCB 46	ND	U	59.4	59.4			1
PCB 52	141		48.0	51.3	0.70	1.001	1
PCBs 43 + 73	ND	U	43.2	51.3			1
PCBs 49 + 69	ND	U	43.9	103			1
PCB 48	ND	U	47.9	51.3			1
PCBs 44 + 47 + 65	101J		45.4	103	0.81	1.037	1
PCBs 59 + 62 + 75	ND	U	36.6	103			1
PCB 42	ND	U	51.9	103			1
PCBs 41 + 71 + 40	ND	U	47.9	103			1
PCB 64	46.2J		36.0	51.3	0.72	1.082	1
PCB 72	ND	U	34.7	51.3			1
PCB 68	ND	U	33.4	51.3			1
PCB 57	ND	U	35.3	51.3			1
PCB 58	ND	U	35.5	51.3			1
PCB 67	ND	U	35.9	51.3			1
PCB 63	ND	U	33.9	51.3			1
PCBs 70 + 61 + 74 + 76	168J		35.3	205	0.65	1.172	1
PCB 66	52.5K		33.9	51.3	0.52	1.184	1
PCB 55	ND	U	36.3	51.3			1
PCB 56	54.7		40.7	51.3	0.83	0.916	1
PCB 60	ND	U	37.7	51.3			1
PCB 80	ND	U	34.5	51.3			1
PCB 79	ND	U	34.9	51.3			1
PCB 78	ND	U	36.1	51.3			1
PCB 81	ND	U	33.4	33.4			1
PCB 77	ND	U	34.4	34.4			1
PCB 104	ND	U	59.9	59.9			1
PCB 96	ND	U	44.3	51.3			1
PCB 103	ND	U	50.9	51.3			1
PCB 94	ND	U	59.7	59.7			1
PCBs 95 + 93 + 100	252		54.7	205	1.73	1.106	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-02  
**Lab Code:** K1701324-002

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:10  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 974mL  
**Data File Name:** P303470  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 16:42  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCBs 98 + 102	ND	U	53.8	205			1
PCBs 88 + 91	ND	U	54.4	54.4			1
PCB 84	ND	U	61.2	61.2			1
PCB 89	ND	U	57.7	57.7			1
PCB 121	ND	U	31.5	51.3			1
PCB 92	ND	U	42.6	51.3			1
PCBs 90 + 101 + 113	302		34.6	205	1.69	1.001	1
PCBs 83 + 99	143		39.5	103	1.46	1.017	1
PCB 112	ND	U	32.0	51.3			1
PCBs 86 + 87 + 97 + 109 + 119 + 125	230		34.2	205	1.32	1.036	1
PCBs 85 + 116 + 117	49.2JK		32.9	103	1.84	1.054	1
PCBs 110 + 115	486		29.1	103	1.65	1.059	1
PCB 82	ND	U	45.8	51.3			1
PCB 111	ND	U	27.4	51.3			1
PCB 120	ND	U	27.4	51.3			1
PCBs 108 + 124	ND	U	44.0	103			1
PCB 107	ND	U	42.5	51.3			1
PCB 123	ND	U	34.5	34.5			1
PCB 106	ND	U	44.4	51.3			1
PCB 118	269		36.1	36.1	1.49	1.001	1
PCB 122	ND	U	48.0	51.3			1
PCB 114	ND	U	36.2	36.2			1
PCB 105	119		35.3	35.3	1.34	1.001	1
PCB 127	ND	U	43.2	51.3			1
PCB 126	ND	U	37.5	37.5			1
PCB 155	ND	U	19.5	20.5			1
PCB 152	ND	U	17.1	51.3			1
PCB 150	ND	U	17.5	51.3			1
PCB 136	76.7		17.9	51.3	1.16	1.027	1
PCB 145	ND	U	17.5	51.3			1
PCB 148	ND	U	21.4	51.3			1
PCBs 135 + 151 + 154	192		20.5	103	1.16	1.093	1
PCB 144	30.3J		20.7	51.3	1.37	1.110	1
PCBs 147 + 149	517		23.0	103	1.16	0.903	1
PCB 134	43.2J		33.5	103	1.38	0.908	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-02  
**Lab Code:** K1701324-002

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:10  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 974mL  
**Data File Name:** P303470  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 16:42  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 143	ND	U	22.0	103			1
PCBs 139 + 140	ND	U	22.6	103			1
PCB 131	ND	U	27.4	51.3			1
PCB 142	ND	U	24.8	51.3			1
PCB 132	220		24.3	51.3	1.31	0.933	1
PCB 133	ND	U	24.6	51.3			1
PCB 165	ND	U	18.7	51.3			1
PCB 146	78.3		20.6	51.3	1.30	0.956	1
PCB 161	ND	U	18.2	51.3			1
PCBs 153 + 168	473		18.3	103	1.21	0.971	1
PCB 141	118		22.7	51.3	1.22	0.977	1
PCB 130	ND	U	25.2	51.3			1
PCB 137	ND	U	21.6	51.3			1
PCB 164	49.2J		17.9	51.3	1.35	0.994	1
PCBs 129 + 138 + 163	894		27.9	205	1.14	1.000	1
PCB 160	ND	U	11.2	205			1
PCB 158	68.2		16.3	51.3	1.17	1.009	1
PCBs 128 + 166	109		19.5	103	1.15	1.031	1
PCB 159	ND	U	34.2	51.3			1
PCB 162	ND	U	32.9	51.3			1
PCB 167	28.0		22.9	22.9	1.35	1.001	1
PCBs 156 + 157	69.8		40.4	41.1	1.12	1.000	1
PCB 169	ND	U	24.9	24.9			1
PCB 188	ND	U	28.2	28.2			1
PCB 179	112		24.0	51.3	1.17	1.011	1
PCB 184	ND	U	22.6	51.3			1
PCB 176	ND	U	24.5	51.3			1
PCB 186	ND	U	24.9	51.3			1
PCB 178	50.0JK		30.6	51.3	1.38	1.077	1
PCB 175	ND	U	29.1	51.3			1
PCB 187	318		28.3	51.3	0.98	1.099	1
PCB 182	ND	U	30.0	51.3			1
PCBs 183 + 185	136		46.4	103	1.09	1.113	1
PCB 174	250		47.5	51.3	1.15	1.121	1
PCB 177	143		48.3	51.3	0.91	1.132	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-02  
**Lab Code:** K1701324-002

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:10  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 974mL  
**Data File Name:** P303470  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 16:42  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 181	ND	U	43.5	51.3			1
PCBs 171 + 173	ND	U	47.4	103			1
PCB 172	ND	U	44.9	51.3			1
PCB 192	ND	U	35.6	51.3			1
PCBs 180 + 193	528		36.9	103	1.03	0.918	1
PCB 191	ND	U	33.0	51.3			1
PCB 170	212		43.6	51.3	1.07	0.943	1
PCB 190	32.4JK		31.5	51.3	0.71	0.953	1
PCB 189	ND	U	29.8	29.8			1
PCB 202	30.0K		25.1	25.1	0.71	1.001	1
PCB 201	ND	U	24.0	51.3			1
PCB 204	ND	U	24.4	51.3			1
PCB 197	ND	U	23.1	103			1
PCB 200	ND	U	23.7	103			1
PCBs 198 + 199	168		29.7	103	0.76	1.103	1
PCB 196	83.9		28.5	51.3	0.94	0.923	1
PCB 203	91.5K		26.5	51.3	0.73	0.927	1
PCB 195	63.9		29.7	51.3	0.99	0.951	1
PCB 194	127		26.6	51.3	0.90	0.992	1
PCB 205	ND	U	26.2	26.2			1
PCB 208	33.4K		28.1	28.1	0.48	1.000	1
PCB 207	ND	U	28.3	51.3			1
PCB 206	62.7K		49.6	49.6	1.13	1.000	1
PCB 209	ND	U	25.7	25.7			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-02  
**Lab Code:** K1701324-002

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:10  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 974mL  
**Data File Name:** P303470  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 16:42  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total MonoCB	ND	U	72.2	72.2			1
Total DiCB	525		11.5	20.5			1
Total TriCB	ND	U	40.7	51.3			1
Total TetraCB	564		33.4	205			1
Total PentaCB	1850		27.4	205			1
Total HexaCB	2970		11.2	20.5			1
Total HeptaCB	1640		22.6	22.6			1
Total OctaCB	565		23.1	23.1			1
Total NonaCB	96.2		28.1	28.1			1
Total PCBs	8350		11.2	205			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-02  
**Lab Code:** K1701324-002

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:10  
**Date Received:** 02/09/17 13:30  
**Units:** Percent  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 974mL  
**Data File Name:** P303470  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 16:42  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
PCB 1L	2000	737.577	37		15-150	2.97	0.745
PCB 3L	2000	856.029	43		15-150	3.10	0.873
PCB 4L	2000	810.120	41		25-150	1.59	0.889
PCB 15L	2000	1177.470	59		25-150	1.57	1.220
PCB 19L	2000	1011.047	51		25-150	0.92	1.068
PCB 37L	2000	1298.943	65		25-150	0.99	1.080
PCB 54L	2000	797.383	40		25-150	0.74	0.836
PCB 81L	2000	1534.235	77		25-150	0.74	1.320
PCB 77L	2000	1636.717	82		25-150	0.76	1.342
PCB 104L	2000	849.614	42		25-150	1.54	0.830
PCB 123L	2000	1357.460	68		25-150	1.55	1.133
PCB 118L	2000	1326.580	66		25-150	1.66	1.142
PCB 114L	2000	1325.574	66		25-150	1.60	1.157
PCB 105L	2000	1387.844	69		25-150	1.58	1.177
PCB 126L	2000	1510.513	76		25-150	1.57	1.264
PCB 155L	2000	886.099	44		25-150	1.27	0.806
PCB 167L	2000	1170.761	59		25-150	1.23	1.068
PCBs 156L + 157L	4000	2304.656	58		25-150	1.18	1.097
PCB 169L	2000	1205.019	60		25-150	1.32	1.170
PCB 188L	2000	1214.312	61		25-150	1.06	0.736
PCB 189L	2000	1541.146	77		25-150	1.02	0.962
PCB 202L	2000	1369.416	68		25-150	0.92	0.833
PCB 205L	2000	1243.945	62		25-150	0.91	1.008
PCB 208L	2000	1069.931	53		25-150	0.83	0.953
PCB 206L	2000	1195.757	60		25-150	0.78	1.039
PCB 209L	2000	1110.676	56		25-150	1.21	1.067
PCB 28L	2000	1451.080	73	K	30-135	1.32	0.933
PCB 111L	2000	1443.115	72		30-135	1.52	1.075
PCB 178L	2000	1274.445	64		30-135	1.11	1.009

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-02  
**Lab Code:** K1701324-002

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:10  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Toxicity Equivalency Quotient**

<b>Analyte Name</b>	<b>Result</b>	<b>DL</b>	<b>MRL</b>	<b>Dilution Factor</b>	<b>TEF</b>	<b>TEF - Adjusted Concentration</b>
PCB 81	ND	33.4	33.4	1	0.0003	
PCB 77	ND	34.4	34.4	1	0.0001	
PCB 123	ND	34.5	34.5	1	0.00003	
PCB 118	<b>269</b>	36.1	36.1	1	0.00003	0.00807
PCB 114	ND	36.2	36.2	1	0.00003	
PCB 105	<b>119</b>	35.3	35.3	1	0.00003	0.00357
PCB 126	ND	37.5	37.5	1	0.1	
PCB 167	<b>28.0</b>	22.9	22.9	1	0.00003	0.000840
PCBs 156 + 157	<b>69.8</b>	40.4	41.1	1	0.00003	0.00209
PCB 169	ND	24.9	24.9	1	0.03	
PCB 189	ND	29.8	29.8	1	0.00003	
<b>Total TEQ</b>						<b>0.0146</b>

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-03  
**Lab Code:** K1701324-003

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:59  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1028mL  
**Data File Name:** P303471  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 17:47  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 1	ND	U	60.7	60.7			1
PCB 2	ND	U	70.1	70.1			1
PCB 3	ND	U	62.2	62.2			1
PCB 4	ND	U	48.5	48.5			1
PCB 10	ND	U	30.7	48.6			1
PCB 9	ND	U	11.5	19.5			1
PCB 7	ND	U	10.5	19.5			1
PCB 6	ND	U	10.8	19.5			1
PCB 5	ND	U	11.1	19.5			1
PCB 8	ND	U	10.9	48.6			1
PCB 14	ND	U	10.9	19.5			1
PCB 11	413		11.2	97.3	-	0.972	1
PCBs 12 + 13	ND	U	11.1	48.6			1
PCB 15	ND	U	9.30	19.5			1
PCB 19	ND	U	102	102			1
PCBs 18 + 30	ND	U	68.5	68.5			1
PCB 17	ND	U	82.0	82.0			1
PCB 27	ND	U	57.0	57.0			1
PCB 24	ND	U	59.2	59.2			1
PCB 16	ND	U	93.0	93.0			1
PCB 32	ND	U	54.4	54.4			1
PCB 34	ND	U	70.7	70.7			1
PCB 23	ND	U	69.5	69.5			1
PCBs 26 + 29	ND	U	72.4	72.4			1
PCB 25	ND	U	67.9	67.9			1
PCB 31	ND	U	67.7	67.7			1
PCBs 20 + 28	ND	U	68.7	68.7			1
PCBs 21 + 33	ND	U	72.4	72.4			1
PCB 22	ND	U	69.7	69.7			1
PCB 36	ND	U	69.2	69.2			1
PCB 39	ND	U	64.9	64.9			1
PCB 38	ND	U	71.1	71.1			1
PCB 35	ND	U	71.7	71.7			1
PCB 37	ND	U	63.9	63.9			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-03  
**Lab Code:** K1701324-003

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:59  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1028mL  
**Data File Name:** P303471  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 17:47  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 54	ND	U	45.6	45.6			1
PCBs 50 + 53	ND	U	38.8	97.3			1
PCBs 45 + 51	ND	U	40.2	48.6			1
PCB 46	ND	U	46.0	46.0			1
PCB 52	ND	U	37.2	48.6			1
PCBs 43 + 73	ND	U	33.5	48.6			1
PCBs 49 + 69	ND	U	34.0	97.3			1
PCB 48	ND	U	37.1	48.6			1
PCBs 44 + 47 + 65	41.8JK		35.2	97.3	0.58	1.037	1
PCBs 59 + 62 + 75	ND	U	28.4	97.3			1
PCB 42	ND	U	40.2	97.3			1
PCBs 41 + 71 + 40	ND	U	37.1	97.3			1
PCB 64	ND	U	27.9	48.6			1
PCB 72	ND	U	26.9	48.6			1
PCB 68	ND	U	25.9	48.6			1
PCB 57	ND	U	27.4	48.6			1
PCB 58	ND	U	27.5	48.6			1
PCB 67	ND	U	27.9	48.6			1
PCB 63	ND	U	26.3	48.6			1
PCBs 70 + 61 + 74 + 76	60.9J		27.4	195	0.71	1.173	1
PCB 66	30.3J		26.3	48.6	0.80	1.184	1
PCB 55	ND	U	28.1	48.6			1
PCB 56	ND	U	36.9	48.6			1
PCB 60	ND	U	34.3	48.6			1
PCB 80	ND	U	31.3	48.6			1
PCB 79	ND	U	31.7	48.6			1
PCB 78	ND	U	32.7	48.6			1
PCB 81	ND	U	33.9	33.9			1
PCB 77	ND	U	36.0	36.0			1
PCB 104	ND	U	31.7	31.7			1
PCB 96	ND	U	29.2	48.6			1
PCB 103	ND	U	33.6	48.6			1
PCB 94	ND	U	39.4	48.6			1
PCBs 95 + 93 + 100	72.4JK		36.1	195	2.16	1.105	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-03  
**Lab Code:** K1701324-003

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:59  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1028mL  
**Data File Name:** P303471  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 17:47  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCBs 98 + 102	ND	U	35.5	195			1
PCBs 88 + 91	ND	U	35.9	48.6			1
PCB 84	ND	U	40.4	40.4			1
PCB 89	ND	U	38.1	48.6			1
PCB 121	ND	U	31.6	48.6			1
PCB 92	ND	U	42.7	48.6			1
PCBs 90 + 101 + 113	84.9JK		34.7	195	1.06	1.000	1
PCBs 83 + 99	43.3JK		39.6	97.3	0.73	1.016	1
PCB 112	ND	U	32.1	48.6			1
PCBs 86 + 87 + 97 + 109 + 119 + 125	ND	U	34.3	195			1
PCBs 85 + 116 + 117	ND	U	33.0	97.3			1
PCBs 110 + 115	156		29.2	97.3	1.41	1.059	1
PCB 82	ND	U	45.9	48.6			1
PCB 111	ND	U	27.5	48.6			1
PCB 120	ND	U	27.5	48.6			1
PCBs 108 + 124	ND	U	40.0	97.3			1
PCB 107	ND	U	38.7	48.6			1
PCB 123	ND	U	36.0	36.0			1
PCB 106	ND	U	40.4	48.6			1
PCB 118	108		35.6	35.6	1.49	1.000	1
PCB 122	ND	U	43.6	48.6			1
PCB 114	ND	U	35.9	35.9			1
PCB 105	60.2K		38.0	38.0	1.81	1.000	1
PCB 127	ND	U	39.3	48.6			1
PCB 126	ND	U	38.6	38.6			1
PCB 155	ND	U	22.0	22.0			1
PCB 152	ND	U	23.0	48.6			1
PCB 150	ND	U	23.7	48.6			1
PCB 136	25.0J		24.1	48.6	1.32	1.028	1
PCB 145	ND	U	23.6	48.6			1
PCB 148	ND	U	28.9	48.6			1
PCBs 135 + 151 + 154	40.5JK		27.7	97.3	1.54	1.093	1
PCB 144	ND	U	28.0	48.6			1
PCBs 147 + 149	164		27.1	97.3	1.21	0.903	1
PCB 134	ND	U	39.3	97.3			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-03  
**Lab Code:** K1701324-003

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:59  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1028mL  
**Data File Name:** P303471  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 17:47  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 143	ND	U	25.8	97.3			1
PCBs 139 + 140	ND	U	26.5	97.3			1
PCB 131	ND	U	32.2	48.6			1
PCB 142	ND	U	29.1	48.6			1
PCB 132	48.9K		28.5	48.6	1.99	0.933	1
PCB 133	ND	U	28.9	48.6			1
PCB 165	ND	U	22.0	48.6			1
PCB 146	25.9JK		24.2	48.6	0.74	0.956	1
PCB 161	ND	U	21.4	48.6			1
PCBs 153 + 168	154		21.5	97.3	1.16	0.971	1
PCB 141	37.1JK		26.7	48.6	0.67	0.977	1
PCB 130	ND	U	29.6	48.6			1
PCB 137	ND	U	25.4	48.6			1
PCB 164	ND	U	21.1	48.6			1
PCBs 129 + 138 + 163	318		32.8	195	1.23	1.000	1
PCB 160	ND	U	13.1	195			1
PCB 158	ND	U	19.1	48.6			1
PCBs 128 + 166	ND	U	22.9	97.3			1
PCB 159	ND	U	28.1	48.6			1
PCB 162	ND	U	27.0	48.6			1
PCB 167	ND	U	20.3	20.3			1
PCBs 156 + 157	ND	U	35.0	38.9			1
PCB 169	ND	U	23.8	23.8			1
PCB 188	ND	U	28.1	28.1			1
PCB 179	31.7JK		25.3	48.6	0.87	1.011	1
PCB 184	ND	U	23.9	48.6			1
PCB 176	ND	U	25.8	48.6			1
PCB 186	ND	U	26.2	48.6			1
PCB 178	ND	U	32.3	48.6			1
PCB 175	ND	U	30.7	48.6			1
PCB 187	74.6K		29.8	48.6	1.34	1.099	1
PCB 182	ND	U	31.6	48.6			1
PCBs 183 + 185	ND	U	39.3	97.3			1
PCB 174	73.9		40.2	48.6	1.04	1.121	1
PCB 177	ND	U	40.9	48.6			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-03  
**Lab Code:** K1701324-003

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:59  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1028mL  
**Data File Name:** P303471  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 17:47  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 181	ND	U	36.7	48.6			1
PCBs 171 + 173	ND	U	40.1	97.3			1
PCB 172	ND	U	38.0	48.6			1
PCB 192	ND	U	30.1	48.6			1
PCBs 180 + 193	151		31.2	97.3	0.90	0.919	1
PCB 191	ND	U	27.9	48.6			1
PCB 170	61.7		36.8	48.6	0.90	0.943	1
PCB 190	ND	U	26.6	48.6			1
PCB 189	ND	U	27.5	27.5			1
PCB 202	ND	U	24.1	24.1			1
PCB 201	ND	U	23.7	48.6			1
PCB 204	ND	U	24.1	48.6			1
PCB 197	ND	U	22.8	97.3			1
PCB 200	ND	U	23.4	97.3			1
PCBs 198 + 199	ND	U	29.3	97.3			1
PCB 196	ND	U	28.1	48.6			1
PCB 203	ND	U	26.1	48.6			1
PCB 195	ND	U	29.3	48.6			1
PCB 194	28.6J		26.2	48.6	0.76	0.992	1
PCB 205	ND	U	26.7	26.7			1
PCB 208	ND	U	27.9	27.9			1
PCB 207	ND	U	29.9	48.6			1
PCB 206	ND	U	50.7	50.7			1
PCB 209	ND	U	29.2	29.2			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-03  
**Lab Code:** K1701324-003

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:59  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1028mL  
**Data File Name:** P303471  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 17:47  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total MonoCB	ND	U	60.7	60.7			1
Total DiCB	413		9.30	19.5			1
Total TriCB	ND	U	54.4	54.4			1
Total TetraCB	133J		25.9	195			1
Total PentaCB	526		27.5	195			1
Total HexaCB	813		13.1	19.5			1
Total HeptaCB	393		23.9	23.9			1
Total OctaCB	28.6		22.8	22.8			1
Total NonaCB	ND	U	27.9	27.9			1
Total PCBs	2310		9.30	195			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-03  
**Lab Code:** K1701324-003

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:59  
**Date Received:** 02/09/17 13:30  
**Units:** Percent  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1028mL  
**Data File Name:** P303471  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 17:47  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
PCB 1L	2000	852.170	43		15-150	2.99	0.745
PCB 3L	2000	1015.853	51		15-150	3.01	0.873
PCB 4L	2000	1051.068	53		25-150	1.59	0.888
PCB 15L	2000	1365.975	68		25-150	1.64	1.220
PCB 19L	2000	1164.173	58	K	25-150	1.22	1.067
PCB 37L	2000	1672.893	84		25-150	1.17	1.081
PCB 54L	2000	1155.889	58		25-150	0.85	0.836
PCB 81L	2000	1694.317	85		25-150	0.85	1.321
PCB 77L	2000	1688.130	84		25-150	0.77	1.342
PCB 104L	2000	1211.518	61		25-150	1.60	0.831
PCB 123L	2000	1491.211	75		25-150	1.58	1.133
PCB 118L	2000	1511.107	76		25-150	1.61	1.142
PCB 114L	2000	1511.186	76		25-150	1.67	1.158
PCB 105L	2000	1494.610	75		25-150	1.59	1.177
PCB 126L	2000	1619.699	81		25-150	1.66	1.264
PCB 155L	2000	1232.357	62		25-150	1.26	0.805
PCB 167L	2000	1350.669	68		25-150	1.23	1.068
PCBs 156L + 157L	4000	2592.487	65		25-150	1.22	1.096
PCB 169L	2000	1340.723	67		25-150	1.27	1.171
PCB 188L	2000	1566.487	78		25-150	1.08	0.736
PCB 189L	2000	1744.864	87		25-150	1.01	0.962
PCB 202L	2000	1646.199	82		25-150	0.90	0.833
PCB 205L	2000	1406.420	70		25-150	0.88	1.008
PCB 208L	2000	1439.449	72		25-150	0.82	0.953
PCB 206L	2000	1329.295	66		25-150	0.78	1.039
PCB 209L	2000	1253.109	63		25-150	1.13	1.067
PCB 28L	2000	1749.884	87	K	30-135	1.23	0.933
PCB 111L	2000	1531.955	77		30-135	1.55	1.075
PCB 178L	2000	1415.713	71		30-135	1.02	1.009

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-03  
**Lab Code:** K1701324-003

**Service Request:** K1701324  
**Date Collected:** 02/08/17 10:59  
**Date Received:** 02/09/17 13:30

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
PCB 81	ND	33.9	33.9	1	0.0003	
PCB 77	ND	36.0	36.0	1	0.0001	
PCB 123	ND	36.0	36.0	1	0.00003	
PCB 118	<b>108</b>	35.6	35.6	1	0.00003	0.00324
PCB 114	ND	35.9	35.9	1	0.00003	
PCB 105	<b>60.2</b>	38.0	38.0	1	0.00003	0.00181
PCB 126	ND	38.6	38.6	1	0.1	
PCB 167	ND	20.3	20.3	1	0.00003	
PCBs 156 + 157	ND	35.0	38.9	1	0.00003	
PCB 169	ND	23.8	23.8	1	0.03	
PCB 189	ND	27.5	27.5	1	0.00003	
Total TEQ						0.00505

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-04  
**Lab Code:** K1701324-004

**Service Request:** K1701324  
**Date Collected:** 02/08/17 00:00  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 989mL  
**Data File Name:** P303472  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 18:55  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 1	ND	U	60.8	60.8			1
PCB 2	ND	U	71.8	71.8			1
PCB 3	ND	U	65.1	65.1			1
PCB 4	ND	U	45.8	45.8			1
PCB 10	ND	U	29.1	50.6			1
PCB 9	ND	U	16.1	20.2			1
PCB 7	ND	U	14.8	20.2			1
PCB 6	ND	U	15.1	20.2			1
PCB 5	ND	U	15.6	20.2			1
PCB 8	ND	U	15.3	50.6			1
PCB 14	ND	U	15.2	20.2			1
PCB 11	361		15.7	101	-	0.972	1
PCBs 12 + 13	ND	U	15.6	50.6			1
PCB 15	31.5		13.1	20.2	-	1.001	1
PCB 19	ND	U	68.0	68.0			1
PCBs 18 + 30	ND	U	51.8	51.8			1
PCB 17	ND	U	62.0	62.0			1
PCB 27	ND	U	43.1	43.1			1
PCB 24	ND	U	44.8	44.8			1
PCB 16	ND	U	70.3	70.3			1
PCB 32	ND	U	41.2	41.2			1
PCB 34	ND	U	61.1	61.1			1
PCB 23	ND	U	60.0	60.0			1
PCBs 26 + 29	ND	U	62.5	62.5			1
PCB 25	ND	U	58.6	58.6			1
PCB 31	86.8K		58.4	58.4	0.82	0.854	1
PCBs 20 + 28	125		59.3	59.3	1.01	0.864	1
PCBs 21 + 33	ND	U	62.6	62.6			1
PCB 22	ND	U	60.2	60.2			1
PCB 36	ND	U	59.8	59.8			1
PCB 39	ND	U	56.1	56.1			1
PCB 38	ND	U	61.4	61.4			1
PCB 35	ND	U	61.9	61.9			1
PCB 37	78.1K		60.6	60.6	1.21	1.000	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-04  
**Lab Code:** K1701324-004

**Service Request:** K1701324  
**Date Collected:** 02/08/17 00:00  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 989mL  
**Data File Name:** P303472  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 18:55  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 54	ND	U	42.0	42.0			1
PCBs 50 + 53	ND	U	47.0	101			1
PCBs 45 + 51	ND	U	48.7	50.6			1
PCB 46	ND	U	55.8	55.8			1
PCB 52	203		45.2	50.6	0.79	1.001	1
PCBs 43 + 73	ND	U	40.6	50.6			1
PCBs 49 + 69	82.3J		41.2	101	0.72	1.018	1
PCB 48	ND	U	45.0	50.6			1
PCBs 44 + 47 + 65	158		42.6	101	0.81	1.037	1
PCBs 59 + 62 + 75	ND	U	34.4	101			1
PCB 42	ND	U	48.8	101			1
PCBs 41 + 71 + 40	ND	U	45.0	101			1
PCB 64	62.1K		33.9	50.6	0.62	1.083	1
PCB 72	ND	U	32.6	50.6			1
PCB 68	ND	U	31.4	50.6			1
PCB 57	ND	U	33.2	50.6			1
PCB 58	ND	U	33.4	50.6			1
PCB 67	ND	U	33.8	50.6			1
PCB 63	ND	U	31.9	50.6			1
PCBs 70 + 61 + 74 + 76	323		33.2	202	0.74	1.173	1
PCB 66	157		31.8	50.6	0.79	1.184	1
PCB 55	ND	U	34.1	50.6			1
PCB 56	83.1K		39.0	50.6	1.12	0.916	1
PCB 60	46.5JK		36.2	50.6	1.14	0.922	1
PCB 80	ND	U	33.1	50.6			1
PCB 79	ND	U	33.5	50.6			1
PCB 78	ND	U	34.6	50.6			1
PCB 81	ND	U	37.4	37.4			1
PCB 77	ND	U	37.4	37.4			1
PCB 104	ND	U	37.7	37.7			1
PCB 96	ND	U	34.6	50.6			1
PCB 103	ND	U	39.7	50.6			1
PCB 94	ND	U	46.6	50.6			1
PCBs 95 + 93 + 100	322		42.8	202	1.60	1.105	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-04  
**Lab Code:** K1701324-004

**Service Request:** K1701324  
**Date Collected:** 02/08/17 00:00  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 989mL  
**Data File Name:** P303472  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 18:55  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCBs 98 + 102	ND	U	42.1	202			1
PCBs 88 + 91	87.4		42.5	50.6	1.42	1.145	1
PCB 84	ND	U	47.8	47.8			1
PCB 89	ND	U	45.1	50.6			1
PCB 121	ND	U	30.7	50.6			1
PCB 92	57.3K		41.5	50.6	1.95	0.984	1
PCBs 90 + 101 + 113	381		33.7	202	1.52	1.001	1
PCBs 83 + 99	194		38.5	101	1.60	1.017	1
PCB 112	ND	U	31.1	50.6			1
PCBs 86 + 87 + 97 + 109 + 119 + 125	296		33.3	202	1.46	1.036	1
PCBs 85 + 116 + 117	63.7J		32.0	101	1.36	1.054	1
PCBs 110 + 115	591		28.4	101	1.48	1.059	1
PCB 82	ND	U	44.6	50.6			1
PCB 111	ND	U	26.7	50.6			1
PCB 120	ND	U	26.7	50.6			1
PCBs 108 + 124	ND	U	32.3	101			1
PCB 107	ND	U	31.2	50.6			1
PCB 123	ND	U	29.2	29.2			1
PCB 106	ND	U	32.6	50.6			1
PCB 118	410		28.5	28.5	1.63	1.000	1
PCB 122	ND	U	35.2	50.6			1
PCB 114	ND	U	29.1	29.1			1
PCB 105	200		30.8	30.8	1.66	1.001	1
PCB 127	ND	U	31.7	50.6			1
PCB 126	ND	U	33.0	33.0			1
PCB 155	ND	U	21.0	21.0			1
PCB 152	ND	U	21.4	50.6			1
PCB 150	ND	U	22.0	50.6			1
PCB 136	116K		22.5	50.6	1.01	1.028	1
PCB 145	ND	U	22.0	50.6			1
PCB 148	ND	U	26.9	50.6			1
PCBs 135 + 151 + 154	272		25.8	101	1.24	1.093	1
PCB 144	44.2J		26.0	50.6	1.12	1.110	1
PCBs 147 + 149	674		30.9	101	1.17	0.903	1
PCB 134	ND	U	44.9	101			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-04  
**Lab Code:** K1701324-004

**Service Request:** K1701324  
**Date Collected:** 02/08/17 00:00  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 989mL  
**Data File Name:** P303472  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 18:55  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 143	ND	U	29.4	101			1
PCBs 139 + 140	ND	U	30.2	101			1
PCB 131	ND	U	36.7	50.6			1
PCB 142	ND	U	33.2	50.6			1
PCB 132	302		32.5	50.6	1.17	0.933	1
PCB 133	ND	U	33.0	50.6			1
PCB 165	ND	U	25.1	50.6			1
PCB 146	114K		27.6	50.6	1.04	0.956	1
PCB 161	ND	U	24.3	50.6			1
PCBs 153 + 168	641		24.5	101	1.19	0.971	1
PCB 141	150K		30.5	50.6	1.02	0.977	1
PCB 130	39.5J		33.8	50.6	1.31	0.986	1
PCB 137	47.8J		28.9	50.6	1.33	0.991	1
PCB 164	68.3		24.0	50.6	1.30	0.994	1
PCBs 129 + 138 + 163	1170		37.4	202	1.25	1.001	1
PCB 160	ND	U	14.9	202			1
PCB 158	69.7K		21.8	50.6	0.98	1.009	1
PCBs 128 + 166	139		26.2	101	1.15	1.031	1
PCB 159	ND	U	34.1	50.6			1
PCB 162	ND	U	32.8	50.6			1
PCB 167	36.3		24.8	24.8	1.10	1.000	1
PCBs 156 + 157	79.5K		42.2	42.2	1.00	1.000	1
PCB 169	ND	U	28.4	28.4			1
PCB 188	ND	U	23.6	23.6			1
PCB 179	125K		21.9	50.6	0.86	1.011	1
PCB 184	ND	U	20.7	50.6			1
PCB 176	37.8JK		22.4	50.6	0.75	1.033	1
PCB 186	ND	U	22.7	50.6			1
PCB 178	69.4		28.0	50.6	1.06	1.077	1
PCB 175	ND	U	26.6	50.6			1
PCB 187	419		25.8	50.6	1.01	1.098	1
PCB 182	ND	U	27.4	50.6			1
PCBs 183 + 185	197K		43.1	101	0.88	1.114	1
PCB 174	378		44.1	50.6	1.10	1.121	1
PCB 177	187		44.9	50.6	1.02	1.132	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-04  
**Lab Code:** K1701324-004

**Service Request:** K1701324  
**Date Collected:** 02/08/17 00:00  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 989mL  
**Data File Name:** P303472  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 18:55  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 181	ND	U	40.4	50.6			1
PCBs 171 + 173	96.3J		44.1	101	1.07	1.147	1
PCB 172	ND	U	41.7	50.6			1
PCB 192	ND	U	33.1	50.6			1
PCBs 180 + 193	623		34.3	101	0.99	0.919	1
PCB 191	ND	U	30.7	50.6			1
PCB 170	272		40.5	50.6	1.03	0.943	1
PCB 190	37.2J		29.2	50.6	0.89	0.953	1
PCB 189	ND	U	32.0	32.0			1
PCB 202	ND	U	25.2	25.2			1
PCB 201	ND	U	25.7	50.6			1
PCB 204	ND	U	26.2	50.6			1
PCB 197	ND	U	24.8	101			1
PCB 200	ND	U	25.4	101			1
PCBs 198 + 199	179		31.8	101	0.89	1.103	1
PCB 196	84.2		30.5	50.6	0.77	0.923	1
PCB 203	107		28.3	50.6	0.89	0.927	1
PCB 195	45.0JK		31.8	50.6	0.69	0.951	1
PCB 194	123K		28.4	50.6	0.73	0.992	1
PCB 205	ND	U	30.2	30.2			1
PCB 208	ND	U	31.8	31.8			1
PCB 207	ND	U	34.8	50.6			1
PCB 206	58.7K		52.5	52.5	0.42	1.001	1
PCB 209	ND	U	28.4	28.4			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-04  
**Lab Code:** K1701324-004

**Service Request:** K1701324  
**Date Collected:** 02/08/17 00:00  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 989mL  
**Data File Name:** P303472  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 18:55  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total MonoCB	ND	U	60.8	60.8			1
Total DiCB	392		13.1	20.2			1
Total TriCB	290		41.2	50.6			1
Total TetraCB	1110		31.4	202			1
Total PentaCB	2600		26.7	202			1
Total HexaCB	3960		14.9	20.2			1
Total HeptaCB	2250		20.7	20.7			1
Total OctaCB	539		24.8	24.8			1
Total NonaCB	58.7		31.8	31.8			1
Total PCBs	11400		13.1	202			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-04  
**Lab Code:** K1701324-004

**Service Request:** K1701324  
**Date Collected:** 02/08/17 00:00  
**Date Received:** 02/09/17 13:30  
**Units:** Percent  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 989mL  
**Data File Name:** P303472  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 18:55  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
PCB 1L	2000	1009.260	50		15-150	2.90	0.745
PCB 3L	2000	1138.503	57		15-150	2.97	0.873
PCB 4L	2000	1184.576	59		25-150	1.56	0.888
PCB 15L	2000	1565.230	78		25-150	1.63	1.220
PCB 19L	2000	1550.702	78		25-150	1.08	1.067
PCB 37L	2000	1687.912	84		25-150	1.14	1.081
PCB 54L	2000	1214.221	61		25-150	0.83	0.836
PCB 81L	2000	1642.439	82		25-150	0.71	1.321
PCB 77L	2000	1660.406	83		25-150	0.84	1.342
PCB 104L	2000	1282.454	64		25-150	1.63	0.831
PCB 123L	2000	1554.027	78		25-150	1.49	1.133
PCB 118L	2000	1562.707	78		25-150	1.60	1.142
PCB 114L	2000	1585.432	79		25-150	1.49	1.158
PCB 105L	2000	1570.780	79		25-150	1.61	1.177
PCB 126L	2000	1655.949	83		25-150	1.56	1.265
PCB 155L	2000	1303.498	65		25-150	1.25	0.805
PCB 167L	2000	1410.638	71		25-150	1.20	1.068
PCBs 156L + 157L	4000	2810.172	70		25-150	1.28	1.097
PCB 169L	2000	1389.860	69		25-150	1.25	1.171
PCB 188L	2000	1752.149	88		25-150	1.08	0.736
PCB 189L	2000	1781.162	89		25-150	1.12	0.962
PCB 202L	2000	1828.758	91		25-150	0.96	0.833
PCB 205L	2000	1472.987	74		25-150	0.94	1.008
PCB 208L	2000	1452.491	73		25-150	0.81	0.953
PCB 206L	2000	1310.476	66		25-150	0.77	1.039
PCB 209L	2000	1309.200	65		25-150	1.16	1.067
PCB 28L	2000	1736.142	87		30-135	1.07	0.933
PCB 111L	2000	1611.745	81		30-135	1.59	1.075
PCB 178L	2000	1535.282	77		30-135	1.07	1.009

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** W17B063-04  
**Lab Code:** K1701324-004

**Service Request:** K1701324  
**Date Collected:** 02/08/17 00:00  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
PCB 81	ND	37.4	37.4	1	0.0003	
PCB 77	ND	37.4	37.4	1	0.0001	
PCB 123	ND	29.2	29.2	1	0.00003	
PCB 118	<b>410</b>	28.5	28.5	1	0.00003	0.0123
PCB 114	ND	29.1	29.1	1	0.00003	
PCB 105	<b>200</b>	30.8	30.8	1	0.00003	0.00600
PCB 126	ND	33.0	33.0	1	0.1	
PCB 167	<b>36.3</b>	24.8	24.8	1	0.00003	0.00109
PCBs 156 + 157	<b>79.5</b>	42.2	42.2	1	0.00003	0.00239
PCB 169	ND	28.4	28.4	1	0.03	
PCB 189	ND	32.0	32.0	1	0.00003	
Total TEQ						0.0218

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 1	ND	U	74.5	74.5			1
PCB 2	ND	U	89.8	89.8			1
PCB 3	ND	U	83.1	83.1			1
PCB 4	ND	U	63.3	63.3			1
PCB 10	ND	U	41.8	50.0			1
PCB 9	ND	U	15.7	20.0			1
PCB 7	ND	U	14.4	20.0			1
PCB 6	ND	U	14.7	20.0			1
PCB 5	ND	U	15.2	20.0			1
PCB 8	ND	U	14.9	50.0			1
PCB 14	ND	U	14.8	20.0			1
PCB 11	ND	U	15.2	100			1
PCBs 12 + 13	ND	U	15.1	50.0			1
PCB 15	ND	U	13.2	20.0			1
PCB 19	ND	U	82.1	82.1			1
PCBs 18 + 30	ND	U	63.9	63.9			1
PCB 17	ND	U	76.4	76.4			1
PCB 27	ND	U	53.1	53.1			1
PCB 24	ND	U	55.2	55.2			1
PCB 16	ND	U	86.6	86.6			1
PCB 32	ND	U	50.7	50.7			1
PCB 34	ND	U	60.7	60.7			1
PCB 23	ND	U	59.7	59.7			1
PCBs 26 + 29	ND	U	62.1	62.1			1
PCB 25	ND	U	58.3	58.3			1
PCB 31	ND	U	58.1	58.1			1
PCBs 20 + 28	ND	U	59.0	59.0			1
PCBs 21 + 33	ND	U	62.2	62.2			1
PCB 22	ND	U	59.8	59.8			1
PCB 36	ND	U	59.5	59.5			1
PCB 39	ND	U	55.7	55.7			1
PCB 38	ND	U	61.1	61.1			1
PCB 35	ND	U	61.6	61.6			1
PCB 37	ND	U	61.3	61.3			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 54	ND	U	50.7	50.7			1
PCBs 50 + 53	ND	U	51.4	100			1
PCBs 45 + 51	ND	U	53.3	53.3			1
PCB 46	ND	U	61.0	61.0			1
PCB 52	ND	U	49.4	50.0			1
PCBs 43 + 73	ND	U	44.4	50.0			1
PCBs 49 + 69	ND	U	45.1	100			1
PCB 48	ND	U	49.2	50.0			1
PCBs 44 + 47 + 65	ND	U	46.6	100			1
PCBs 59 + 62 + 75	ND	U	37.6	100			1
PCB 42	ND	U	53.3	100			1
PCBs 41 + 71 + 40	ND	U	49.2	100			1
PCB 64	ND	U	37.0	50.0			1
PCB 72	ND	U	35.6	50.0			1
PCB 68	ND	U	34.4	50.0			1
PCB 57	ND	U	36.3	50.0			1
PCB 58	ND	U	36.5	50.0			1
PCB 67	ND	U	36.9	50.0			1
PCB 63	ND	U	34.8	50.0			1
PCBs 70 + 61 + 74 + 76	ND	U	36.3	200			1
PCB 66	ND	U	34.8	50.0			1
PCB 55	ND	U	37.3	50.0			1
PCB 56	ND	U	36.7	50.0			1
PCB 60	ND	U	34.1	50.0			1
PCB 80	ND	U	31.2	50.0			1
PCB 79	ND	U	31.5	50.0			1
PCB 78	ND	U	32.6	50.0			1
PCB 81	ND	U	31.4	31.4			1
PCB 77	ND	U	32.2	32.2			1
PCB 104	ND	U	60.8	60.8			1
PCB 96	ND	U	47.1	50.0			1
PCB 103	ND	U	54.1	54.1			1
PCB 94	ND	U	63.5	63.5			1
PCBs 95 + 93 + 100	ND	U	58.2	200			1

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

**Native Analyte Results**

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCBs 98 + 102	ND	U	57.3	200			1
PCBs 88 + 91	ND	U	57.9	57.9			1
PCB 84	ND	U	65.1	65.1			1
PCB 89	ND	U	61.4	61.4			1
PCB 121	ND	U	42.8	50.0			1
PCB 92	ND	U	58.0	58.0			1
PCBs 90 + 101 + 113	ND	U	47.1	200			1
PCBs 83 + 99	ND	U	53.8	100			1
PCB 112	ND	U	43.5	50.0			1
PCBs 86 + 87 + 97 + 109 + 119 + 125	ND	U	46.6	200			1
PCBs 85 + 116 + 117	ND	U	44.8	100			1
PCBs 110 + 115	ND	U	39.6	100			1
PCB 82	ND	U	62.3	62.3			1
PCB 111	ND	U	37.3	50.0			1
PCB 120	ND	U	37.3	50.0			1
PCBs 108 + 124	ND	U	57.8	100			1
PCB 107	ND	U	55.9	55.9			1
PCB 123	ND	U	47.3	47.3			1
PCB 106	ND	U	58.3	58.3			1
PCB 118	ND	U	47.1	47.1			1
PCB 122	ND	U	63.0	63.0			1
PCB 114	ND	U	48.6	48.6			1
PCB 105	ND	U	46.0	46.0			1
PCB 127	ND	U	56.7	56.7			1
PCB 126	ND	U	45.9	45.9			1
PCB 155	ND	U	26.0	26.0			1
PCB 152	ND	U	21.0	50.0			1
PCB 150	ND	U	21.6	50.0			1
PCB 136	ND	U	22.0	50.0			1
PCB 145	ND	U	21.6	50.0			1
PCB 148	ND	U	26.3	50.0			1
PCBs 135 + 151 + 154	ND	U	25.3	100			1
PCB 144	ND	U	25.5	50.0			1
PCBs 147 + 149	ND	U	27.0	100			1
PCB 134	ND	U	39.3	100			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 143	ND	U	25.8	100			1
PCBs 139 + 140	ND	U	26.5	100			1
PCB 131	ND	U	32.2	50.0			1
PCB 142	ND	U	29.1	50.0			1
PCB 132	ND	U	28.5	50.0			1
PCB 133	ND	U	28.9	50.0			1
PCB 165	ND	U	22.0	50.0			1
PCB 146	ND	U	24.2	50.0			1
PCB 161	ND	U	21.3	50.0			1
PCBs 153 + 168	ND	U	21.5	100			1
PCB 141	ND	U	26.7	50.0			1
PCB 130	ND	U	29.6	50.0			1
PCB 137	ND	U	25.3	50.0			1
PCB 164	ND	U	21.0	50.0			1
PCBs 129 + 138 + 163	ND	U	32.7	200			1
PCB 160	ND	U	13.1	200			1
PCB 158	ND	U	19.1	50.0			1
PCBs 128 + 166	ND	U	22.9	100			1
PCB 159	ND	U	33.7	50.0			1
PCB 162	ND	U	32.4	50.0			1
PCB 167	ND	U	22.9	22.9			1
PCBs 156 + 157	ND	U	37.1	40.0			1
PCB 169	ND	U	24.3	24.3			1
PCB 188	ND	U	33.9	33.9			1
PCB 179	ND	U	27.3	50.0			1
PCB 184	ND	U	25.7	50.0			1
PCB 176	ND	U	27.8	50.0			1
PCB 186	ND	U	28.3	50.0			1
PCB 178	ND	U	34.8	50.0			1
PCB 175	ND	U	33.1	50.0			1
PCB 187	ND	U	32.1	50.0			1
PCB 182	ND	U	34.1	50.0			1
PCBs 183 + 185	ND	U	48.7	100			1
PCB 174	ND	U	49.8	50.0			1
PCB 177	ND	U	50.7	50.7			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 181	ND	U	45.5	50.0			1
PCBs 171 + 173	ND	U	49.7	100			1
PCB 172	ND	U	47.1	50.0			1
PCB 192	ND	U	37.3	50.0			1
PCBs 180 + 193	ND	U	38.7	100			1
PCB 191	ND	U	34.6	50.0			1
PCB 170	ND	U	45.6	50.0			1
PCB 190	ND	U	33.0	50.0			1
PCB 189	ND	U	28.9	28.9			1
PCB 202	ND	U	20.1	20.1			1
PCB 201	ND	U	19.4	50.0			1
PCB 204	ND	U	19.7	50.0			1
PCB 197	ND	U	18.7	100			1
PCB 200	ND	U	19.1	100			1
PCBs 198 + 199	ND	U	24.0	100			1
PCB 196	ND	U	23.0	50.0			1
PCB 203	ND	U	21.3	50.0			1
PCB 195	ND	U	24.0	50.0			1
PCB 194	ND	U	21.4	50.0			1
PCB 205	ND	U	21.3	21.3			1
PCB 208	ND	U	22.2	22.2			1
PCB 207	ND	U	21.6	50.0			1
PCB 206	ND	U	38.3	38.3			1
PCB 209	ND	U	17.5	20.0			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total MonoCB	ND	U	74.5	74.5			1
Total DiCB	ND	U	13.2	20.0			1
Total TriCB	ND	U	50.7	50.7			1
Total TetraCB	ND	U	31.2	200			1
Total PentaCB	ND	U	37.3	200			1
Total HexaCB	ND	U	13.1	20.0			1
Total HeptaCB	ND	U	25.7	25.7			1
Total OctaCB	ND	U	18.7	20.0			1
Total NonaCB	ND	U	21.6	21.6			1
Total PCBs	ND	U	13.1	200			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Units:** Percent  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
PCB 1L	2000	885.848	44		15-150	3.05	0.745
PCB 3L	2000	953.211	48		15-150	3.21	0.873
PCB 4L	2000	897.995	45		25-150	1.58	0.889
PCB 15L	2000	1134.093	57		25-150	1.66	1.220
PCB 19L	2000	1259.712	63		25-150	1.16	1.067
PCB 37L	2000	1255.806	63		25-150	1.08	1.081
PCB 54L	2000	723.791	36		25-150	0.82	0.836
PCB 81L	2000	1462.165	73		25-150	0.78	1.321
PCB 77L	2000	1478.973	74		25-150	0.79	1.343
PCB 104L	2000	770.838	39		25-150	1.50	0.831
PCB 123L	2000	1223.568	61		25-150	1.54	1.133
PCB 118L	2000	1282.635	64		25-150	1.49	1.142
PCB 114L	2000	1243.559	62		25-150	1.65	1.158
PCB 105L	2000	1326.689	66		25-150	1.63	1.177
PCB 126L	2000	1437.757	72		25-150	1.65	1.264
PCB 155L	2000	823.255	41		25-150	1.27	0.805
PCB 167L	2000	1096.601	55		25-150	1.28	1.068
PCBs 156L + 157L	4000	2312.413	58		25-150	1.24	1.096
PCB 169L	2000	1165.075	58		25-150	1.28	1.170
PCB 188L	2000	1111.843	56		25-150	1.05	0.736
PCB 189L	2000	1539.388	77		25-150	1.04	0.963
PCB 202L	2000	1399.241	70		25-150	0.89	0.833
PCB 205L	2000	1264.371	63		25-150	0.90	1.009
PCB 208L	2000	1106.545	55		25-150	0.73	0.953
PCB 206L	2000	1249.452	62		25-150	0.75	1.039
PCB 209L	2000	1234.238	62		25-150	1.21	1.067
PCB 28L	2000	871.614	44	K	30-135	0.78	0.933
PCB 111L	2000	1267.239	63		30-135	1.54	1.075
PCB 178L	2000	1228.547	61		30-135	1.09	1.009



# Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Analyzed:** 02/24/17  
**Date Extracted:** 02/16/17

**Duplicate Lab Control Sample Summary**  
**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Units:** pg/L  
**Basis:** NA  
**Analysis Lot:** 536514

Analyte Name	Lab Control Sample EQ1700064-02			Duplicate Lab Control Sample EQ1700064-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
PCB 1	592	1000	59	589	1000	59	50-150	<1	50
PCB 2	749	1000	75	681	1000	68	50-150	9	50
PCB 3	653	1000	65	587	1000	59	50-150	11	50
PCB 10	594	1000	59	575	1000	58	50-150	3	50
PCB 11	791	1000	79	760	1000	76	50-150	4	50
PCB 14	674	1000	67	624	1000	62	50-150	8	50
PCB 15	681	1000	68	631	1000	63	50-150	8	50
PCB 4	649	1000	65	609	1000	61	50-150	6	50
PCB 5	637	1000	64	569	1000	57	50-150	11	50
PCB 6	641	1000	64	574	1000	57	50-150	11	50
PCB 7	533	1000	53	536	1000	54	50-150	<1	50
PCB 8	584	1000	58	505	1000	50	50-150	15	50
PCB 9	642	1000	64	589	1000	59	50-150	9	50
PCBs 12 + 13	1490	2000	74	1400	2000	70	50-150	6	50
PCB 16	743	1000	74	685	1000	68	50-150	8	50
PCB 17	657	1000	66	593	1000	59	50-150	10	50
PCB 19	917	1000	92	733	1000	73	50-150	22	50
PCB 22	849	1000	85	801	1000	80	50-150	6	50
PCB 23	707	1000	71	641	1000	64	50-150	10	50
PCB 24	617	1000	62	572	1000	57	50-150	8	50
PCB 25	759	1000	76	747	1000	75	50-150	2	50
PCB 27	696	1000	70	572	1000	57	50-150	20	50
PCB 31	803	1000	80	824	1000	82	50-150	3	50
PCB 32	682	1000	68	623	1000	62	50-150	9	50
PCB 34	739	1000	74	691	1000	69	50-150	7	50
PCB 35	1030	1000	103	1030	1000	103	50-150	<1	50
PCB 36	995	1000	100	883	1000	88	50-150	12	50
PCB 37	769	1000	77	850	1000	85	50-150	10	50
PCB 38	899	1000	90	941	1000	94	50-150	5	50
PCB 39	898	1000	90	886	1000	89	50-150	1	50
PCBs 18 + 30	1200	2000	60	1110	2000	55	50-150	8	50
PCBs 20 + 28	1580	2000	79	1560	2000	78	50-150	2	50
PCBs 21 + 33	1750	2000	88	1670	2000	84	50-150	5	50
PCBs 26 + 29	1610	2000	80	1530	2000	76	50-150	5	50
PCB 42	1370	2000	68	1450	2000	73	50-150	6	50
PCB 46	1380	2000	69	1380	2000	69	50-150	<1	50
PCB 48	1320	2000	66	1340	2000	67	50-150	2	50
PCB 52	1490	2000	75	1340	2000	67	50-150	11	50

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QA/QC Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Analyzed:** 02/24/17  
**Date Extracted:** 02/16/17

**Duplicate Lab Control Sample Summary**  
**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Units:** pg/L  
**Basis:** NA  
**Analysis Lot:** 536514

Analyte Name	Lab Control Sample EQ1700064-02			Duplicate Lab Control Sample EQ1700064-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
PCB 54	1420	2000	71	1470	2000	74	50-150	4	50
PCB 55	1510	2000	75	1570	2000	78	50-150	4	50
PCB 56	1960	2000	98	2070	2000	104	50-150	6	50
PCB 57	1460	2000	73	1510	2000	75	50-150	3	50
PCB 58	1560	2000	78	1660	2000	83	50-150	6	50
PCB 60	1740	2000	87	1890	2000	95	50-150	8	50
PCB 63	1420	2000	71	1530	2000	76	50-150	7	50
PCB 64	1440	2000	72	1470	2000	73	50-150	2	50
PCB 66	1560	2000	78	1680	2000	84	50-150	7	50
PCB 67	1560	2000	78	1540	2000	77	50-150	2	50
PCB 68	1400	2000	70	1460	2000	73	50-150	4	50
PCB 72	1510	2000	75	1590	2000	79	50-150	5	50
PCB 77	1820	2000	91	1740	2000	87	50-150	4	50
PCB 78	1850	2000	93	1960	2000	98	50-150	6	50
PCB 79	1990	2000	100	2070	2000	104	50-150	4	50
PCB 80	1870	2000	93	1940	2000	97	50-150	4	50
PCB 81	1880	2000	94	1940	2000	97	50-150	3	50
PCBs 41 + 71 + 40	4500	6000	75	4630	6000	77	50-150	3	50
PCBs 43 + 73	2460	4000	62	2520	4000	63	50-150	2	50
PCBs 44 + 47 + 65	4070	6000	68	4110	6000	69	50-150	<1	50
PCBs 45 + 51	2510	4000	63	2460	4000	62	50-150	2	50
PCBs 49 + 69	2580	4000	65	2650	4000	66	50-150	3	50
PCBs 50 + 53	2350	4000	59	2230	4000	56	50-150	5	50
PCBs 59 + 62 + 75	3990	6000	66	4100	6000	68	50-150	3	50
PCBs 70 + 61 + 74 + 76	6070	8000	76	6380	8000	80	50-150	5	50
PCB 103	1730	2000	87	1660	2000	83	50-150	4	50
PCB 104	1600	2000	80	1680	2000	84	50-150	5	50
PCB 105	1970	2000	99	1990	2000	99	50-150	<1	50
PCB 106	1920	2000	96	2080	2000	104	50-150	8	50
PCB 107	2240	2000	112	2230	2000	112	50-150	<1	50
PCB 111	1610	2000	80	1640	2000	82	50-150	2	50
PCB 112	1800	2000	90	1800	2000	90	50-150	<1	50
PCB 114	1830	2000	92	1750	2000	87	50-150	5	50
PCB 118	1610	2000	81	1610	2000	80	50-150	<1	50
PCB 120	1850	2000	93	1820	2000	91	50-150	2	50
PCB 121	1400	2000	70	1330	2000	66	50-150	5	50
PCB 122	2250	2000	113	2320	2000	116	50-150	3	50
PCB 123	1550	2000	77	1570	2000	79	50-150	2	50
PCB 126	1960	2000	98	1950	2000	97	50-150	<1	50
PCB 127	2050	2000	103	2120	2000	106	50-150	3	50

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Analyzed:** 02/24/17  
**Date Extracted:** 02/16/17

**Duplicate Lab Control Sample Summary**  
**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Units:** pg/L  
**Basis:** NA  
**Analysis Lot:** 536514

Analyte Name	Lab Control Sample EQ1700064-02			Duplicate Lab Control Sample EQ1700064-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
PCB 82	1900	2000	95	1930	2000	97	50-150	2	50
PCB 84	1890	2000	94	1860	2000	93	50-150	2	50
PCB 89	1930	2000	97	1870	2000	94	50-150	3	50
PCB 92	1780	2000	89	1830	2000	91	50-150	3	50
PCB 94	1700	2000	85	1720	2000	86	50-150	1	50
PCB 96	1660	2000	83	1630	2000	81	50-150	2	50
PCBs 108 + 124	4080	4000	102	4140	4000	103	50-150	1	50
PCBs 110 + 115	3290	4000	82	3420	4000	86	50-150	4	50
PCBs 83 + 99	3380	4000	84	3500	4000	88	50-150	4	50
PCBs 85 + 116 + 117	5090	6000	85	5160	6000	86	50-150	1	50
PCBs 86 + 87 + 97 + 109 + 119 + 125	10300	12000	86	10400	12000	87	50-150	1	50
PCBs 88 + 91	3480	4000	87	3540	4000	89	50-150	2	50
PCBs 90 + 101 + 113	5030	6000	84	5040	6000	84	50-150	<1	50
PCBs 95 + 93 + 100	5190	6000	87	5130	6000	85	50-150	1	50
PCBs 98 + 102	3380	4000	84	3410	4000	85	50-150	1	50
PCB 130	1880	2000	94	2050	2000	103	50-150	9	50
PCB 131	2030	2000	101	2010	2000	101	50-150	<1	50
PCB 132	1820	2000	91	1770	2000	89	50-150	3	50
PCB 133	2020	2000	101	1970	2000	99	50-150	2	50
PCB 134	2210	2000	111	2360	2000	118	50-150	6	50
PCB 136	2120	2000	106	2090	2000	105	50-150	1	50
PCB 137	1730	2000	87	1780	2000	89	50-150	3	50
PCB 141	1880	2000	94	1870	2000	94	50-150	<1	50
PCB 142	1760	2000	88	1690	2000	85	50-150	4	50
PCB 143	1650	2000	83	1530	2000	76	50-150	8	50
PCB 144	2010	2000	100	2010	2000	100	50-150	<1	50
PCB 145	1930	2000	97	1870	2000	94	50-150	3	50
PCB 146	1930	2000	96	2000	2000	100	50-150	4	50
PCB 148	1940	2000	97	1930	2000	97	50-150	<1	50
PCB 150	1730	2000	87	1860	2000	93	50-150	7	50
PCB 152	2140	2000	107	2050	2000	102	50-150	5	50
PCB 155	1820	2000	91	1790	2000	89	50-150	2	50
PCB 158	1880	2000	94	1880	2000	94	50-150	<1	50
PCB 159	2130	2000	107	2190	2000	110	50-150	3	50
PCB 160	1800	2000	90	1770	2000	89	50-150	2	50
PCB 161	1940	2000	97	1880	2000	94	50-150	3	50
PCB 162	1950	2000	97	2000	2000	100	50-150	3	50
PCB 164	1930	2000	96	1920	2000	96	50-150	<1	50
PCB 165	1850	2000	92	1820	2000	91	50-150	1	50
PCB 167	2010	2000	101	2000	2000	100	50-150	<1	50

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QA/QC Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Analyzed:** 02/24/17  
**Date Extracted:** 02/16/17

**Duplicate Lab Control Sample Summary**  
**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Units:** pg/L  
**Basis:** NA  
**Analysis Lot:** 536514

Analyte Name	Lab Control Sample EQ1700064-02			Duplicate Lab Control Sample EQ1700064-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
PCB 169	1830	2000	91	1860	2000	93	50-150	2	50
PCBs 128 + 166	3530	4000	88	3640	4000	91	50-150	3	50
PCBs 129 + 138 + 163	5600	6000	93	5860	6000	98	50-150	5	50
PCBs 135 + 151 + 154	5900	6000	98	5790	6000	97	50-150	2	50
PCBs 139 + 140	3640	4000	91	3640	4000	91	50-150	<1	50
PCBs 147 + 149	3540	4000	88	3410	4000	85	50-150	4	50
PCBs 153 + 168	3780	4000	95	3740	4000	94	50-150	1	50
PCBs 156 + 157	3810	4000	95	3840	4000	96	50-150	<1	50
PCB 170	1930	2000	96	2070	2000	104	50-150	7	50
PCB 172	2110	2000	105	2100	2000	105	50-150	<1	50
PCB 174	2280	2000	114	2390	2000	120	50-150	5	50
PCB 175	2150	2000	107	2190	2000	109	50-150	2	50
PCB 176	2390	2000	119	2330	2000	117	50-150	2	50
PCB 177	2220	2000	111	2320	2000	116	50-150	5	50
PCB 178	2160	2000	108	2230	2000	111	50-150	3	50
PCB 179	2380	2000	119	2340	2000	117	50-150	2	50
PCB 181	2080	2000	104	2070	2000	104	50-150	<1	50
PCB 182	2190	2000	109	2200	2000	110	50-150	<1	50
PCB 184	2130	2000	107	2070	2000	104	50-150	3	50
PCB 186	2290	2000	115	2180	2000	109	50-150	5	50
PCB 187	2130	2000	107	2170	2000	109	50-150	2	50
PCB 188	2180	2000	109	2190	2000	110	50-150	<1	50
PCB 189	2200	2000	110	2190	2000	109	50-150	<1	50
PCB 190	1940	2000	97	2020	2000	101	50-150	4	50
PCB 191	2010	2000	101	2090	2000	104	50-150	4	50
PCB 192	2040	2000	102	2030	2000	101	50-150	<1	50
PCBs 171 + 173	4480	4000	112	4480	4000	112	50-150	<1	50
PCBs 180 + 193	4070	4000	102	4090	4000	102	50-150	<1	50
PCBs 183 + 185	4490	2000	224	4740	2000	237		5	
PCB 194	2450	3000	82	2610	3000	87	50-150	6	50
PCB 195	2640	3000	88	2810	3000	94	50-150	6	50
PCB 196	2740	3000	91	2890	3000	96	50-150	5	50
PCB 197	3010	3000	100	3030	3000	101	50-150	<1	50
PCB 200	2990	3000	100	3260	3000	109	50-150	9	50
PCB 201	3190	3000	106	3270	3000	109	50-150	2	50
PCB 202	2850	3000	95	2970	3000	99	50-150	4	50
PCB 203	2590	3000	86	2690	3000	90	50-150	3	50
PCB 204	3150	3000	105	3250	3000	108	50-150	3	50
PCB 205	3160	3000	105	3200	3000	107	50-150	1	50

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Analyzed:** 02/24/17  
**Date Extracted:** 02/16/17

**Duplicate Lab Control Sample Summary**  
**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Units:** pg/L  
**Basis:** NA  
**Analysis Lot:** 536514

Analyte Name	Lab Control Sample EQ1700064-02			Duplicate Lab Control Sample EQ1700064-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
PCBs 198 + 199	5510	4000	138	5850	4000	146	50-150	6	50
PCB 206	3370	3000	112	3340	3000	111	50-150	<1	50
PCB 207	3360	3000	112	3490	3000	116	50-150	4	50
PCB 208	3290	3000	110	3490	3000	116	50-150	6	50
PCB 209	3230	3000	108	3190	3000	106	50-150	1	50

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Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** pg/L  
**Basis:** NA

**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303475  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

**Native Analyte Results**

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 1	592		62.2	62.2	2.92	1.000	1
PCB 2	749		75.2	75.2	2.96	0.989	1
PCB 3	653		69.8	69.8	3.00	1.001	1
PCB 4	649		42.0	42.0	-	1.001	1
PCB 10	594		28.9	50.0	-	1.012	1
PCB 9	642		17.9	20.0	-	1.126	1
PCB 7	533		16.4	20.0	-	1.137	1
PCB 6	641		16.8	20.0	-	1.153	1
PCB 5	637		17.4	20.0	-	1.173	1
PCB 8	584		17.0	50.0	-	1.183	1
PCB 14	674		16.9	20.0	-	0.932	1
PCB 11	791		17.4	100	-	0.972	1
PCBs 12 + 13	1490		17.3	50.0	-	0.986	1
PCB 15	681		15.8	20.0	-	1.001	1
PCB 19	917		108	108	1.16	1.001	1
PCBs 18 + 30	1200		74.2	74.2	1.08	1.091	1
PCB 17	657		88.7	88.7	1.11	1.117	1
PCB 27	696		61.7	61.7	1.10	1.128	1
PCB 24	617		64.1	64.1	1.06	1.135	1
PCB 16	743		101	101	1.15	1.143	1
PCB 32	682		58.9	58.9	0.96	1.167	1
PCB 34	739		49.7	49.7	1.06	1.230	1
PCB 23	707		48.9	48.9	1.14	1.237	1
PCBs 26 + 29	1610		50.9	50.9	1.07	1.254	1
PCB 25	759		47.7	47.7	1.11	0.844	1
PCB 31	803		47.6	50.0	1.07	0.855	1
PCBs 20 + 28	1580		48.3	50.0	1.03	0.866	1
PCBs 21 + 33	1750		51.0	51.0	1.07	0.872	1
PCB 22	849		49.0	49.0	1.07	0.887	1
PCB 36	995		48.7	48.7	1.09	0.938	1
PCB 39	898		45.7	45.7	0.97	0.951	1
PCB 38	899		50.0	50.0	1.07	0.970	1
PCB 35	1030		50.4	50.4	1.08	0.987	1
PCB 37	769		45.7	45.7	1.00	1.001	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303475  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 54	1420		37.3	37.3	0.83	1.001	1
PCBs 50 + 53	2350		43.7	100	0.78	0.914	1
PCBs 45 + 51	2510		45.2	50.0	0.75	0.941	1
PCB 46	1380		51.8	51.8	0.76	0.953	1
PCB 52	1490		41.9	50.0	0.75	1.002	1
PCBs 43 + 73	2460		37.7	50.0	0.74	1.006	1
PCBs 49 + 69	2580		38.3	100	0.76	1.016	1
PCB 48	1320		41.8	50.0	0.76	1.029	1
PCBs 44 + 47 + 65	4070		39.6	100	0.76	1.037	1
PCBs 59 + 62 + 75	3990		32.0	100	0.75	1.048	1
PCB 42	1370		45.3	100	0.82	1.057	1
PCBs 41 + 71 + 40	4500		41.8	100	0.77	1.076	1
PCB 64	1440		31.4	50.0	0.73	1.083	1
PCB 72	1510		30.2	50.0	0.77	1.110	1
PCB 68	1400		29.2	50.0	0.77	1.121	1
PCB 57	1460		30.8	50.0	0.77	1.136	1
PCB 58	1560		31.0	50.0	0.75	1.145	1
PCB 67	1560		31.4	50.0	0.82	1.150	1
PCB 63	1420		29.6	50.0	0.81	1.160	1
PCBs 70 + 61 + 74 + 76	6070		30.8	200	0.76	1.173	1
PCB 66	1560		29.6	50.0	0.77	1.185	1
PCB 55	1510		31.7	50.0	0.75	1.192	1
PCB 56	1960		40.0	50.0	0.78	0.916	1
PCB 60	1740		37.1	50.0	0.77	0.922	1
PCB 80	1870		33.9	50.0	0.77	0.930	1
PCB 79	1990		34.3	50.0	0.74	0.973	1
PCB 78	1850		35.4	50.0	0.74	0.988	1
PCB 81	1880		36.6	36.6	0.71	1.000	1
PCB 77	1820		37.1	37.1	0.75	1.000	1
PCB 104	1600		47.8	47.8	1.62	1.001	1
PCB 96	1660		40.8	50.0	1.65	1.018	1
PCB 103	1730		46.9	50.0	1.56	1.080	1
PCB 94	1700		55.0	55.0	1.41	1.090	1
PCBs 95 + 93 + 100	5190		50.4	200	1.52	1.110	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303475  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCBs 98 + 102	3380		49.6	200	1.62	1.118	1
PCBs 88 + 91	3480		50.1	50.1	1.56	1.135	1
PCB 84	1890		56.4	56.4	1.61	1.145	1
PCB 89	1930		53.2	53.2	1.56	1.161	1
PCB 121	1400		49.4	50.0	1.46	1.170	1
PCB 92	1780		66.9	66.9	1.52	0.984	1
PCBs 90 + 101 + 113	5030		54.4	200	1.55	1.000	1
PCBs 83 + 99	3380		62.1	100	1.60	1.016	1
PCB 112	1800		50.2	50.2	1.54	1.021	1
PCBs 86 + 87 + 97 + 109 + 119 + 125	10300		53.8	200	1.56	1.031	1
PCBs 85 + 116 + 117	5090		51.7	100	1.58	1.053	1
PCBs 110 + 115	3290		45.7	100	1.61	1.059	1
PCB 82	1900		71.9	71.9	1.59	1.069	1
PCB 111	1610		43.0	50.0	1.54	1.076	1
PCB 120	1850		43.1	50.0	1.54	1.089	1
PCBs 108 + 124	4080		155	155	1.47	0.992	1
PCB 107	2240		149	149	1.49	0.998	1
PCB 123	1550		132	132	1.49	1.001	1
PCB 106	1920		156	156	1.57	1.004	1
PCB 118	1610		128	128	1.48	1.001	1
PCB 122	2250		168	168	1.49	1.011	1
PCB 114	1830		138	138	1.47	1.000	1
PCB 105	1970		132	132	1.56	1.000	1
PCB 127	2050		152	152	1.52	1.034	1
PCB 126	1960		133	133	1.54	1.000	1
PCB 155	1820		24.3	24.3	1.28	1.000	1
PCB 152	2140		22.1	50.0	1.24	1.010	1
PCB 150	1730		22.7	50.0	1.29	1.014	1
PCB 136	2120		23.2	50.0	1.23	1.027	1
PCB 145	1930		22.7	50.0	1.21	1.034	1
PCB 148	1940		27.7	50.0	1.29	1.074	1
PCBs 135 + 151 + 154	5900		26.6	100	1.27	1.094	1
PCB 144	2010		26.9	50.0	1.25	1.109	1
PCBs 147 + 149	3540		152	152	1.21	0.902	1
PCB 134	2210		220	220	1.25	0.909	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303475  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 143	1650		145	145	1.21	0.910	1
PCBs 139 + 140	3640		149	149	1.21	0.916	1
PCB 131	2030		180	180	1.17	0.922	1
PCB 142	1760		163	163	1.19	0.925	1
PCB 132	1820		160	160	1.25	0.933	1
PCB 133	2020		162	162	1.15	0.942	1
PCB 165	1850		123	123	1.25	0.951	1
PCB 146	1930		135	135	1.25	0.957	1
PCB 161	1940		120	120	1.25	0.959	1
PCBs 153 + 168	3780		120	120	1.26	0.971	1
PCB 141	1880		150	150	1.25	0.977	1
PCB 130	1880		166	166	1.23	0.986	1
PCB 137	1730		142	142	1.21	0.991	1
PCB 164	1930		118	118	1.26	0.994	1
PCBs 129 + 138 + 163	5600		183	200	1.23	1.001	1
PCB 160	1800		73.0	200	1.20	1.004	1
PCB 158	1880		107	107	1.22	1.010	1
PCBs 128 + 166	3530		129	129	1.18	1.029	1
PCB 159	2130		36.6	50.0	1.23	0.984	1
PCB 162	1950		35.2	50.0	1.24	0.990	1
PCB 167	2010		25.4	25.4	1.21	1.000	1
PCBs 156 + 157	3810		44.1	44.1	1.31	1.000	1
PCB 169	1830		27.8	27.8	1.32	1.000	1
PCB 188	2180		25.1	25.1	1.03	1.001	1
PCB 179	2380		23.3	50.0	1.06	1.011	1
PCB 184	2130		22.0	50.0	1.02	1.022	1
PCB 176	2390		23.8	50.0	0.97	1.033	1
PCB 186	2290		24.2	50.0	1.01	1.044	1
PCB 178	2160		29.7	50.0	1.02	1.076	1
PCB 175	2150		28.3	50.0	1.04	1.092	1
PCB 187	2130		27.5	50.0	0.98	1.098	1
PCB 182	2190		29.1	50.0	1.06	1.103	1
PCBs 183 + 185	4490		49.6	100	1.04	1.113	1
PCB 174	2280		50.8	50.8	1.10	1.121	1
PCB 177	2220		51.7	51.7	1.05	1.132	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303475  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 181	2080		46.5	50.0	1.07	1.141	1
PCBs 171 + 173	4480		50.7	100	1.03	1.147	1
PCB 172	2110		48.0	50.0	0.99	0.906	1
PCB 192	2040		38.1	50.0	1.05	0.911	1
PCBs 180 + 193	4070		39.5	100	1.07	0.917	1
PCB 191	2010		35.3	50.0	1.03	0.925	1
PCB 170	1930		46.6	50.0	0.98	0.943	1
PCB 190	1940		33.6	50.0	1.07	0.952	1
PCB 189	2200		37.1	37.1	1.04	1.000	1
PCB 202	2850		26.7	26.7	0.87	1.001	1
PCB 201	3190		27.4	50.0	0.87	1.021	1
PCB 204	3150		27.9	50.0	0.89	1.035	1
PCB 197	3010		26.4	100	0.90	1.040	1
PCB 200	2990		27.1	100	0.93	1.044	1
PCBs 198 + 199	5510		34.0	100	0.89	1.102	1
PCB 196	2740		32.5	50.0	0.88	0.923	1
PCB 203	2590		30.2	50.0	0.86	0.926	1
PCB 195	2640		34.0	50.0	0.86	0.951	1
PCB 194	2450		30.3	50.0	0.90	0.992	1
PCB 205	3160		32.7	32.7	0.87	1.001	1
PCB 208	3290		26.2	26.2	0.79	1.001	1
PCB 207	3360		28.9	50.0	0.77	1.018	1
PCB 206	3370		83.9	83.9	0.76	1.000	1
PCB 209	3230		26.2	26.2	1.22	1.000	1

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** pg/L  
**Basis:** NA

**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303475  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

**Native Analyte Results**

<b>Analyte Name</b>	<b>Result</b>	<b>Q</b>	<b>EDL</b>	<b>MRL</b>	<b>Ion Ratio</b>	<b>RRT</b>	<b>Dilution Factor</b>
Total MonoCB	1990		62.2	62.2			1
Total DiCB	7920		15.8	20.0			1
Total TriCB	18900		45.7	50.0			1
Total TetraCB	62100		29.2	200			1
Total PentaCB	81400		40.8	200			1
Total HexaCB	79700		22.1	22.1			1
Total HeptaCB	47400		22.0	22.0			1
Total OctaCB	34300		26.4	26.4			1
Total NonaCB	10000		26.2	26.2			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** Percent  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

**Data File Name:** P303475  
**ICAL Date:** 04/09/16

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
PCB 1L	2000	953.483	48		15-150	3.08	0.746
PCB 3L	2000	1022.311	51		15-150	3.18	0.874
PCB 4L	2000	1066.131	53		25-150	1.57	0.890
PCB 15L	2000	1224.304	61		25-150	1.58	1.222
PCB 19L	2000	950.199	48		25-150	0.90	1.069
PCB 37L	2000	1342.098	67		25-150	0.94	1.081
PCB 54L	2000	993.532	50		25-150	0.88	0.837
PCB 81L	2000	1588.763	79		25-150	0.74	1.322
PCB 77L	2000	1731.478	87		25-150	0.87	1.343
PCB 104L	2000	1043.640	52		25-150	1.55	0.830
PCB 123L	2000	1502.950	75		25-150	1.50	1.133
PCB 118L	2000	1530.431	77		25-150	1.59	1.142
PCB 114L	2000	1497.895	75		25-150	1.57	1.158
PCB 105L	2000	1540.640	77		25-150	1.61	1.177
PCB 126L	2000	1627.184	81		25-150	1.54	1.264
PCB 155L	2000	1193.938	60		25-150	1.27	0.806
PCB 167L	2000	1365.787	68		25-150	1.26	1.069
PCBs 156L + 157L	4000	2724.130	68		25-150	1.25	1.096
PCB 169L	2000	1404.941	70		25-150	1.21	1.171
PCB 188L	2000	1700.696	85		25-150	1.04	0.736
PCB 189L	2000	1672.357	84		25-150	1.01	0.963
PCB 202L	2000	1853.977	93		25-150	0.89	0.833
PCB 205L	2000	1445.096	72		25-150	0.86	1.008
PCB 208L	2000	1504.917	75		25-150	0.80	0.953
PCB 206L	2000	1317.136	66		25-150	0.84	1.039
PCB 209L	2000	1273.921	64		25-150	1.27	1.067
PCB 28L	2000	1621.754	81		30-135	1.13	0.933
PCB 111L	2000	1533.457	77		30-135	1.63	1.075
PCB 178L	2000	1524.058	76		30-135	1.06	1.009

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 1	589		68.6	68.6	3.02	1.000	1
PCB 2	681		81.9	81.9	3.11	0.989	1
PCB 3	587		74.9	74.9	3.04	1.001	1
PCB 4	609		51.9	51.9	-	1.001	1
PCB 10	575		35.1	50.0	-	1.011	1
PCB 9	589		10.8	20.0	-	1.126	1
PCB 7	536		9.83	20.0	-	1.137	1
PCB 6	574		10.1	20.0	-	1.153	1
PCB 5	569		10.4	20.0	-	1.173	1
PCB 8	505		10.2	50.0	-	1.182	1
PCB 14	624		10.2	20.0	-	0.932	1
PCB 11	760		10.5	100	-	0.972	1
PCBs 12 + 13	1400		10.4	50.0	-	0.986	1
PCB 15	631		9.22	20.0	-	1.001	1
PCB 19	733		78.7	78.7	1.16	1.001	1
PCBs 18 + 30	1110		55.3	55.3	1.10	1.090	1
PCB 17	593		66.1	66.1	1.08	1.116	1
PCB 27	572		46.0	46.0	1.20	1.128	1
PCB 24	572		47.7	47.7	1.02	1.135	1
PCB 16	685		74.9	74.9	1.08	1.143	1
PCB 32	623		43.9	43.9	1.04	1.167	1
PCB 34	691		71.8	71.8	0.96	1.229	1
PCB 23	641		70.5	70.5	0.95	1.237	1
PCBs 26 + 29	1530		73.5	73.5	1.06	1.254	1
PCB 25	747		68.9	68.9	1.05	0.844	1
PCB 31	824		68.7	68.7	1.04	0.855	1
PCBs 20 + 28	1560		69.7	69.7	1.04	0.866	1
PCBs 21 + 33	1670		73.5	73.5	1.05	0.872	1
PCB 22	801		70.7	70.7	1.00	0.887	1
PCB 36	883		70.3	70.3	1.03	0.938	1
PCB 39	886		65.9	65.9	1.00	0.950	1
PCB 38	941		72.2	72.2	0.97	0.970	1
PCB 35	1030		72.8	72.8	1.05	0.986	1
PCB 37	850		66.6	66.6	0.95	1.001	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 54	1470		44.6	44.6	0.80	1.001	1
PCBs 50 + 53	2230		45.0	100	0.79	0.914	1
PCBs 45 + 51	2460		46.7	50.0	0.74	0.940	1
PCB 46	1380		53.4	53.4	0.72	0.952	1
PCB 52	1340		43.2	50.0	0.74	1.001	1
PCBs 43 + 73	2520		38.9	50.0	0.75	1.006	1
PCBs 49 + 69	2650		39.5	100	0.76	1.016	1
PCB 48	1340		43.1	50.0	0.74	1.029	1
PCBs 44 + 47 + 65	4110		40.8	100	0.73	1.037	1
PCBs 59 + 62 + 75	4100		33.0	100	0.76	1.048	1
PCB 42	1450		46.7	100	0.76	1.057	1
PCBs 41 + 71 + 40	4630		43.1	100	0.75	1.075	1
PCB 64	1470		32.4	50.0	0.75	1.083	1
PCB 72	1590		31.2	50.0	0.81	1.110	1
PCB 68	1460		30.1	50.0	0.76	1.120	1
PCB 57	1510		31.8	50.0	0.77	1.136	1
PCB 58	1660		32.0	50.0	0.77	1.145	1
PCB 67	1540		32.4	50.0	0.78	1.150	1
PCB 63	1530		30.5	50.0	0.80	1.160	1
PCBs 70 + 61 + 74 + 76	6380		31.8	200	0.74	1.173	1
PCB 66	1680		30.5	50.0	0.76	1.185	1
PCB 55	1570		32.7	50.0	0.75	1.192	1
PCB 56	2070		46.0	50.0	0.78	0.916	1
PCB 60	1890		42.6	50.0	0.72	0.922	1
PCB 80	1940		39.0	50.0	0.74	0.930	1
PCB 79	2070		39.4	50.0	0.75	0.973	1
PCB 78	1960		40.7	50.0	0.77	0.988	1
PCB 81	1940		40.6	40.6	0.74	1.001	1
PCB 77	1740		41.0	41.0	0.75	1.001	1
PCB 104	1680		57.1	57.1	1.61	1.001	1
PCB 96	1630		46.7	50.0	1.55	1.017	1
PCB 103	1660		53.7	53.7	1.63	1.080	1
PCB 94	1720		63.0	63.0	1.55	1.090	1
PCBs 95 + 93 + 100	5130		57.7	200	1.54	1.106	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCBs 98 + 102	3410		56.8	200	1.63	1.118	1
PCBs 88 + 91	3540		57.4	57.4	1.51	1.135	1
PCB 84	1860		64.6	64.6	1.65	1.145	1
PCB 89	1870		60.9	60.9	1.55	1.161	1
PCB 121	1330		51.1	51.1	1.65	1.170	1
PCB 92	1830		69.2	69.2	1.58	0.984	1
PCBs 90 + 101 + 113	5040		56.2	200	1.56	1.000	1
PCBs 83 + 99	3500		64.2	100	1.50	1.016	1
PCB 112	1800		51.9	51.9	1.54	1.021	1
PCBs 86 + 87 + 97 + 109 + 119 + 125	10400		55.6	200	1.58	1.031	1
PCBs 85 + 116 + 117	5160		53.4	100	1.55	1.053	1
PCBs 110 + 115	3420		47.3	100	1.59	1.059	1
PCB 82	1930		74.3	74.3	1.59	1.069	1
PCB 111	1640		44.4	50.0	1.62	1.076	1
PCB 120	1820		44.5	50.0	1.57	1.089	1
PCBs 108 + 124	4140		153	153	1.49	0.992	1
PCB 107	2230		148	148	1.56	0.998	1
PCB 123	1570		129	129	1.48	1.001	1
PCB 106	2080		154	154	1.56	1.003	1
PCB 118	1610		125	125	1.56	1.000	1
PCB 122	2320		167	167	1.45	1.010	1
PCB 114	1750		133	133	1.58	1.001	1
PCB 105	1990		133	133	1.54	1.000	1
PCB 127	2120		150	150	1.42	1.034	1
PCB 126	1950		128	128	1.55	1.001	1
PCB 155	1790		21.0	21.0	1.27	1.001	1
PCB 152	2050		18.7	50.0	1.26	1.011	1
PCB 150	1860		19.3	50.0	1.30	1.014	1
PCB 136	2090		19.6	50.0	1.24	1.028	1
PCB 145	1870		19.2	50.0	1.27	1.034	1
PCB 148	1930		23.5	50.0	1.22	1.075	1
PCBs 135 + 151 + 154	5790		22.5	100	1.29	1.094	1
PCB 144	2010		22.8	50.0	1.27	1.110	1
PCBs 147 + 149	3410		88.0	100	1.21	0.902	1
PCB 134	2360		128	128	1.21	0.908	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 143	1530		83.9	100	1.22	0.910	1
PCBs 139 + 140	3640		86.2	100	1.22	0.916	1
PCB 131	2010		105	105	1.19	0.922	1
PCB 142	1690		94.6	94.6	1.22	0.925	1
PCB 132	1770		92.8	92.8	1.23	0.933	1
PCB 133	1970		94.1	94.1	1.19	0.941	1
PCB 165	1820		71.5	71.5	1.26	0.951	1
PCB 146	2000		78.6	78.6	1.22	0.956	1
PCB 161	1880		69.4	69.4	1.19	0.959	1
PCBs 153 + 168	3740		69.8	100	1.18	0.971	1
PCB 141	1870		86.8	86.8	1.21	0.976	1
PCB 130	2050		96.3	96.3	1.16	0.986	1
PCB 137	1780		82.5	82.5	1.22	0.991	1
PCB 164	1920		68.4	68.4	1.21	0.994	1
PCBs 129 + 138 + 163	5860		107	200	1.20	1.001	1
PCB 160	1770		42.6	200	1.26	1.004	1
PCB 158	1880		62.1	62.1	1.27	1.009	1
PCBs 128 + 166	3640		74.6	100	1.21	1.029	1
PCB 159	2190		69.8	69.8	1.31	0.984	1
PCB 162	2000		67.1	67.1	1.17	0.990	1
PCB 167	2000		49.3	49.3	1.18	1.000	1
PCBs 156 + 157	3840		82.1	82.1	1.24	1.000	1
PCB 169	1860		51.2	51.2	1.23	1.000	1
PCB 188	2190		19.9	20.0	1.04	1.000	1
PCB 179	2340		17.9	50.0	1.00	1.011	1
PCB 184	2070		16.8	50.0	1.03	1.022	1
PCB 176	2330		18.2	50.0	1.03	1.033	1
PCB 186	2180		18.5	50.0	1.02	1.044	1
PCB 178	2230		22.8	50.0	1.04	1.076	1
PCB 175	2190		21.7	50.0	1.09	1.091	1
PCB 187	2170		21.0	50.0	0.98	1.098	1
PCB 182	2200		22.3	50.0	1.13	1.103	1
PCBs 183 + 185	4740		53.0	100	1.08	1.113	1
PCB 174	2390		54.3	54.3	1.00	1.121	1
PCB 177	2320		55.2	55.2	1.04	1.132	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 181	2070		49.6	50.0	1.04	1.141	1
PCBs 171 + 173	4480		54.2	100	1.04	1.147	1
PCB 172	2100		51.3	51.3	1.00	0.906	1
PCB 192	2030		40.7	50.0	1.04	0.911	1
PCBs 180 + 193	4090		42.2	100	1.04	0.917	1
PCB 191	2090		37.7	50.0	0.99	0.925	1
PCB 170	2070		49.7	50.0	1.01	0.943	1
PCB 190	2020		35.9	50.0	1.11	0.952	1
PCB 189	2190		37.3	37.3	1.01	1.000	1
PCB 202	2970		21.0	21.0	0.92	1.000	1
PCB 201	3270		21.7	50.0	0.87	1.021	1
PCB 204	3250		22.1	50.0	0.91	1.035	1
PCB 197	3030		20.9	100	0.91	1.040	1
PCB 200	3260		21.4	100	0.91	1.044	1
PCBs 198 + 199	5850		26.8	100	0.90	1.102	1
PCB 196	2890		25.7	50.0	0.93	0.923	1
PCB 203	2690		23.9	50.0	0.87	0.926	1
PCB 195	2810		26.8	50.0	0.87	0.951	1
PCB 194	2610		24.0	50.0	0.88	0.992	1
PCB 205	3200		25.9	25.9	0.90	1.001	1
PCB 208	3490		25.9	25.9	0.75	1.000	1
PCB 207	3490		28.1	50.0	0.81	1.018	1
PCB 206	3340		88.1	88.1	0.77	1.001	1
PCB 209	3190		28.5	28.5	1.13	1.000	1

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA  
  
**Units:** pg/L  
**Basis:** NA

**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

**Native Analyte Results**

<b>Analyte Name</b>	<b>Result</b>	<b>Q</b>	<b>EDL</b>	<b>MRL</b>	<b>Ion Ratio</b>	<b>RRT</b>	<b>Dilution Factor</b>
Total MonoCB	1860		68.6	68.6			1
Total DiCB	7370		9.22	20.0			1
Total TriCB	17900		43.9	50.0			1
Total TetraCB	63700		30.1	200			1
Total PentaCB	82100		44.4	200			1
Total HexaCB	79900		18.7	20.0			1
Total HeptaCB	47800		16.8	20.0			1
Total OctaCB	35800		20.9	20.9			1
Total NonaCB	10300		25.9	25.9			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B063  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701324  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** Percent  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
PCB 1L	2000	769.323	38		15-150	3.02	0.746
PCB 3L	2000	841.867	42		15-150	3.11	0.874
PCB 4L	2000	841.876	42		25-150	1.59	0.890
PCB 15L	2000	1038.662	52		25-150	1.53	1.222
PCB 19L	2000	871.260	44		25-150	0.97	1.069
PCB 37L	2000	1150.659	58		25-150	1.12	1.081
PCB 54L	2000	813.331	41		25-150	0.87	0.837
PCB 81L	2000	1458.716	73		25-150	0.78	1.321
PCB 77L	2000	1634.170	82		25-150	0.84	1.342
PCB 104L	2000	911.561	46		25-150	1.63	0.830
PCB 123L	2000	1373.667	69		25-150	1.55	1.133
PCB 118L	2000	1373.592	69		25-150	1.56	1.142
PCB 114L	2000	1380.802	69		25-150	1.69	1.157
PCB 105L	2000	1411.837	71		25-150	1.52	1.177
PCB 126L	2000	1563.474	78		25-150	1.49	1.264
PCB 155L	2000	1067.238	53		25-150	1.33	0.805
PCB 167L	2000	1252.139	63		25-150	1.30	1.069
PCBs 156L + 157L	4000	2613.259	65		25-150	1.27	1.096
PCB 169L	2000	1337.316	67		25-150	1.29	1.171
PCB 188L	2000	1560.332	78		25-150	1.05	0.736
PCB 189L	2000	1642.006	82		25-150	1.05	0.963
PCB 202L	2000	1694.178	85		25-150	0.89	0.833
PCB 205L	2000	1349.351	67		25-150	0.86	1.008
PCB 208L	2000	1402.963	70		25-150	0.80	0.953
PCB 206L	2000	1268.952	63		25-150	0.78	1.039
PCB 209L	2000	1202.887	60		25-150	1.21	1.067
PCB 28L	2000	1052.789	53		30-135	1.12	0.933
PCB 111L	2000	1378.830	69		30-135	1.63	1.075
PCB 178L	2000	1396.319	70		30-135	1.08	1.009



55 SW Yamhill Street, Suite 400 Portland, OR 97204  
P: 503.239.8799 F: 503.239.8940  
info@gsiwatersolutions.com www.gsiwatersolutions.com

# **Laboratory Data QA/QC Review Upland Source Control Investigation Stormwater Sampling in City Outfall Basin 53A**

**To:** File  
**From:** Brian Anderson, GSI Water Solutions, Inc.  
**Date:** March 21, 2017

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during source control investigation sampling and analyses conducted by the City of Portland (City) in February 2017. One stormwater grab sample (W17B060-01) and one field blank (W17B060-02) were collected in Outfall Basin 53A on February 8, 2017, and submitted for analysis.

The laboratory analyses for these samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed below:

- BES WPCL
  - Conductivity – FO SOP 1.03a
  - pH – FO SOP 1.01a
  - Temp – FO SOP 1.05a
  - Total Suspended Solids (TSS) – SM 2540D
  - Total Metals – EPA 200.8
  - Total Mercury – WPCL SOP M-10
  - Polynuclear Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270M-SIM
- ALS Environmental – Houston HRMS
  - Polychlorinated Biphenyls (PCB) Congeners – EPA 1668A

The WPCL summary reports and the subcontracted laboratory's data reports are attached for all analyses associated with these source control program samples.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL and the subcontracted laboratories. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in field blanks
- Chemicals of interest detected in method blanks
- Internal standard recoveries within accuracy control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control and duplicate laboratory control (LC/DLC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for laboratory duplicate samples within laboratory control limits.

The results of the QA/QC review of the laboratory reports are presented below.

## **Chain-of-Custody**

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures were adequate and sample integrity was maintained through the sample collection and delivery process.

## **Analysis Holding Times**

The samples were extracted and analyzed within acceptable holding times.

## **Field Blank**

One field blank was collected and analyzed for the same constituents as field sample 53A\_SW1, and field blank detections are listed in Table 1. Copper was detected in the field blank at a concentration of 1.17 µg/L. Copper was also detected in the field sample at a concentration of 11.7 µg/L. Because copper in the field sample at least 10 times the field blank concentration, the detection has not been qualified.

## **Method Blanks**

Method blanks were analyzed during the laboratory analyses of TSS, total metals, total mercury, PAHs and phthalates, and subcontracted analysis of PCB congeners. No analytes were detected in the method blanks.

## **Surrogate Recoveries**

Surrogate recoveries were completed during the analyses of PAHs and phthalates. Surrogate recoveries for the field samples and associated QC samples were within control criteria.

## **Internal Standard Recoveries**

Isotopically-labeled internal standards were processed during the subcontracted laboratory analysis of PCB congeners. The laboratory reported that internal standards in the sample extracts were recovered at 36% - 86%. Internal standard recoveries were within the target ranges specified in the method. Because the quantification of the native PCB congeners was based on internal standard and isotope dilution methodology, the data were automatically corrected for variation in recovery, which allowed accurate values to be obtained.

## **Matrix Spike/Matrix Spike Duplicates**

MS samples were processed during the laboratory analysis of total metals, total mercury, and PAHs and phthalates, and one MSD was processed for PAHs and phthalate analysis. MS and MSD sample results were within acceptance limits and MSD sample results were within RPD limits.

## **Laboratory Control and Duplicate Laboratory Control Samples**

LC samples were processed during the analyses of TSS, total metals, total mercury, PAHs and phthalates, and PCB congeners. A DLC sample was processed during analysis of PCB Congeners. LC sample recoveries were within laboratory control limits for all analyses, and DLC RPD values were within control criteria.

## **Laboratory Duplicate**

WPCL processed laboratory duplicate samples during TSS, total metals, and total mercury analysis. During TSS analysis, three laboratory duplicate samples were processed. RPDs were within laboratory acceptance limits for total metals and TSS samples. The laboratory duplicate sample result for total mercury was above the 20% RPD limit, therefore total mercury results have been qualified as estimated (J).

## **Other**

The sample was delivered to WPCL with a cooler temperature of 8° C, but qualifications have not been made as the cooler was delivered within the same hour as sampling and the temperature indicates the chilling process had begun. Temperatures during shipping and transport of the samples for subcontracted analyses were less than 6° C.

ALS Environmental reported that the ion abundance ratio between the primary and secondary ions were outside of theoretical acceptance limits for several PCB congeners and a laboratory qualifier, K, has been added. Reported concentrations have been flagged as estimates (J).

No other anomalies were reported by WPCL or the subcontracted laboratories. A list of additional data qualifications added during data review is provided in Table 2.

**Table 1. Field Blank Detections (W17B060-02)**

City of Portland

*Outfall 53A*

Analyte	Unit	Result	Notes
Copper	µg/L	1.17	Concentration detected in the corresponding field sample was 11.7 µg/L.

**Notes**

µg/L = micrograms per liter

**Table 2. Qualifiers Added or Modified During Validation**

City of Portland

Outfall 53A

Sample ID	Analyte	Unit	Result	Qualifier	Reason Codes
W17B060-01	PCB 130	pg/L	78.6	J	Ion ratio
W17B060-01	PCB 137	pg/L	56.9	J	Ion ratio
W17B060-01	PCB 141	pg/L	156	J	Ion ratio
W17B060-01	PCB 144	pg/L	45.4	J	Ion ratio
W17B060-01	PCB 177	pg/L	142	J	Ion ratio
W17B060-01	PCB 190	pg/L	50.3	J	Ion ratio
W17B060-01	PCB 194	pg/L	116	J	Ion ratio
W17B060-01	PCB 196	pg/L	62.5	J	Ion ratio
W17B060-01	PCB 203	pg/L	94.5	J	Ion ratio
W17B060-01	PCB 206	pg/L	83.4	J	Ion ratio
W17B060-01	PCB 42	pg/L	123	J	Ion ratio
W17B060-01	PCB 92	pg/L	102	J	Ion ratio
W17B060-01	PCBs 128 + 166	pg/L	198	J	Ion ratio
W17B060-01	PCBs 20 + 28	pg/L	554	J	Ion ratio
W17B060-01	PCBs 26 + 29	pg/L	109	J	Ion ratio
W17B060-01	PCBs 41 + 71 + 40	pg/L	248	J	Ion ratio
W17B060-01	PCBs 183 + 185	pg/L	182	J+	LC+
W17B060-01	Mercury	µg/L	0.00921	J	LD
W17B060-02	Mercury	µg/L	ND	UJ	LD
W17B060-01	Copper	µg/L	11.7	JB	FBD

**Notes**

µg/L = micrograms per liter

pg/L = picograms per liter

**Qualifier Definitions**

J = Detection of analyte is considered an estimate

J+ = Detection of analyte is considered an estimate, possibly biased high

JB = Analyte was detected in field blank sample and reported concentration is considered an estimate

UJ = estimated detection limit

**Reason Code Definitions**

Ion ratio = The ion abundance ratio between the primary and secondary ions were outside of theoretical acceptance limits; reported results should be considered estimates

LC+ = The Laboratory control sample recovery was outside control limits; the sample result should be considered an estimate

LD = Relative percent difference of laboratory duplicate was outside of control criteria; sample concentration is considered an estimate

FBD = Constituent was detected in the field blank; sample concentration is considered an estimate



City of Portland  
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656



March 16, 2017

Linda Scheffler  
Director's Office

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Work Order  
**W17B060**

Project  
**Portland Harbor**

Received  
02/08/17 08:50

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Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford  
Laboratory Coordinator QA/QC





**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**LABORATORY ANALYSIS REPORT**

Project:	<b>Portland Harbor</b>	Client:	Director's Office
Work Order:	<b>W17B060</b>	Project Mgr:	Linda Scheffler
Received:	2/8/17 8:50		
Submitted By:	Field Operations		

Sample	Laboratory ID	Matrix	Type	Sample Collection Date		Qualifier
				Start	End	
53A_SW1	W17B060-01	Stormwater	Grab	02/08/17 08:18	02/08/17 08:18	
FDBLANK	W17B060-02	Stormwater	Grab	02/08/17 08:14	02/08/17 08:14	

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Field Parameters**

Field conductivity

53A_SW1 : W17B060-01										
Conductivity*	48	umhos/cm			1	B17B137	02/08/17	02/08/17	FO SOP 1.03a	

Field pH

53A_SW1 : W17B060-01										
pH*	6.1	pH Units			1	B17B137	02/08/17 08:18	02/08/17	FO SOP 1.01a	

Field temperature

53A_SW1 : W17B060-01										
Temperature*	6.0	°C			1	B17B137	02/08/17 08:18	02/08/17	FO SOP 1.05a	

**General Chemistry**

Total Suspended Solids

53A_SW1 : W17B060-01										
Total suspended solids	74	mg/L	2	2		B17B126	02/08/17	02/08/17	SM 2540D	

FDBLANK : W17B060-02										
Total suspended solids	ND	mg/L	2	2		B17B126	02/08/17	02/08/17	SM 2540D	

Reported: 03/16/17 13:27

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W17B060**

**Client: Director's Office**  
**Received: 02/08/17 08:50**

Analyte	Result Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Total Metals**

Total Metals by ICPMS

53A\_SW1 : W17B060-01

Arsenic	0.879 ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Cadmium	0.149 ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Chromium	19.3 ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Copper	11.7 ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Lead	9.62 ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Mercury	0.00921 ug/L	0.00100	0.00100	1	B17B219	02/14/17	02/14/17	WPCLSOP M-10	
Nickel	3.44 ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Zinc	184 ug/L	0.500	0.500	1	B17B149	02/09/17	02/10/17	EPA 200.8	

FDBLANK : W17B060-02

Arsenic	ND ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Cadmium	ND ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Chromium	ND ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Copper	1.17 ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Lead	ND ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Mercury	ND ug/L	0.00100	0.00100	1	B17B219	02/14/17	02/14/17	WPCLSOP M-10	
Nickel	ND ug/L	0.200	0.200	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Silver	ND ug/L	0.100	0.100	1	B17B149	02/09/17	02/10/17	EPA 200.8	
Zinc	ND ug/L	0.500	0.500	1	B17B149	02/09/17	02/10/17	EPA 200.8	

Reported: 03/16/17 13:27

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland**  
**Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W17B060**

**Client: Director's Office**  
**Received: 02/08/17 08:50**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

53A\_SW1 : W17B060-01

Acenaphthene	ND	ug/L	0.060	0.060	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.060	0.060	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Anthracene	ND	ug/L	0.060	0.060	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(a)anthracene	0.079	ug/L	0.030	0.030	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(a)pyrene	0.12	ug/L	0.030	0.030	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(b)fluoranthene	0.26	ug/L	0.030	0.030	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(g,h,i)perylene	0.20	ug/L	0.030	0.030	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(k)fluoranthene	0.099	ug/L	0.030	0.030	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Chrysene	0.14	ug/L	0.030	0.030	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Dibenzo(a,h)anthracene	0.043	ug/L	0.030	0.030	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluoranthene	0.36	ug/L	0.030	0.030	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluorene	ND	ug/L	0.060	0.060	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene*	0.12	ug/L	0.030	0.030	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.12	0.12	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.12	0.12	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.12	0.12	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Phenanthrene	0.24	ug/L	0.060	0.060	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Pyrene	0.32	ug/L	0.030	0.030	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	3.0	1.5	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	3.0	1.5	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	3.0	1.5	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	3.0	1.5	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	3.0	1.5	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	1.8	ug/L	3.0	1.5	3	B17B134	02/08/17	02/08/17	EPA 8270-SIM	J
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.19	ug/L	0.229	81%	31-164	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluoranthene-d10	0.23	ug/L	0.229	103%	65-145	B17B134	02/08/17	02/08/17	EPA 8270-SIM	

FDBLANK : W17B060-02

Acenaphthene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene*	ND	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
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**Project: Portland Harbor**  
**Work Order: W17B060**

**Client: Director's Office**  
**Received: 02/08/17 08:50**

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
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**Semivolatile Organics - SIM**

Polynuclear Aromatics & Phthalates by GCMS-SIM

FDBLANK : W17B060-02

2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Phenanthrene	ND	ug/L	0.020	0.020	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Pyrene	ND	ug/L	0.010	0.010	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Diethyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Dimethyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50	1	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
<b>Surrogate</b>	<b>Result</b>		<b>Expected</b>	<b>%Rec</b>	<b>Limits(%)</b>					
2-Methylnaphthalene-d10	0.23	ug/L	0.229	99%	31-164	B17B134	02/08/17	02/08/17	EPA 8270-SIM	
Fluoranthene-d10	0.24	ug/L	0.229	106%	65-145	B17B134	02/08/17	02/08/17	EPA 8270-SIM	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W17B060**

**Client: Director's Office**  
**Received: 02/08/17 08:50**

**Quality Control Report**

**General Chemistry - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Suspended Solids - Batch B17B126</b>										
<b>Blank (B17B126-BLK1)</b>										
Total suspended solids	ND	mg/L	2	2					02/08/17 :02/08/17	
<b>LCS (B17B126-BS1)</b>										
Total suspended solids	97	mg/L			100		97% (90-110)		02/08/17 :02/08/17	
<b>Duplicate (B17B126-DUP1) Source: W17B059-03</b>										
Total suspended solids	9	mg/L	2	2		9		4 (20)	02/08/17 :02/08/17	
<b>Duplicate (B17B126-DUP3) Source: W17B060-01</b>										
Total suspended solids	68	mg/L	2	2		74		8 (20)	02/08/17 :02/08/17	
<b>Duplicate (B17B126-DUP4) Source: W17B049-01RE1</b>										
Total suspended solids	350	mg/L	2	2		330		6 (20)	02/08/17 :02/09/17	

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
<b>Total Metals by ICPMS - Batch B17B149</b>										
<b>Blank (B17B149-BLK1)</b>										
Arsenic	ND	ug/L	0.100	0.100					02/09/17 :02/10/17	
Cadmium	ND	ug/L	0.100	0.100					02/09/17 :02/10/17	
Chromium	ND	ug/L	0.200	0.200					02/09/17 :02/10/17	
Copper	ND	ug/L	0.200	0.200					02/09/17 :02/10/17	
Lead	ND	ug/L	0.100	0.100					02/09/17 :02/10/17	
Nickel	ND	ug/L	0.200	0.200					02/09/17 :02/10/17	
Silver	ND	ug/L	0.100	0.100					02/09/17 :02/10/17	
Zinc	ND	ug/L	0.500	0.500					02/09/17 :02/10/17	
<b>LCS (B17B149-BS1)</b>										
Arsenic	10.4	ug/L	0.100	0.100	10.0		104% (85-115)		02/09/17 :02/10/17	
Cadmium	10.0	ug/L	0.100	0.100	10.0		100% (85-115)		02/09/17 :02/10/17	
Chromium	10.3	ug/L	0.200	0.200	10.0		103% (85-115)		02/09/17 :02/10/17	
Copper	10.5	ug/L	0.200	0.200	10.0		105% (85-115)		02/09/17 :02/10/17	
Lead	10.2	ug/L	0.100	0.100	10.0		102% (85-115)		02/09/17 :02/10/17	
Nickel	10.2	ug/L	0.200	0.200	10.0		102% (85-115)		02/09/17 :02/10/17	
Silver	9.35	ug/L	0.100	0.100	10.0		93% (85-115)		02/09/17 :02/10/17	
Zinc	52.1	ug/L	0.500	0.500	50.0		104% (85-115)		02/09/17 :02/10/17	

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Jennifer Shackelford, Laboratory Coordinator QA/QC



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**Project: Portland Harbor**  
**Work Order: W17B060**

**Client: Director's Office**  
**Received: 02/08/17 08:50**

**Total Metals - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Total Metals by ICPMS - Batch B17B149**

**Duplicate (B17B149-DUP1)**

**Source: W17B063-01**

Arsenic	0.481	ug/L	0.100	0.100		0.467		3 (20)	02/09/17 :02/10/17	
Cadmium	0.166	ug/L	0.100	0.100		0.154		8 (20)	02/09/17 :02/10/17	
Chromium	2.56	ug/L	0.200	0.200		2.48		3 (20)	02/09/17 :02/10/17	
Copper	10.3	ug/L	0.200	0.200		10.4		0.9 (20)	02/09/17 :02/10/17	
Lead	7.62	ug/L	0.100	0.100		7.46		2 (20)	02/09/17 :02/10/17	
Nickel	1.63	ug/L	0.200	0.200		1.66		2 (20)	02/09/17 :02/10/17	
Silver	ND	ug/L	0.100	0.100		ND		(20)	02/09/17 :02/10/17	
Zinc	71.3	ug/L	0.500	0.500		70.8		0.7 (20)	02/09/17 :02/10/17	

**Matrix Spike (B17B149-MS1)**

**Source: W17B063-01**

Arsenic	10.4	ug/L	0.100	0.100	10.0	0.467	99% (70-130)		02/09/17 :02/10/17	
Cadmium	10.1	ug/L	0.100	0.100	10.0	0.154	99% (70-130)		02/09/17 :02/10/17	
Chromium	12.8	ug/L	0.200	0.200	10.0	2.48	104% (70-130)		02/09/17 :02/10/17	
Copper	20.6	ug/L	0.200	0.200	10.0	10.4	101% (70-130)		02/09/17 :02/10/17	
Lead	18.3	ug/L	0.100	0.100	10.0	7.46	109% (70-130)		02/09/17 :02/10/17	
Nickel	11.6	ug/L	0.200	0.200	10.0	1.66	100% (70-130)		02/09/17 :02/10/17	
Silver	8.34	ug/L	0.100	0.100	10.0	ND	83% (70-130)		02/09/17 :02/10/17	
Zinc	122	ug/L	0.500	0.500	50.0	70.8	103% (70-130)		02/09/17 :02/10/17	

**Total Metals by ICPMS - Batch B17B219**

**Blank (B17B219-BLK1)**

Mercury	ND	ug/L	0.000900	0.000900					02/14/17 :02/14/17	
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**LCS (B17B219-BS1)**

Mercury	0.0102	ug/L	0.000900	0.000900	0.0100		102% (85-125)		02/14/17 :02/14/17	
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**Duplicate (B17B219-DUP1)**

**Source: W17B063-02**

Mercury	0.0103	ug/L	0.00100	0.00100		0.00755		30 (20)	02/14/17 :02/14/17	M1
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**Matrix Spike (B17B219-MS1)**

**Source: W17B063-02**

Mercury	0.0289	ug/L	0.00100	0.00100	0.0222	0.00755	96% (70-130)		02/14/17 :02/14/17	
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**Project: Portland Harbor**  
**Work Order: W17B060**

**Client: Director's Office**  
**Received: 02/08/17 08:50**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B17B134**

**Blank (B17B134-BLK1)**

Acenaphthene	ND	ug/L	0.020	0.020					02/08/17 :02/08/17	
Acenaphthylene	ND	ug/L	0.020	0.020					02/08/17 :02/08/17	
Anthracene	ND	ug/L	0.020	0.020					02/08/17 :02/08/17	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Chrysene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Fluoranthene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Fluorene	ND	ug/L	0.020	0.020					02/08/17 :02/08/17	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					02/08/17 :02/08/17	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					02/08/17 :02/08/17	
Naphthalene	ND	ug/L	0.040	0.040					02/08/17 :02/08/17	
Phenanthrene	ND	ug/L	0.020	0.020					02/08/17 :02/08/17	
Pyrene	ND	ug/L	0.010	0.010					02/08/17 :02/08/17	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					02/08/17 :02/08/17	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					02/08/17 :02/08/17	
Diethyl phthalate	ND	ug/L	1.0	0.50					02/08/17 :02/08/17	
Dimethyl phthalate	ND	ug/L	1.0	0.50					02/08/17 :02/08/17	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					02/08/17 :02/08/17	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					02/08/17 :02/08/17	

**Surrogate**

2-Methylnaphthalene-d10	0.22	ug/L			0.229		96% (31-164)		02/08/17 :02/08/17	
Fluoranthene-d10	0.26	ug/L			0.229		114% (65-145)		02/08/17 :02/08/17	

**LCS (B17B134-BS1)**

Acenaphthene	0.214	ug/L	0.020	0.020	0.229		94% (67-125)		02/08/17 :02/08/17	
Acenaphthylene	0.219	ug/L	0.020	0.020	0.229		96% (64-138)		02/08/17 :02/08/17	
Anthracene	0.203	ug/L	0.020	0.020	0.229		89% (65-143)		02/08/17 :02/08/17	
Benzo(a)anthracene	0.219	ug/L	0.010	0.010	0.229		96% (80-130)		02/08/17 :02/08/17	
Benzo(a)pyrene	0.230	ug/L	0.010	0.010	0.229		101% (74-131)		02/08/17 :02/08/17	
Benzo(b)fluoranthene	0.231	ug/L	0.010	0.010	0.229		101% (67-128)		02/08/17 :02/08/17	
Benzo(g,h,i)perylene	0.214	ug/L	0.010	0.010	0.229		94% (57-137)		02/08/17 :02/08/17	
Benzo(k)fluoranthene	0.224	ug/L	0.010	0.010	0.229		98% (63-140)		02/08/17 :02/08/17	
Chrysene	0.231	ug/L	0.010	0.010	0.229		101% (80-134)		02/08/17 :02/08/17	
Dibenzo(a,h)anthracene	0.208	ug/L	0.010	0.010	0.229		91% (56-138)		02/08/17 :02/08/17	
Fluoranthene	0.222	ug/L	0.010	0.010	0.229		97% (70-150)		02/08/17 :02/08/17	
Fluorene	0.220	ug/L	0.020	0.020	0.229		96% (64-130)		02/08/17 :02/08/17	

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**Project: Portland Harbor**  
**Work Order: W17B060**

**Client: Director's Office**  
**Received: 02/08/17 08:50**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B17B134**

**LCS (B17B134-BS1)**

Indeno(1,2,3-cd)pyrene	0.210	ug/L	0.010	0.010	0.229		92% (58-138)		02/08/17 :02/08/17	
1-Methylnaphthalene	0.215	ug/L	0.040	0.040	0.229		94% (35-164)		02/08/17 :02/08/17	
2-Methylnaphthalene	0.210	ug/L	0.040	0.040	0.229		92% (29-162)		02/08/17 :02/08/17	
Naphthalene	0.204	ug/L	0.040	0.040	0.229		89% (53-134)		02/08/17 :02/08/17	
Phenanthrene	0.220	ug/L	0.020	0.020	0.229		96% (73-132)		02/08/17 :02/08/17	
Pyrene	0.218	ug/L	0.010	0.010	0.229		96% (69-153)		02/08/17 :02/08/17	
Butyl benzyl phthalate	2.65	ug/L	1.0	0.50	2.29		116% (55-181)		02/08/17 :02/08/17	
Di-n-butyl phthalate	2.46	ug/L	1.0	0.50	2.29		107% (61-183)		02/08/17 :02/08/17	
Diethyl phthalate	2.52	ug/L	1.0	0.50	2.29		110% (65-177)		02/08/17 :02/08/17	
Dimethyl phthalate	2.57	ug/L	1.0	0.50	2.29		113% (77-151)		02/08/17 :02/08/17	
Di-n-octyl phthalate	2.47	ug/L	1.0	0.50	2.29		108% (12-185)		02/08/17 :02/08/17	
Bis(2-ethylhexyl) phthalate	2.37	ug/L	1.0	0.50	2.29		104% (39-170)		02/08/17 :02/08/17	
<b>Surrogate</b>										
2-Methylnaphthalene-d10	0.23	ug/L			0.229		101% (31-164)		02/08/17 :02/08/17	
Fluoranthene-d10	0.24	ug/L			0.229		104% (65-145)		02/08/17 :02/08/17	

**Matrix Spike (B17B134-MS1)**

**Source: W17B026-03**

Acenaphthene	0.217	ug/L	0.020	0.020	0.229	ND	95% (67-125)		02/08/17 :02/08/17	
Acenaphthylene	0.239	ug/L	0.020	0.020	0.229	ND	105% (64-138)		02/08/17 :02/08/17	
Anthracene	0.225	ug/L	0.020	0.020	0.229	ND	98% (65-143)		02/08/17 :02/08/17	
Benzo(a)anthracene	0.245	ug/L	0.010	0.010	0.229	0.0217	98% (80-130)		02/08/17 :02/08/17	
Benzo(a)pyrene	0.239	ug/L	0.010	0.010	0.229	0.0246	94% (74-131)		02/08/17 :02/08/17	
Benzo(b)fluoranthene	0.264	ug/L	0.010	0.010	0.229	0.0543	92% (67-128)		02/08/17 :02/08/17	
Benzo(g,h,i)perylene	0.238	ug/L	0.010	0.010	0.229	0.0531	81% (57-137)		02/08/17 :02/08/17	
Benzo(k)fluoranthene	0.217	ug/L	0.010	0.010	0.229	0.0160	88% (63-140)		02/08/17 :02/08/17	
Chrysene	0.263	ug/L	0.010	0.010	0.229	0.0303	102% (80-134)		02/08/17 :02/08/17	
Dibenzo(a,h)anthracene	0.185	ug/L	0.010	0.010	0.229	ND	81% (56-138)		02/08/17 :02/08/17	
Fluoranthene	0.309	ug/L	0.010	0.010	0.229	0.0851	98% (70-150)		02/08/17 :02/08/17	
Fluorene	0.229	ug/L	0.020	0.020	0.229	ND	100% (64-130)		02/08/17 :02/08/17	
Indeno(1,2,3-cd)pyrene	0.207	ug/L	0.010	0.010	0.229	0.0251	79% (58-138)		02/08/17 :02/08/17	
1-Methylnaphthalene	0.212	ug/L	0.040	0.040	0.229	ND	93% (35-164)		02/08/17 :02/08/17	
2-Methylnaphthalene	0.210	ug/L	0.040	0.040	0.229	ND	92% (29-162)		02/08/17 :02/08/17	
Naphthalene	0.218	ug/L	0.040	0.040	0.229	ND	95% (53-134)		02/08/17 :02/08/17	
Phenanthrene	0.277	ug/L	0.020	0.020	0.229	0.0531	98% (73-132)		02/08/17 :02/08/17	
Pyrene	0.317	ug/L	0.010	0.010	0.229	0.0949	97% (69-153)		02/08/17 :02/08/17	
Butyl benzyl phthalate	2.73	ug/L	1.0	0.50	2.29	ND	120% (55-181)		02/08/17 :02/08/17	
Di-n-butyl phthalate	2.76	ug/L	1.0	0.50	2.29	ND	121% (61-183)		02/08/17 :02/08/17	
Diethyl phthalate	2.66	ug/L	1.0	0.50	2.29	ND	117% (65-177)		02/08/17 :02/08/17	
Dimethyl phthalate	2.61	ug/L	1.0	0.50	2.29	ND	114% (77-151)		02/08/17 :02/08/17	
Di-n-octyl phthalate	2.29	ug/L	1.0	0.50	2.29	ND	100% (12-185)		02/08/17 :02/08/17	
Bis(2-ethylhexyl) phthalate	2.39	ug/L	1.0	0.50	2.29	ND	104% (39-170)		02/08/17 :02/08/17	

Reported: 03/16/17 13:27

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*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



**City of Portland  
Water Pollution Control Laboratory**

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



**Project: Portland Harbor**  
**Work Order: W17B060**

**Client: Director's Office**  
**Received: 02/08/17 08:50**

**Semivolatile Organics - SIM - QC**

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
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**Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B17B134**

**Matrix Spike (B17B134-MS1)**

**Source: W17B026-03**

**Surrogate**

2-Methylnaphthalene-d10	0.23	ug/L			0.229		99% (31-164)		02/08/17 :02/08/17	
Fluoranthene-d10	0.26	ug/L			0.229		113% (65-145)		02/08/17 :02/08/17	

**Matrix Spike Dup (B17B134-MSD1)**

**Source: W17B026-03**

Acenaphthene	0.222	ug/L	0.020	0.020	0.229	ND	97% (67-125)	2 (30)	02/08/17 :02/08/17	
Acenaphthylene	0.238	ug/L	0.020	0.020	0.229	ND	104% (64-138)	0.7 (30)	02/08/17 :02/08/17	
Anthracene	0.220	ug/L	0.020	0.020	0.229	ND	96% (65-143)	2 (30)	02/08/17 :02/08/17	
Benzo(a)anthracene	0.253	ug/L	0.010	0.010	0.229	0.0217	101% (80-130)	3 (30)	02/08/17 :02/08/17	
Benzo(a)pyrene	0.241	ug/L	0.010	0.010	0.229	0.0246	95% (74-131)	1 (30)	02/08/17 :02/08/17	
Benzo(b)fluoranthene	0.268	ug/L	0.010	0.010	0.229	0.0543	94% (67-128)	2 (30)	02/08/17 :02/08/17	
Benzo(g,h,i)perylene	0.230	ug/L	0.010	0.010	0.229	0.0531	77% (57-137)	4 (30)	02/08/17 :02/08/17	
Benzo(k)fluoranthene	0.215	ug/L	0.010	0.010	0.229	0.0160	87% (63-140)	0.8 (30)	02/08/17 :02/08/17	
Chrysene	0.267	ug/L	0.010	0.010	0.229	0.0303	104% (80-134)	1 (30)	02/08/17 :02/08/17	
Dibenzo(a,h)anthracene	0.163	ug/L	0.010	0.010	0.229	ND	71% (56-138)	13 (30)	02/08/17 :02/08/17	
Fluoranthene	0.370	ug/L	0.010	0.010	0.229	0.0851	125% (70-150)	18 (30)	02/08/17 :02/08/17	
Fluorene	0.222	ug/L	0.020	0.020	0.229	ND	97% (64-130)	3 (30)	02/08/17 :02/08/17	
Indeno(1,2,3-cd)pyrene	0.193	ug/L	0.010	0.010	0.229	0.0251	73% (58-138)	7 (30)	02/08/17 :02/08/17	
1-Methylnaphthalene	0.211	ug/L	0.040	0.040	0.229	ND	92% (35-164)	0.5 (30)	02/08/17 :02/08/17	
2-Methylnaphthalene	0.210	ug/L	0.040	0.040	0.229	ND	92% (29-162)	0 (30)	02/08/17 :02/08/17	
Naphthalene	0.225	ug/L	0.040	0.040	0.229	ND	98% (53-134)	3 (30)	02/08/17 :02/08/17	
Phenanthrene	0.298	ug/L	0.020	0.020	0.229	0.0531	107% (73-132)	7 (30)	02/08/17 :02/08/17	
Pyrene	0.378	ug/L	0.010	0.010	0.229	0.0949	124% (69-153)	17 (30)	02/08/17 :02/08/17	
Butyl benzyl phthalate	2.71	ug/L	1.0	0.50	2.29	ND	119% (55-181)	0.7 (30)	02/08/17 :02/08/17	
Di-n-butyl phthalate	2.70	ug/L	1.0	0.50	2.29	ND	118% (61-183)	2 (30)	02/08/17 :02/08/17	
Diethyl phthalate	2.49	ug/L	1.0	0.50	2.29	ND	109% (65-177)	7 (30)	02/08/17 :02/08/17	
Dimethyl phthalate	2.60	ug/L	1.0	0.50	2.29	ND	114% (77-151)	0.5 (30)	02/08/17 :02/08/17	
Di-n-octyl phthalate	1.88	ug/L	1.0	0.50	2.29	ND	82% (12-185)	20 (30)	02/08/17 :02/08/17	
Bis(2-ethylhexyl) phthalate	2.12	ug/L	1.0	0.50	2.29	ND	93% (39-170)	12 (30)	02/08/17 :02/08/17	

**Surrogate**

2-Methylnaphthalene-d10	0.22	ug/L			0.229		97% (31-164)		02/08/17 :02/08/17	
Fluoranthene-d10	0.26	ug/L			0.229		113% (65-145)		02/08/17 :02/08/17	

Reported: 03/16/17 13:27

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*

*Jennifer Shackelford*

Jennifer Shackelford, Laboratory Coordinator QA/QC



City of Portland  
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656  
ORELAP Certification ID 4023



Project: **Portland Harbor**  
Work Order: **W17B060**

Client: Director's Office  
Received: 02/08/17 08:50

**Qualifiers**

- J Analyte was detected but at a concentration below the reporting limit; the result is an estimate.
- M1 Matrix duplicate precision measurement indicates non-homogeneous sample matrix. Sample result should be considered an estimate.

**Definitions**

- |        |   |     |  |
|--------|---|-----|--|
| DET    | Analyte Detected                          | ND  | Analyte Not Detected at or above the reporting limit |
| MRL    | Method Reporting Limit                    | MDL | Method Detection Limit                               |
| NR     | Not Reportable                            | dry | Sample results reported on a dry weight basis        |
| % Rec. | Percent Recovery                          | RPD | Relative Percent Difference                          |
| *      | This analyte is not certified under NELAP |     |  |

Reported: 03/16/17 13:27

Jennifer Shackelford, Laboratory Coordinator QA/QC

*The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.*



City of Portland  
 Chain-of-Custody



Bureau of Environmental Services

Date: 2/8/17

Work Order #: W17B060

Collected By: MJS, RLB

Client Name: Director's Office Matrix: Stormwater  
 Project Name: Portland Harbor

Requested Analyses

5 wastroll 1

2016 Stormwater Outfall Monitoring COC

<sup>1</sup>Pesticides only required for samples from Outfalls 17 and 44

Lab Number	Location ID	Sample Date	Sample Time	Sample Type	TSS	Total Metals (As, Cd, Cr, Cu (Pb, Ni, Ag, Zn)	Total Mercury	PCB Congeners	PAHs + phthalates (low-level)	Pesticides (Low-level) <sup>1</sup>							Conductivity (umhos/cm) Meter:	pH (pH units) Meter:	Temperature (Deg C) Meter:	# of Containers	Remarks		
																						01	53A_SW1
02	FDB	2/8/17	0814	G	0	0	0	0	0													4	

Relinquished By: [Signature]  
 Signature: [Signature] Date: 2/8/17  
 Printed Name: Maty S. H. Van Time: 0850

Received By: [Signature]  
 Signature: [Signature] Date: 2/8/17  
 Printed Name: R. Katzenmeyer Time: 0850

Relinquished By:  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_

Received By:  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_

### WPCL Cooler Receipt Form

Work Order Number: W17B060

Cooler Receipt Form Filled Out By: RK

Project: Portland Harbor

Sample transport: Samples received on ice  Courier

Directly from field

Temperature (°C) 6

	Yes	No	NA
Is the COC present and signed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are sample bottles intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do the COC and sample labels match?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are the appropriate containers used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are samples appropriately preserved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do VOA vials have Headspace?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Are samples received within holding times?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO <sub>3</sub> (1:1) to pH <2	1601707	0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H <sub>2</sub> SO <sub>4</sub> (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2		1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
2/8/17	1000	RK	W17B060-01,02	-01D -02C	1	

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



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ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

March 15, 2017

**Analytical Report for Service Request No: K1701325**

Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203

**RE: Portland Harbor / W17B060**

Dear Jennifer,

Enclosed are the results of the sample(s) submitted to our laboratory February 09, 2017  
For your reference, these analyses have been assigned our service request number **K1701325**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at [howard.holmes@alsglobal.com](mailto:howard.holmes@alsglobal.com).

Respectfully submitted,

**ALS Group USA, Corp. dba ALS Environmental**

Howard Holmes  
Project Manager



---

ALS Environmental  
ALS Group USA, Corp  
1317 South 13th Avenue  
Kelso, WA 98626  
T : +1 360 577 7222  
F : +1 360 636 1068  
[www.alsglobal.com](http://www.alsglobal.com)

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Acronyms

Qualifiers

State Certifications, Accreditations, And Licenses

Chain of Custody

Subcontract Lab Results

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### Inorganic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Organic Data Qualifiers

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2795
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L14-51
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Hawaii DOH	Not available	-
ISO 17025	<a href="http://www.pjllabs.com/">http://www.pjllabs.com/</a>	L16-57
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	03016
Maine DHS	Not available	WA01276
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-457
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA01276
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA100010
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	T104704427
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C544
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.ALSGlobal.com](http://www.ALSGlobal.com) or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.



# Chain of Custody

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577- 7222 Fax (360)636- 1068  
[www.alsglobal.com](http://www.alsglobal.com)

**SUBCONTRACT ORDER**

**City of Portland Water Pollution Control Lab  
W17B060**

*W17B060*

**SENDING LABORATORY:**

City of Portland Water Pollution Control Lab  
6543 N. Burlington Ave  
Portland, OR 97203  
Phone: 503-823-5600  
Fax: 503-823-5656  
Invoice To: Charles Lytle

**RECEIVING LABORATORY:**

ALS Environmental  
1317 S. 13th Avenue  
Kelso, WA 98626  
Phone : (360) 577-7222  
Fax: (360) 636-1068

**WPCL Project Name**  
**Portland Harbor**

<b>TURNAROUND REQUEST</b>	
<input checked="" type="checkbox"/> Standard	
<input type="checkbox"/> Rush _ day(s)	

Analysis	Due	Expires	Laboratory ID	Comments
<b>Sample ID: W17B060-01</b>	<b>Water</b>	<b>Sampled:02/08/17 08:18</b>		
Out-PCB Congeners 209	02/23/17 17:00	08/07/17 08:18		
<i>Containers Supplied:</i> G amber 1L (A)				
<b>Sample ID: W17B060-02</b>	<b>Water</b>	<b>Sampled:02/08/17 08:14</b>		
Out-PCB Congeners 209	02/23/17 17:00	08/07/17 08:14		
<i>Containers Supplied:</i> G amber 1L (A)				

	<i>2/9/17</i>	<i>Bull ALS</i>	<i>2-9-17</i>	<i>11:30</i>
Released By	Date	Received By	Date	Date
		<i>Kula Smith</i>	<i>2/9/17</i>	<i>1330</i>
Released By	Date	Received By	Date	Date



PC H2

### Cooler Receipt and Preservation Form

Client: WPCC Service Request K17 01325  
 Received: 2/9/17 Opened: 2/9/17 By: CG Unloaded: 2/9/17 By: CG

- Samples were received via? USPS ~~Fed Ex~~ ~~UPS~~ ~~DHL~~ ~~PDX~~ ~~Courier~~ Hand Delivered
- Samples were received in: (circle) Cooler ~~Box~~ ~~Envelope~~ ~~Other~~ NA
- Were custody seals on coolers? NA ~~Y~~ ~~N~~ If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact? Y ~~N~~ If present, were they signed and dated? Y ~~N~~

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
5.4	5.3	/	/	-0.1	356	NA	NA	NA

- Packing material: Inserts ~~Baggies~~ ~~Bubble Wrap~~ ~~Gel Packs~~ ~~Wet Ice~~ ~~Dry Ice~~ ~~Sleeves~~ No cooling/NA
- Were custody papers properly filled out (ink, signed, etc.)? NA ~~Y~~ ~~N~~
- Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA ~~Y~~ ~~N~~  
 If applicable, tissue samples were received: Frozen ~~Partially Thawed~~ ~~Thawed~~
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA ~~Y~~ ~~N~~
- Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA ~~Y~~ ~~N~~
- Were appropriate bottles/containers and volumes received for the tests indicated? NA ~~Y~~ ~~N~~
- Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below NA ~~Y~~ ~~N~~
- Were VOA vials received without headspace? Indicate in the table below. NA ~~Y~~ ~~N~~
- Was C12/Res negative? NA ~~Y~~ ~~N~~

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Out of	Head-	Broke	pH	Reagent	Volume	Reagent Lot	Initials	Time
	Bottle Type	Temp	space				added	Number		

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Subcontract Lab Results

**ALS Environmental—Kelso Laboratory**  
1317 South 13th Avenue, Kelso, WA 98626  
Phone (360)577-7222 Fax (360)636-1068  
[www.alsglobal.com](http://www.alsglobal.com)



10450 Stancliff Rd., Suite 210  
Houston, TX 77099  
T: +1 713 266 1599  
F: +1 713 266 1599  
[www.alsglobal.com](http://www.alsglobal.com)

February 28, 2017.

Service Request No: K1701325

Howard Holmes.

ALS Environmental  
1317 South 13<sup>th</sup> Avenue  
Kelso, WA 98626

**Laboratory Result for: City of Portland.**

Dear Howard:

Enclosed are the results of the sample(s) submitted to our laboratory on February 15, 2017. For Your reference, these analyses have been assigned our service request number: **K1701325**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and considered in their entirety, and ALS Environmental is not responsible for use of less than the final complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. In accordance to the TNI 2009 Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Please contact me if you have any questions. My direct line is 281-575-2279. You may also contact me via email at [Arthi.Kodur@alsglobal.com](mailto:Arthi.Kodur@alsglobal.com)

Respectfully submitted,

**ALS Group USA Corp., dba ALS Environmental**

Arthi Kodur  
Project Manager

Page 1 of \_\_\_\_\_



# Certificate of Analysis

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

## ALS ENVIRONMENTAL

**Client:** City of Portland  
**Project:** Portland Harbor  
**Sample Matrix:** Water

**Service Request No.:** K1701324  
**Date Received:** 2/15/17

### ALS ENVIRONMENTAL NARRATIVE

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

#### Sample Receipt

Four waters were received for analysis at ALS Environmental – Houston HRMS on 2/15/17.

The date of receipt currently references the date ALS Environmental-Kelso received the samples (2/9/17) and not the date ALS Environmental-Houston HRMS received the samples (2/15/17).

The samples were received at 0.9°C in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

#### Data Validation Notes and Discussion

##### Precision and Accuracy

EQ1700064: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of an MS/DMS for this extraction batch. The batch quality was met.

##### K flags

EMPC - When the ion abundance ratios associated with a particular compound are outside the QC limits, samples are flagged with a 'K' flag. A 'K' flag indicates an estimated maximum possible concentration for the associated compound.

K1701325-002: 77L not meet ion ratio and not within 15 % CCAL

##### Detection Limits

Detection limits are calculated for each congener in each sample by measuring the height of the noise level for each quantitation ion for the associated labeled standard. The concentration equivalent to 2.5 times the height of the noise is then calculated using the appropriate response factor and the weight of the sample. The calculated concentration equals the detection limit.

Where the EDL is greater than the MRL, the MRL will increase equal the EDL.

**The TEQ Summary results for each sample have been calculated by ALS ENVIRONMENTAL/Houston to include:**

- WHO-2005 TEFs, The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds (M. Van den Berg et al., Toxicological Sciences 93(2):223-241, 2006)
- Non-detected compounds are not included in the 'Total'

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060

**Service Request:**K1701325

**SAMPLE CROSS-REFERENCE**

<u>SAMPLE #</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
K1701325-001	W17B060-01	2/8/2017	0818
K1701325-002	W17B060-02	2/8/2017	0814

## Service Request Summary

2 1000 ml-Glass Bottle NM AMBER Teflon Liner Unpreserved  
 Location: E-Disposed  
 Pressure Gas:

**Folder #:** K1701325  
**Client Name:** Portland, City of  
**Project Name:** Portland Harbor  
**Project Number:** W17B060

**Report To:** Jennifer Shackelford  
 City of Portland  
 6543 N. Burlington Ave  
 Portland, OR 97203  
 USA

**Project Chemist:** Howard Holmes  
**Originating Lab:** KELSO  
**Logged By:** KSMITH  
**Date Received:** 02/09/17  
**Internal Due Date:** 2/28/2017  
**QAP:** LAB QAP  
**Qualifier Set:** Lab Standard  
**Formset:** Lab Standard  
**Merged?:** Y

**Phone Number:** 503-823-5614  
**Cell Number:**  
**Fax Number:** 503-823-4500  
**E-mail:** jennifer.shackelford@portlandoregon.gov

**Report to MDL?:** Y  
**P.O. Number:** 30004890  
**EDD:** City Of Portland

Lab Samp No.	Client Samp No	Matrix	Collected	HOUST ON
K1701325-001	W17B060-01	Water	02/08/17 0818	Cl Biphen Cong/1668A
K1701325-002	W17B060-02	Water	02/08/17 0814	II

**Folder Comments:**  
 Tier II

## Service Request Summary

2 1000 ml-Glass Bottle NM AMBER Teflon Liner Unpreserved  
Location: E-Disposed  
Pressure Gas:

Project Chemist: Howard Holmes  
Originating Lab: KELSO  
Logged By: KSMITH  
Date Received: 02/09/17  
Internal Due Date: 2/28/2017  
QAP: LAB QAP  
Qualifier Set: Lab Standard  
Formset: Lab Standard  
Merged?: Y  
Report to MDL?: Y  
P.O. Number: 30004890  
EDD: City Of Portland

**Folder #:** K1701325  
**Client Name:** Portland, City of  
**Project Name:** Portland Harbor  
**Project Number:** W17B060  
**Report To:** Jennifer Shackelford  
City of Portland  
6543 N. Burlington Ave  
Portland, OR 97203  
USA  
**Phone Number:** 503-823-5614  
**Cell Number:**  
**Fax Number:** 503-823-4500  
**E-mail:** jennifer.shackelford@portlandoregon.gov

### **Test Comments:**

<b>Group</b>	<b>Test/Method</b>	<b>Samples</b>	<b>Comments</b>
Semivoa GCMS	CI Biphem Cong/1668A	2	209 Congeners

## Data Qualifiers

### HRMS Qualifier Set

- B Indicates the associated analyte was found in the method blank at >1/10th the reported value.
- E Estimated value. The reported concentration is above the calibration range of the instrument.
- H Sample extracted and/or analyzed out of suggested holding time.
- J Estimated value. The reported concentration is below the MRL.
- K The ion abundance ratio between the primary and secondary ions were outside of theoretical acceptance limits. The concentration of this analyte should be considered as an estimate.
- P Chlorodiphenyl ether interference was present at the retention time of the target analyte. Reported result should be considered an estimate.
- Q Monitored lock-mass indicates matrix-interference. Reported result is estimated.
- S Signal saturated detector. Result reported from dilution.
- U Compound was analyzed for, but was not detected (ND).
- X See Case Narrative.
- Y Isotopically Labeled Standard recovery outside of acceptance limits. In all cases, the signal-to-nois ratios are greater than 10:1, making the recoveries acceptable.
- i The MDL/MRL have been elevated due to a matrix interference.

# ALS Laboratory Group

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## Acronyms

Cal	Calibration
Conc	CONCEntration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient

### State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
American Association for Laboratory Accreditation	2897.01	11/30/2017
Arizona Department of Health Services	AZ0793	5/27/2017
Arkansas Department of Environmental Quality	14-038-0	6/16/2017
Florida Department of Health	E87611	6/30/2017
Hawaii Department of Health	TX02694	4/30/2017
Illinois Environmental Protection Agency	200057	5/9/2017
Kansas Department of Health and Environment	E-10406	7/31/2017
Louisiana Department of Environmental Quality	03048	6/30/2017
Maine Center for Disease Control and Prevention	2014019	6/5/2018
Maryland Department of the Environment	343	6/30/2017
Michigan Department of Environmental Quality	9971	6/5/2018
Minnesota Department of Health	840911	12/31/2017
Nebraska Department of Health and Human Services	NE-OS-25-13	4/30/2017
Nevada Department of Conservation and Natural Resources	TX014112013-2	7/31/2017
New Jersey Department of Environmental Protection	NLC140001	6/30/2017
New Mexico Environment Department	TX02694	4/17/2017
New York Department of Health	11707	4/1/2017
Oklahoma Department of Environmental Quality	2014 124	8/21/2017
Oregon Environmental Laboratory Accreditation Program	TX200002	3/24/2017
Pennsylvania Department of Environmental Protection	68-03441	6/30/2017
Tennessee Department of Environment and Conservation	04016	6/30/2017
Texas Commission on Environmental Quality	TX104704216-14-5	6/30/2017
United States Department of Agriculture	P330-14-00067	6/19/2018
Utah Department of Health Environmental Laboratory Certification	TX02694	7/31/2017
West Virginia Department of Environmental Protection	347	6/30/2017

ALS ENVIRONMENTAL – Houston  
Data Processing/Form Production and Peer Review Signatures

SR# Unique ID K1791325

DB-5MSUI

SPB-Octyl

**First Level - Data Processing - to be filled by person generating the forms**

Date:	Analyst:	Samples:
02/28/17	TC	-001, -002

**Second Level - Data Review – to be filled by person doing peer review**

Date:	Analyst:	Samples:
02/28/17	LK	001, 002



# Chain of Custody

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd, Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

# Intra-Network Chain of Custody

1317 South 13th Avenue • Kelso, WA 98626 • 1-360-577-7222 • FAX 1-360-636-1068

ALS Contact: Howard Holmes

Project Name: Portland Harbor  
 Project Number: W17B060  
 Project Manager: Jennifer Shackelford  
 Company: City of Portland  
 QAP: LAB QAP

**K1701325**

City of Portland  
Portland Harbor



5

Cl Biphem Cong  
1668A

Lab Code	Client Sample ID	# of Cont.	Matrix	Sample		Date Received	Date	Time	Send To
				Date	Time				
K1701325-001	W17B060-01	1	Water	2/8/17	0818	2/9/17			HOUSTON
K1701325-002	W17B060-02	1	Water	2/8/17	0814	2/9/17			HOUSTON

**Test Comments**

Cl Biphem Cong - 1668A

K1701325-001.2

**Folder Comments:**

Tier II

209 Congeners

**Special Instructions/Comments**

Please provide the electronic (PDF and EDD) report to the following e-mail address:  
 ALKLS.Data@alsglobal.com.

**Turnaround Requirements**

\_\_\_ RUSH (Surcharges Apply)

PLEASE CIRCLE WORK DAYS

1 2 3 4 5

\_\_\_ STANDARD

Requested FAX Date: \_\_\_\_\_

Requested Report Date: 02/24/17

**Report Requirements**

\_\_\_ I. Results Only

II. Results + QC Summaries

\_\_\_ III. Results + QC and Calibration Summaries

\_\_\_ IV. Data Validation Report with Raw Data

PQL/MDL/1 Y

EDD Y

**Invoice Information**

PO#  
51K1701325

Bill to

Checked \_\_\_\_\_

Received By: \_\_\_\_\_

2/14/17

2/15/17 8:35

Airbill Number: \_\_\_\_\_

# Cooler Receipt Form

 Project Chemist AK

 Client/Project ALS Kelso

 Thermometer ID SMO 4

 Date/Time Received: 2/15/17 8:35 Initials: AL Date/Time Logged in: 2/15/17 Initials AL

 1. Method of delivery:  US Mail  Fed Ex  UPS  DHL  Courier  Client

 2. Samples received in:  Cooler  Box  Envelope  Other

 3. Were custody seals on coolers?  Yes  No  
 Were they intact?  Yes  No  N/A  
 Were they signed and dated?  Yes  No  N/A  
 If yes, how many and where? No seals

 4. Packing Material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Sleeves  Other

 5. Foreign or Regulated Soil?  Yes  No Location of Sampling: \_\_\_\_\_

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
7227 2428 2131		2/15/17	9:33	AL	19/0.9	<input checked="" type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>
						<input type="checkbox"/>

- 6. Were custody papers properly filled out (ink, signed, dated, etc)?  Yes  No
- 7. Did all bottles arrive in good condition (not broken, no signs of leakage)?  Yes  No
- 8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)?  Yes  No
- 9. Were appropriate bottles/containers and volumes received for the requested tests?  Yes  No
- 10. Did sample labels and tags agree with custody documents?  Yes  No

 Notes, Discrepancies, & Resolutions:  

Service request Label: 
**K1701325**      **5**  
City of Portland  
Portland Harbor





## SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

### **Cooler Custody Seals (desirable, mandatory if specified in SAP):**

- ✓ Intact on outside of cooler, signed and dated

### **Chain-of-Custody (COC) documentation (mandatory):**

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sample. The COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

### **Sample Integrity (mandatory):**

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

### **Temperature Requirement (varies by sample matrix):**

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C.
- ✓ Air samples are shipped and stored cold, at 0 to 6°C
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report



# Preparation Information Benchsheets

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

# Preparation Information Benchsheet

Prep Run#: 281737  
 Team: Semivoa GCMS/JGHOSH

Prep WorkFlow: OrgExtAq(365)  
 Prep Method: Method Sep Funnel/Jar

Status: Prepped  
 Prep Date/Time: 2/16/17 08:00 AM

#	Lab Code	Client ID	B#	Method /Test	pH	CI	Matrix	Amt. Ext.	Sample Description
1	EQ1700064-01	MB		1668A/CI/Biphen Cong	5	x	Liquid	1000mL	
2	EQ1700064-02	LCS		1668A/CI/Biphen Cong	5	x	Liquid	1000mL	
3	EQ1700064-03	D LCS		1668A/CI/Biphen Cong	5	x	Liquid	1000mL	
4	K1701324-001	W17B063-01	.02	1668A/CI/Biphen Cong	5	x	Water	1031mL	Light brown liquid
5	K1701324-002	W17B063-02	.01	1668A/CI/Biphen Cong	5	x	Water	974mL	Light brown liquid; cloudy
6	K1701324-003	W17B063-03	.01	1668A/CI/Biphen Cong	5	x	Water	1028mL	Light brown liquid
7	K1701324-004	W17B063-04	.02	1668A/CI/Biphen Cong	5	x	Water	989mL	Off white liquid
8	K1701325-001	W17B060-01	.01	1668A/CI/Biphen Cong	5	x	Water	1018mL	Dark brown liquid
9	K1701325-002	W17B060-02	.01	1668A/CI/Biphen Cong	5	x	Water	995mL	Clear liquid

### Spiking Solutions

Name: 1668A Labeled Working Standard      Inventory ID: 178765      Logbook Ref: 178765 TW 1/19/20 2-4NG/ML      Expires On: 07/18/2017

EQ1700064-01	1,000.00µL	EQ1700064-02	1,000.00µL	EQ1700064-03	1,000.00µL	K1701324-001	1,000.00µL	K1701324-002	1,000.00µL	K1701324-003	1,000.00µL
K1701324-004	1,000.00µL	K1701325-001	1,000.00µL	K1701325-002	1,000.00µL						

Name: 1668 A/C PCB Congener (209) Working Matrix      Inventory ID: 179224      Logbook Ref: 179224 TW 02/8/17 10-30NG/ML      Expires On: 08/07/2017

EQ1700064-02	100.00µL	EQ1700064-03	100.00µL								
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Name: 1668A Clean Up Working Standard      Inventory ID: 179322      Logbook Ref: 179322 2/14/17 CID20.0ng/ml      Expires On: 08/13/2017

EQ1700064-01	100.00µL	EQ1700064-02	100.00µL	EQ1700064-03	100.00µL	K1701324-001	100.00µL	K1701324-002	100.00µL	K1701324-003	100.00µL
K1701324-004	100.00µL	K1701325-001	100.00µL	K1701325-002	100.00µL						

### Preparation Materials

Sensafé Free Chlorine WTR	LM 3/19/15 (79756)	Glass Wool	CID 12/22/16 (178182)	Hexanes 95%	CID 1/16/17 (178630)
CHK					
Dichloromethane (Methylene Chloride) 99.9% MeCl2	JP 1/10/16 (178535)	Sodium Hydroxide Reagent Grade NaOH	CID 5/23/2016 (172624)	Sodium Sulfate Anhydrous Reagent Grade Na2SO4	AL 122816 300107005-09 (178440)
Tridecane (n-Tridecane) sulfuric acid	AL 1/25/17 (178887) CID 10/11/16 (176335)	ColorpHast pH-Indicator Strips	AL 8/17/16 (175089)	Silica Gel	CID 1/9/17 (178503)

### Preparation Steps

Step:	Step:	Step:	Step:	Step:	Step:
Extraction	Acid Clean	Silica Gel Clean	Silica Gel Clean	Final Volume	
Started: 2/16/17 08:00	Started: 2/20/17 10:30	Started: 2/21/17 08:00	Started: 2/21/17 08:00	Started: 2/22/17 15:20	
Finished: 2/16/17 14:15	Finished: 2/20/17 11:05	Finished: 2/21/17 09:35	Finished: 2/21/17 09:35	Finished: 2/22/17 15:40	
By: JGHOSH	By: CDIAZ	By: CDIAZ	By: CDIAZ	By: CDIAZ	Comments

# Preparation Information Benchsheet

Prep Run#: 281737  
Team: Semivoa GCMS/JGHOSH

Prep WorkFlow: OrgExtAq(365)  
Prep Method: Method Sep Funnel/Jar

Status: Prepped  
Prep Date/Time: 2/16/17 08:00 AM

Comments: \_\_\_\_\_

Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_

Number of Custody

Relinquished By: \_\_\_\_\_

Date: \_\_\_\_\_

Received By: \_\_\_\_\_

Date: \_\_\_\_\_

Extracts Examined

Yes

No



# Analytical Results

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston, TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-01  
**Lab Code:** K1701325-001

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:18  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1018mL  
**Data File Name:** P303473  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 20:03  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 1	ND	U	54.3	54.3			1
PCB 2	ND	U	62.6	62.6			1
PCB 3	ND	U	55.6	55.6			1
PCB 4	138		38.9	38.9	-	1.001	1
PCB 10	ND	U	25.1	49.1			1
PCB 9	ND	U	17.4	19.6			1
PCB 7	ND	U	16.0	19.6			1
PCB 6	65.8		16.3	19.6	-	1.153	1
PCB 5	ND	U	16.9	19.6			1
PCB 8	204		16.5	49.1	-	1.182	1
PCB 14	ND	U	16.4	19.6			1
PCB 11	389		16.9	98.2	-	0.972	1
PCBs 12 + 13	ND	U	16.8	49.1			1
PCB 15	134		14.3	19.6	-	1.001	1
PCB 19	ND	U	96.6	96.6			1
PCBs 18 + 30	355		74.5	74.5	1.06	1.096	1
PCB 17	164		89.0	89.0	0.99	1.117	1
PCB 27	ND	U	61.9	61.9			1
PCB 24	ND	U	64.3	64.3			1
PCB 16	ND	U	101	101			1
PCB 32	130		59.1	59.1	1.07	1.168	1
PCB 34	ND	U	50.2	50.2			1
PCB 23	ND	U	49.4	49.4			1
PCBs 26 + 29	109K		51.4	51.4	1.52	1.254	1
PCB 25	ND	U	48.2	48.2			1
PCB 31	486		48.1	49.1	0.94	0.855	1
PCBs 20 + 28	554K		48.8	49.1	0.86	0.865	1
PCBs 21 + 33	348		51.5	51.5	1.09	0.873	1
PCB 22	239		49.5	49.5	1.20	0.888	1
PCB 36	ND	U	49.2	49.2			1
PCB 39	ND	U	46.1	46.1			1
PCB 38	ND	U	50.5	50.5			1
PCB 35	ND	U	51.0	51.0			1
PCB 37	165		51.1	51.1	1.16	1.001	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-01  
**Lab Code:** K1701325-001

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:18  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1018mL  
**Data File Name:** P303473  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 20:03  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 54	ND	U	40.6	40.6			1
PCBs 50 + 53	80.4J		56.0	98.2	0.67	0.915	1
PCBs 45 + 51	119		58.1	58.1	0.73	0.940	1
PCB 46	ND	U	66.5	66.5			1
PCB 52	553		53.8	53.8	0.71	1.001	1
PCBs 43 + 73	ND	U	48.4	49.1			1
PCBs 49 + 69	319		49.1	98.2	0.74	1.018	1
PCB 48	ND	U	53.6	53.6			1
PCBs 44 + 47 + 65	507		50.8	98.2	0.79	1.037	1
PCBs 59 + 62 + 75	ND	U	41.0	98.2			1
PCB 42	123K		58.1	98.2	0.63	1.056	1
PCBs 41 + 71 + 40	248K		53.6	98.2	0.58	1.075	1
PCB 64	256		40.3	49.1	0.73	1.083	1
PCB 72	ND	U	38.8	49.1			1
PCB 68	ND	U	37.4	49.1			1
PCB 57	ND	U	39.5	49.1			1
PCB 58	ND	U	39.8	49.1			1
PCB 67	ND	U	40.2	49.1			1
PCB 63	ND	U	37.9	49.1			1
PCBs 70 + 61 + 74 + 76	519		39.5	196	0.72	1.173	1
PCB 66	288		37.9	49.1	0.83	1.184	1
PCB 55	ND	U	40.6	49.1			1
PCB 56	142		41.9	49.1	0.65	0.916	1
PCB 60	88.4		38.9	49.1	0.69	0.922	1
PCB 80	ND	U	35.6	49.1			1
PCB 79	ND	U	36.0	49.1			1
PCB 78	ND	U	37.2	49.1			1
PCB 81	ND	U	38.7	38.7			1
PCB 77	45.8		40.6	40.6	0.76	1.001	1
PCB 104	ND	U	30.5	30.5			1
PCB 96	ND	U	27.5	49.1			1
PCB 103	ND	U	31.7	49.1			1
PCB 94	ND	U	37.1	49.1			1
PCBs 95 + 93 + 100	683		34.1	196	1.51	1.105	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-01  
**Lab Code:** K1701325-001

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:18  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1018mL  
**Data File Name:** P303473  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 20:03  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCBs 98 + 102	ND	U	33.5	196			1
PCBs 88 + 91	242		33.9	49.1	1.53	1.144	1
PCB 84	ND	U	38.1	38.1			1
PCB 89	ND	U	35.9	49.1			1
PCB 121	ND	U	28.3	49.1			1
PCB 92	102K		38.3	49.1	1.91	0.984	1
PCBs 90 + 101 + 113	519		31.1	196	1.37	1.001	1
PCBs 83 + 99	255		35.5	98.2	1.52	1.017	1
PCB 112	ND	U	28.7	49.1			1
PCBs 86 + 87 + 97 + 109 + 119 + 125	402		30.7	196	1.61	1.036	1
PCBs 85 + 116 + 117	87.4J		29.5	98.2	1.44	1.054	1
PCBs 110 + 115	869		26.1	98.2	1.56	1.059	1
PCB 82	ND	U	41.1	49.1			1
PCB 111	ND	U	24.6	49.1			1
PCB 120	ND	U	24.6	49.1			1
PCBs 108 + 124	ND	U	58.8	98.2			1
PCB 107	ND	U	56.8	56.8			1
PCB 123	ND	U	52.3	52.3			1
PCB 106	ND	U	59.3	59.3			1
PCB 118	398		51.1	51.1	1.75	1.000	1
PCB 122	ND	U	64.0	64.0			1
PCB 114	ND	U	53.2	53.2			1
PCB 105	210		56.9	56.9	1.76	1.001	1
PCB 127	ND	U	57.7	57.7			1
PCB 126	ND	U	56.4	56.4			1
PCB 155	ND	U	16.7	19.6			1
PCB 152	ND	U	17.3	49.1			1
PCB 150	ND	U	17.7	49.1			1
PCB 136	117		18.1	49.1	1.40	1.028	1
PCB 145	ND	U	17.7	49.1			1
PCB 148	ND	U	21.6	49.1			1
PCBs 135 + 151 + 154	319		20.7	98.2	1.11	1.093	1
PCB 144	45.4JK		21.0	49.1	0.86	1.110	1
PCBs 147 + 149	765		42.3	98.2	1.19	0.903	1
PCB 134	ND	U	61.4	98.2			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-01  
**Lab Code:** K1701325-001

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:18  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1018mL  
**Data File Name:** P303473  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 20:03  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 143	ND	U	40.3	98.2			1
PCBs 139 + 140	ND	U	41.4	98.2			1
PCB 131	ND	U	50.3	50.3			1
PCB 142	ND	U	45.4	49.1			1
PCB 132	414		44.5	49.1	1.10	0.933	1
PCB 133	ND	U	45.2	49.1			1
PCB 165	ND	U	34.3	49.1			1
PCB 146	138		37.7	49.1	1.12	0.956	1
PCB 161	ND	U	33.3	49.1			1
PCBs 153 + 168	651		33.5	98.2	1.15	0.971	1
PCB 141	156K		41.7	49.1	0.92	0.976	1
PCB 130	78.6K		46.3	49.1	0.84	0.987	1
PCB 137	56.9K		39.6	49.1	0.98	0.990	1
PCB 164	91.3		32.9	49.1	1.08	0.994	1
PCBs 129 + 138 + 163	1570		51.2	196	1.21	1.001	1
PCB 160	ND	U	20.4	196			1
PCB 158	114		29.8	49.1	1.13	1.009	1
PCBs 128 + 166	198K		35.8	98.2	0.98	1.031	1
PCB 159	ND	U	36.9	49.1			1
PCB 162	ND	U	35.5	49.1			1
PCB 167	49.0		26.4	26.4	1.34	1.001	1
PCBs 156 + 157	129		46.3	46.3	1.22	1.000	1
PCB 169	ND	U	32.1	32.1			1
PCB 188	ND	U	30.5	30.5			1
PCB 179	103		28.8	49.1	0.91	1.011	1
PCB 184	ND	U	27.1	49.1			1
PCB 176	ND	U	29.4	49.1			1
PCB 186	ND	U	29.8	49.1			1
PCB 178	ND	U	36.7	49.1			1
PCB 175	ND	U	34.9	49.1			1
PCB 187	328		33.9	49.1	1.10	1.098	1
PCB 182	ND	U	36.0	49.1			1
PCBs 183 + 185	182		59.6	98.2	0.96	1.113	1
PCB 174	360		61.0	61.0	1.05	1.121	1
PCB 177	142K		62.1	62.1	0.78	1.132	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-01  
**Lab Code:** K1701325-001

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:18  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1018mL  
**Data File Name:** P303473  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 20:03  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 181	ND	U	55.8	55.8			1
PCBs 171 + 173	129		60.9	98.2	1.17	1.147	1
PCB 172	ND	U	57.7	57.7			1
PCB 192	ND	U	45.7	49.1			1
PCBs 180 + 193	673		47.4	98.2	1.17	0.919	1
PCB 191	ND	U	42.4	49.1			1
PCB 170	335		55.9	55.9	1.09	0.943	1
PCB 190	50.3K		40.4	49.1	1.40	0.953	1
PCB 189	ND	U	45.2	45.2			1
PCB 202	ND	U	21.2	21.2			1
PCB 201	ND	U	21.6	49.1			1
PCB 204	ND	U	22.0	49.1			1
PCB 197	ND	U	20.8	98.2			1
PCB 200	ND	U	21.3	98.2			1
PCBs 198 + 199	159		26.7	98.2	0.86	1.103	1
PCB 196	62.5K		25.6	49.1	1.20	0.923	1
PCB 203	94.5K		23.8	49.1	1.25	0.927	1
PCB 195	68.0		26.7	49.1	0.84	0.951	1
PCB 194	116K		23.9	49.1	0.65	0.992	1
PCB 205	ND	U	25.4	25.4			1
PCB 208	ND	U	31.4	31.4			1
PCB 207	ND	U	33.0	49.1			1
PCB 206	83.4K		76.7	76.7	1.24	1.001	1
PCB 209	50.4		25.5	25.5	1.04	1.001	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-01  
**Lab Code:** K1701325-001

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:18  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1018mL  
**Data File Name:** P303473  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 20:03  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total MonoCB	ND	U	54.3	54.3			1
Total DiCB	931		14.3	19.6			1
Total TriCB	2550		46.1	49.1			1
Total TetraCB	3290		35.6	196			1
Total PentaCB	3770		24.6	196			1
Total HexaCB	4890		16.7	19.6			1
Total HeptaCB	2120		27.1	27.1			1
Total OctaCB	500		20.8	20.8			1
Total NonaCB	83.4		31.4	31.4			1
Total PCBs	18400		14.3	196			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-01  
**Lab Code:** K1701325-001

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:18  
**Date Received:** 02/09/17 13:30  
**Units:** Percent  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1018mL  
**Data File Name:** P303473  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 20:03  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
PCB 1L	2000	869.929	43		15-150	2.97	0.745
PCB 3L	2000	1033.632	52		15-150	3.06	0.873
PCB 4L	2000	1070.629	54		25-150	1.58	0.888
PCB 15L	2000	1379.918	69		25-150	1.54	1.220
PCB 19L	2000	1288.111	64		25-150	1.10	1.067
PCB 37L	2000	1248.559	62		25-150	1.02	1.080
PCB 54L	2000	1060.843	53		25-150	0.81	0.836
PCB 81L	2000	1554.448	78		25-150	0.86	1.321
PCB 77L	2000	1572.701	79		25-150	0.73	1.342
PCB 104L	2000	1191.342	60		25-150	1.57	0.831
PCB 123L	2000	1464.393	73		25-150	1.60	1.133
PCB 118L	2000	1461.050	73		25-150	1.59	1.142
PCB 114L	2000	1463.504	73		25-150	1.52	1.158
PCB 105L	2000	1421.219	71		25-150	1.61	1.177
PCB 126L	2000	1579.618	79		25-150	1.57	1.265
PCB 155L	2000	1236.778	62		25-150	1.19	0.805
PCB 167L	2000	1299.628	65		25-150	1.28	1.068
PCBs 156L + 157L	4000	2542.586	64		25-150	1.25	1.096
PCB 169L	2000	1229.399	61		25-150	1.23	1.171
PCB 188L	2000	1650.988	83		25-150	1.09	0.736
PCB 189L	2000	1643.333	82		25-150	1.02	0.962
PCB 202L	2000	1705.564	85		25-150	0.95	0.833
PCB 205L	2000	1343.671	67		25-150	0.91	1.008
PCB 208L	2000	1365.553	68		25-150	0.78	0.953
PCB 206L	2000	1294.984	65		25-150	0.78	1.039
PCB 209L	2000	1236.458	62		25-150	1.17	1.067
PCB 28L	2000	1543.132	77		30-135	1.00	0.933
PCB 111L	2000	1567.729	78		30-135	1.54	1.075
PCB 178L	2000	1417.687	71		30-135	1.01	1.009

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:18  
**Date Received:** 02/09/17 13:30

**Sample Name:** W17B060-01  
**Lab Code:** K1701325-001

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
PCB 81	ND	38.7	38.7	1	0.0003	
PCB 77	45.8	40.6	40.6	1	0.0001	0.00458
PCB 123	ND	52.3	52.3	1	0.00003	
PCB 118	398	51.1	51.1	1	0.00003	0.0119
PCB 114	ND	53.2	53.2	1	0.00003	
PCB 105	210	56.9	56.9	1	0.00003	0.00630
PCB 126	ND	56.4	56.4	1	0.1	
PCB 167	49.0	26.4	26.4	1	0.00003	0.00147
PCBs 156 + 157	129	46.3	46.3	1	0.00003	0.00387
PCB 169	ND	32.1	32.1	1	0.03	
PCB 189	ND	45.2	45.2	1	0.00003	
Total TEQ						0.0281

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-02  
**Lab Code:** K1701325-002

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:14  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 995mL  
**Data File Name:** P303474  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 21:11  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 1	ND	U	58.9	58.9			1
PCB 2	ND	U	71.6	71.6			1
PCB 3	ND	U	66.7	66.7			1
PCB 4	ND	U	52.3	52.3			1
PCB 10	ND	U	35.4	50.3			1
PCB 9	ND	U	14.1	20.1			1
PCB 7	ND	U	12.9	20.1			1
PCB 6	ND	U	13.2	20.1			1
PCB 5	ND	U	13.7	20.1			1
PCB 8	ND	U	13.4	50.3			1
PCB 14	ND	U	13.3	20.1			1
PCB 11	ND	U	13.7	101			1
PCBs 12 + 13	ND	U	13.6	50.3			1
PCB 15	ND	U	12.1	20.1			1
PCB 19	ND	U	102	102			1
PCBs 18 + 30	ND	U	72.9	72.9			1
PCB 17	ND	U	87.1	87.1			1
PCB 27	ND	U	60.6	60.6			1
PCB 24	ND	U	62.9	62.9			1
PCB 16	ND	U	98.8	98.8			1
PCB 32	ND	U	57.8	57.8			1
PCB 34	ND	U	62.4	62.4			1
PCB 23	ND	U	61.3	61.3			1
PCBs 26 + 29	ND	U	63.9	63.9			1
PCB 25	ND	U	59.9	59.9			1
PCB 31	ND	U	59.7	59.7			1
PCBs 20 + 28	ND	U	60.6	60.6			1
PCBs 21 + 33	ND	U	64.0	64.0			1
PCB 22	ND	U	61.5	61.5			1
PCB 36	ND	U	61.1	61.1			1
PCB 39	ND	U	57.3	57.3			1
PCB 38	ND	U	62.8	62.8			1
PCB 35	ND	U	63.3	63.3			1
PCB 37	ND	U	59.1	59.1			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-02  
**Lab Code:** K1701325-002

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:14  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 995mL  
**Data File Name:** P303474  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 21:11  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 54	ND	U	41.9	41.9			1
PCBs 50 + 53	ND	U	59.2	101			1
PCBs 45 + 51	ND	U	61.3	61.3			1
PCB 46	ND	U	70.2	70.2			1
PCB 52	ND	U	56.8	56.8			1
PCBs 43 + 73	ND	U	51.1	51.1			1
PCBs 49 + 69	ND	U	51.9	101			1
PCB 48	ND	U	56.6	56.6			1
PCBs 44 + 47 + 65	ND	U	53.7	101			1
PCBs 59 + 62 + 75	ND	U	43.3	101			1
PCB 42	ND	U	61.4	101			1
PCBs 41 + 71 + 40	ND	U	56.6	101			1
PCB 64	ND	U	42.6	50.3			1
PCB 72	ND	U	41.0	50.3			1
PCB 68	ND	U	39.5	50.3			1
PCB 57	ND	U	41.8	50.3			1
PCB 58	ND	U	42.0	50.3			1
PCB 67	ND	U	42.5	50.3			1
PCB 63	ND	U	40.1	50.3			1
PCBs 70 + 61 + 74 + 76	ND	U	41.7	201			1
PCB 66	ND	U	40.1	50.3			1
PCB 55	ND	U	42.9	50.3			1
PCB 56	ND	U	38.7	50.3			1
PCB 60	ND	U	35.9	50.3			1
PCB 80	ND	U	32.8	50.3			1
PCB 79	ND	U	33.2	50.3			1
PCB 78	ND	U	34.3	50.3			1
PCB 81	ND	U	36.5	36.5			1
PCB 77	ND	U	37.3	37.3			1
PCB 104	ND	U	63.7	63.7			1
PCB 96	ND	U	54.3	54.3			1
PCB 103	ND	U	62.4	62.4			1
PCB 94	ND	U	73.2	73.2			1
PCBs 95 + 93 + 100	ND	U	67.1	201			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-02  
**Lab Code:** K1701325-002

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:14  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 995mL  
**Data File Name:** P303474  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 21:11  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCBs 98 + 102	ND	U	66.0	201			1
PCBs 88 + 91	ND	U	66.7	66.7			1
PCB 84	ND	U	75.0	75.0			1
PCB 89	ND	U	70.8	70.8			1
PCB 121	ND	U	43.2	50.3			1
PCB 92	ND	U	58.4	58.4			1
PCBs 90 + 101 + 113	ND	U	47.5	201			1
PCBs 83 + 99	ND	U	54.2	101			1
PCB 112	ND	U	43.8	50.3			1
PCBs 86 + 87 + 97 + 109 + 119 + 125	ND	U	46.9	201			1
PCBs 85 + 116 + 117	ND	U	45.1	101			1
PCBs 110 + 115	ND	U	39.9	101			1
PCB 82	ND	U	62.8	62.8			1
PCB 111	ND	U	37.5	50.3			1
PCB 120	ND	U	37.6	50.3			1
PCBs 108 + 124	ND	U	49.0	101			1
PCB 107	ND	U	47.4	50.3			1
PCB 123	ND	U	41.5	41.5			1
PCB 106	ND	U	49.4	50.3			1
PCB 118	ND	U	40.1	40.1			1
PCB 122	ND	U	53.4	53.4			1
PCB 114	ND	U	45.2	45.2			1
PCB 105	ND	U	42.6	42.6			1
PCB 127	ND	U	48.1	50.3			1
PCB 126	ND	U	41.5	41.5			1
PCB 155	ND	U	17.4	20.1			1
PCB 152	ND	U	16.2	50.3			1
PCB 150	ND	U	16.6	50.3			1
PCB 136	ND	U	16.9	50.3			1
PCB 145	ND	U	16.6	50.3			1
PCB 148	ND	U	20.3	50.3			1
PCBs 135 + 151 + 154	ND	U	19.4	101			1
PCB 144	ND	U	19.7	50.3			1
PCBs 147 + 149	ND	U	26.6	101			1
PCB 134	ND	U	38.7	101			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-02  
**Lab Code:** K1701325-002

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:14  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 995mL  
**Data File Name:** P303474  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 21:11  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 143	ND	U	25.4	101			1
PCBs 139 + 140	ND	U	26.1	101			1
PCB 131	ND	U	31.6	50.3			1
PCB 142	ND	U	28.6	50.3			1
PCB 132	ND	U	28.0	50.3			1
PCB 133	ND	U	28.5	50.3			1
PCB 165	ND	U	21.6	50.3			1
PCB 146	ND	U	23.8	50.3			1
PCB 161	ND	U	21.0	50.3			1
PCBs 153 + 168	ND	U	21.1	101			1
PCB 141	ND	U	26.3	50.3			1
PCB 130	ND	U	29.1	50.3			1
PCB 137	ND	U	24.9	50.3			1
PCB 164	ND	U	20.7	50.3			1
PCBs 129 + 138 + 163	ND	U	32.2	201			1
PCB 160	ND	U	12.9	201			1
PCB 158	ND	U	18.8	50.3			1
PCBs 128 + 166	ND	U	22.6	101			1
PCB 159	ND	U	31.1	50.3			1
PCB 162	ND	U	29.9	50.3			1
PCB 167	ND	U	21.5	21.5			1
PCBs 156 + 157	ND	U	36.9	40.2			1
PCB 169	ND	U	25.1	25.1			1
PCB 188	ND	U	33.2	33.2			1
PCB 179	ND	U	30.2	50.3			1
PCB 184	ND	U	28.5	50.3			1
PCB 176	ND	U	30.8	50.3			1
PCB 186	ND	U	31.3	50.3			1
PCB 178	ND	U	38.5	50.3			1
PCB 175	ND	U	36.6	50.3			1
PCB 187	ND	U	35.5	50.3			1
PCB 182	ND	U	37.7	50.3			1
PCBs 183 + 185	ND	U	52.1	101			1
PCB 174	ND	U	53.3	53.3			1
PCB 177	ND	U	54.3	54.3			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-02  
**Lab Code:** K1701325-002

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:14  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 995mL  
**Data File Name:** P303474  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 21:11  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 181	ND	U	48.8	50.3			1
PCBs 171 + 173	ND	U	53.2	101			1
PCB 172	ND	U	50.4	50.4			1
PCB 192	ND	U	40.0	50.3			1
PCBs 180 + 193	ND	U	41.5	101			1
PCB 191	ND	U	37.0	50.3			1
PCB 170	ND	U	48.9	50.3			1
PCB 190	ND	U	35.3	50.3			1
PCB 189	ND	U	37.4	37.4			1
PCB 202	ND	U	23.0	23.0			1
PCB 201	ND	U	22.8	50.3			1
PCB 204	ND	U	23.2	50.3			1
PCB 197	ND	U	21.9	101			1
PCB 200	ND	U	22.5	101			1
PCBs 198 + 199	ND	U	28.2	101			1
PCB 196	ND	U	27.0	50.3			1
PCB 203	ND	U	25.1	50.3			1
PCB 195	ND	U	28.2	50.3			1
PCB 194	ND	U	25.2	50.3			1
PCB 205	ND	U	25.9	25.9			1
PCB 208	ND	U	34.6	34.6			1
PCB 207	ND	U	37.4	50.3			1
PCB 206	ND	U	59.1	59.1			1
PCB 209	ND	U	31.1	31.1			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-02  
**Lab Code:** K1701325-002

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:14  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 995mL  
**Data File Name:** P303474  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 21:11  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total MonoCB	ND	U	58.9	58.9			1
Total DiCB	ND	U	12.1	20.1			1
Total TriCB	ND	U	57.3	57.3			1
Total TetraCB	ND	U	32.8	201			1
Total PentaCB	ND	U	37.5	201			1
Total HexaCB	ND	U	12.9	20.1			1
Total HeptaCB	ND	U	28.5	28.5			1
Total OctaCB	ND	U	21.9	21.9			1
Total NonaCB	ND	U	34.6	34.6			1
Total PCBs	ND	U	12.1	201			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-02  
**Lab Code:** K1701325-002

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:14  
**Date Received:** 02/09/17 13:30  
**Units:** Percent  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 995mL  
**Data File Name:** P303474  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 21:11  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
PCB 1L	2000	858.686	43		15-150	3.06	0.746
PCB 3L	2000	907.685	45		15-150	3.02	0.874
PCB 4L	2000	927.262	46		25-150	1.55	0.890
PCB 15L	2000	1148.537	57		25-150	1.57	1.222
PCB 19L	2000	981.468	49		25-150	1.06	1.069
PCB 37L	2000	1235.964	62		25-150	1.11	1.081
PCB 54L	2000	880.664	44		25-150	0.82	0.836
PCB 81L	2000	1423.143	71		25-150	0.78	1.321
PCB 77L	2000	1468.729	73	K	25-150	0.91	1.342
PCB 104L	2000	956.914	48		25-150	1.59	0.831
PCB 123L	2000	1305.770	65		25-150	1.58	1.133
PCB 118L	2000	1337.090	67		25-150	1.62	1.142
PCB 114L	2000	1302.086	65		25-150	1.51	1.158
PCB 105L	2000	1343.672	67		25-150	1.45	1.177
PCB 126L	2000	1518.207	76		25-150	1.55	1.264
PCB 155L	2000	1060.967	53		25-150	1.29	0.805
PCB 167L	2000	1185.857	59		25-150	1.38	1.068
PCBs 156L + 157L	4000	2403.596	60		25-150	1.26	1.096
PCB 169L	2000	1190.928	60		25-150	1.34	1.170
PCB 188L	2000	1449.601	72		25-150	1.03	0.736
PCB 189L	2000	1515.710	76		25-150	1.01	0.963
PCB 202L	2000	1585.235	79		25-150	0.89	0.833
PCB 205L	2000	1313.706	66		25-150	0.94	1.008
PCB 208L	2000	1324.068	66		25-150	0.82	0.953
PCB 206L	2000	1178.855	59		25-150	0.79	1.039
PCB 209L	2000	1190.175	60		25-150	1.19	1.067
PCB 28L	2000	1418.396	71		30-135	0.89	0.933
PCB 111L	2000	1447.496	72		30-135	1.63	1.076
PCB 178L	2000	1446.724	72		30-135	1.05	1.009

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** W17B060-02  
**Lab Code:** K1701325-002

**Service Request:** K1701325  
**Date Collected:** 02/08/17 08:14  
**Date Received:** 02/09/17 13:30  
**Units:** pg/L  
**Basis:** NA

**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Toxicity Equivalency Quotient**

<b>Analyte Name</b>	<b>Result</b>	<b>DL</b>	<b>MRL</b>	<b>Dilution Factor</b>	<b>TEF</b>	<b>TEF - Adjusted Concentration</b>
PCB 81	ND	36.5	36.5	1	0.0003	
PCB 77	ND	37.3	37.3	1	0.0001	
PCB 123	ND	41.5	41.5	1	0.00003	
PCB 118	ND	40.1	40.1	1	0.00003	
PCB 114	ND	45.2	45.2	1	0.00003	
PCB 105	ND	42.6	42.6	1	0.00003	
PCB 126	ND	41.5	41.5	1	0.1	
PCB 167	ND	21.5	21.5	1	0.00003	
PCBs 156 + 157	ND	36.9	40.2	1	0.00003	
PCB 169	ND	25.1	25.1	1	0.03	
PCB 189	ND	37.4	37.4	1	0.00003	
<b>Total TEQ</b>						<b>0.00</b>

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 1	ND	U	74.5	74.5			1
PCB 2	ND	U	89.8	89.8			1
PCB 3	ND	U	83.1	83.1			1
PCB 4	ND	U	63.3	63.3			1
PCB 10	ND	U	41.8	50.0			1
PCB 9	ND	U	15.7	20.0			1
PCB 7	ND	U	14.4	20.0			1
PCB 6	ND	U	14.7	20.0			1
PCB 5	ND	U	15.2	20.0			1
PCB 8	ND	U	14.9	50.0			1
PCB 14	ND	U	14.8	20.0			1
PCB 11	ND	U	15.2	100			1
PCBs 12 + 13	ND	U	15.1	50.0			1
PCB 15	ND	U	13.2	20.0			1
PCB 19	ND	U	82.1	82.1			1
PCBs 18 + 30	ND	U	63.9	63.9			1
PCB 17	ND	U	76.4	76.4			1
PCB 27	ND	U	53.1	53.1			1
PCB 24	ND	U	55.2	55.2			1
PCB 16	ND	U	86.6	86.6			1
PCB 32	ND	U	50.7	50.7			1
PCB 34	ND	U	60.7	60.7			1
PCB 23	ND	U	59.7	59.7			1
PCBs 26 + 29	ND	U	62.1	62.1			1
PCB 25	ND	U	58.3	58.3			1
PCB 31	ND	U	58.1	58.1			1
PCBs 20 + 28	ND	U	59.0	59.0			1
PCBs 21 + 33	ND	U	62.2	62.2			1
PCB 22	ND	U	59.8	59.8			1
PCB 36	ND	U	59.5	59.5			1
PCB 39	ND	U	55.7	55.7			1
PCB 38	ND	U	61.1	61.1			1
PCB 35	ND	U	61.6	61.6			1
PCB 37	ND	U	61.3	61.3			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 54	ND	U	50.7	50.7			1
PCBs 50 + 53	ND	U	51.4	100			1
PCBs 45 + 51	ND	U	53.3	53.3			1
PCB 46	ND	U	61.0	61.0			1
PCB 52	ND	U	49.4	50.0			1
PCBs 43 + 73	ND	U	44.4	50.0			1
PCBs 49 + 69	ND	U	45.1	100			1
PCB 48	ND	U	49.2	50.0			1
PCBs 44 + 47 + 65	ND	U	46.6	100			1
PCBs 59 + 62 + 75	ND	U	37.6	100			1
PCB 42	ND	U	53.3	100			1
PCBs 41 + 71 + 40	ND	U	49.2	100			1
PCB 64	ND	U	37.0	50.0			1
PCB 72	ND	U	35.6	50.0			1
PCB 68	ND	U	34.4	50.0			1
PCB 57	ND	U	36.3	50.0			1
PCB 58	ND	U	36.5	50.0			1
PCB 67	ND	U	36.9	50.0			1
PCB 63	ND	U	34.8	50.0			1
PCBs 70 + 61 + 74 + 76	ND	U	36.3	200			1
PCB 66	ND	U	34.8	50.0			1
PCB 55	ND	U	37.3	50.0			1
PCB 56	ND	U	36.7	50.0			1
PCB 60	ND	U	34.1	50.0			1
PCB 80	ND	U	31.2	50.0			1
PCB 79	ND	U	31.5	50.0			1
PCB 78	ND	U	32.6	50.0			1
PCB 81	ND	U	31.4	31.4			1
PCB 77	ND	U	32.2	32.2			1
PCB 104	ND	U	60.8	60.8			1
PCB 96	ND	U	47.1	50.0			1
PCB 103	ND	U	54.1	54.1			1
PCB 94	ND	U	63.5	63.5			1
PCBs 95 + 93 + 100	ND	U	58.2	200			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCBs 98 + 102	ND	U	57.3	200			1
PCBs 88 + 91	ND	U	57.9	57.9			1
PCB 84	ND	U	65.1	65.1			1
PCB 89	ND	U	61.4	61.4			1
PCB 121	ND	U	42.8	50.0			1
PCB 92	ND	U	58.0	58.0			1
PCBs 90 + 101 + 113	ND	U	47.1	200			1
PCBs 83 + 99	ND	U	53.8	100			1
PCB 112	ND	U	43.5	50.0			1
PCBs 86 + 87 + 97 + 109 + 119 + 125	ND	U	46.6	200			1
PCBs 85 + 116 + 117	ND	U	44.8	100			1
PCBs 110 + 115	ND	U	39.6	100			1
PCB 82	ND	U	62.3	62.3			1
PCB 111	ND	U	37.3	50.0			1
PCB 120	ND	U	37.3	50.0			1
PCBs 108 + 124	ND	U	57.8	100			1
PCB 107	ND	U	55.9	55.9			1
PCB 123	ND	U	47.3	47.3			1
PCB 106	ND	U	58.3	58.3			1
PCB 118	ND	U	47.1	47.1			1
PCB 122	ND	U	63.0	63.0			1
PCB 114	ND	U	48.6	48.6			1
PCB 105	ND	U	46.0	46.0			1
PCB 127	ND	U	56.7	56.7			1
PCB 126	ND	U	45.9	45.9			1
PCB 155	ND	U	26.0	26.0			1
PCB 152	ND	U	21.0	50.0			1
PCB 150	ND	U	21.6	50.0			1
PCB 136	ND	U	22.0	50.0			1
PCB 145	ND	U	21.6	50.0			1
PCB 148	ND	U	26.3	50.0			1
PCBs 135 + 151 + 154	ND	U	25.3	100			1
PCB 144	ND	U	25.5	50.0			1
PCBs 147 + 149	ND	U	27.0	100			1
PCB 134	ND	U	39.3	100			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 143	ND	U	25.8	100			1
PCBs 139 + 140	ND	U	26.5	100			1
PCB 131	ND	U	32.2	50.0			1
PCB 142	ND	U	29.1	50.0			1
PCB 132	ND	U	28.5	50.0			1
PCB 133	ND	U	28.9	50.0			1
PCB 165	ND	U	22.0	50.0			1
PCB 146	ND	U	24.2	50.0			1
PCB 161	ND	U	21.3	50.0			1
PCBs 153 + 168	ND	U	21.5	100			1
PCB 141	ND	U	26.7	50.0			1
PCB 130	ND	U	29.6	50.0			1
PCB 137	ND	U	25.3	50.0			1
PCB 164	ND	U	21.0	50.0			1
PCBs 129 + 138 + 163	ND	U	32.7	200			1
PCB 160	ND	U	13.1	200			1
PCB 158	ND	U	19.1	50.0			1
PCBs 128 + 166	ND	U	22.9	100			1
PCB 159	ND	U	33.7	50.0			1
PCB 162	ND	U	32.4	50.0			1
PCB 167	ND	U	22.9	22.9			1
PCBs 156 + 157	ND	U	37.1	40.0			1
PCB 169	ND	U	24.3	24.3			1
PCB 188	ND	U	33.9	33.9			1
PCB 179	ND	U	27.3	50.0			1
PCB 184	ND	U	25.7	50.0			1
PCB 176	ND	U	27.8	50.0			1
PCB 186	ND	U	28.3	50.0			1
PCB 178	ND	U	34.8	50.0			1
PCB 175	ND	U	33.1	50.0			1
PCB 187	ND	U	32.1	50.0			1
PCB 182	ND	U	34.1	50.0			1
PCBs 183 + 185	ND	U	48.7	100			1
PCB 174	ND	U	49.8	50.0			1
PCB 177	ND	U	50.7	50.7			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 181	ND	U	45.5	50.0			1
PCBs 171 + 173	ND	U	49.7	100			1
PCB 172	ND	U	47.1	50.0			1
PCB 192	ND	U	37.3	50.0			1
PCBs 180 + 193	ND	U	38.7	100			1
PCB 191	ND	U	34.6	50.0			1
PCB 170	ND	U	45.6	50.0			1
PCB 190	ND	U	33.0	50.0			1
PCB 189	ND	U	28.9	28.9			1
PCB 202	ND	U	20.1	20.1			1
PCB 201	ND	U	19.4	50.0			1
PCB 204	ND	U	19.7	50.0			1
PCB 197	ND	U	18.7	100			1
PCB 200	ND	U	19.1	100			1
PCBs 198 + 199	ND	U	24.0	100			1
PCB 196	ND	U	23.0	50.0			1
PCB 203	ND	U	21.3	50.0			1
PCB 195	ND	U	24.0	50.0			1
PCB 194	ND	U	21.4	50.0			1
PCB 205	ND	U	21.3	21.3			1
PCB 208	ND	U	22.2	22.2			1
PCB 207	ND	U	21.6	50.0			1
PCB 206	ND	U	38.3	38.3			1
PCB 209	ND	U	17.5	20.0			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303468  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total MonoCB	ND	U	74.5	74.5			1
Total DiCB	ND	U	13.2	20.0			1
Total TriCB	ND	U	50.7	50.7			1
Total TetraCB	ND	U	31.2	200			1
Total PentaCB	ND	U	37.3	200			1
Total HexaCB	ND	U	13.1	20.0			1
Total HeptaCB	ND	U	25.7	25.7			1
Total OctaCB	ND	U	18.7	20.0			1
Total NonaCB	ND	U	21.6	21.6			1
Total PCBs	ND	U	13.1	200			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Method Blank  
**Lab Code:** EQ1700064-01

**Units:** Percent  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL

**Date Analyzed:** 02/24/17 14:23  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

**Data File Name:** P303468  
**ICAL Date:** 04/09/16

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
PCB 1L	2000	885.848	44		15-150	3.05	0.745
PCB 3L	2000	953.211	48		15-150	3.21	0.873
PCB 4L	2000	897.995	45		25-150	1.58	0.889
PCB 15L	2000	1134.093	57		25-150	1.66	1.220
PCB 19L	2000	1259.712	63		25-150	1.16	1.067
PCB 37L	2000	1255.806	63		25-150	1.08	1.081
PCB 54L	2000	723.791	36		25-150	0.82	0.836
PCB 81L	2000	1462.165	73		25-150	0.78	1.321
PCB 77L	2000	1478.973	74		25-150	0.79	1.343
PCB 104L	2000	770.838	39		25-150	1.50	0.831
PCB 123L	2000	1223.568	61		25-150	1.54	1.133
PCB 118L	2000	1282.635	64		25-150	1.49	1.142
PCB 114L	2000	1243.559	62		25-150	1.65	1.158
PCB 105L	2000	1326.689	66		25-150	1.63	1.177
PCB 126L	2000	1437.757	72		25-150	1.65	1.264
PCB 155L	2000	823.255	41		25-150	1.27	0.805
PCB 167L	2000	1096.601	55		25-150	1.28	1.068
PCBs 156L + 157L	4000	2312.413	58		25-150	1.24	1.096
PCB 169L	2000	1165.075	58		25-150	1.28	1.170
PCB 188L	2000	1111.843	56		25-150	1.05	0.736
PCB 189L	2000	1539.388	77		25-150	1.04	0.963
PCB 202L	2000	1399.241	70		25-150	0.89	0.833
PCB 205L	2000	1264.371	63		25-150	0.90	1.009
PCB 208L	2000	1106.545	55		25-150	0.73	0.953
PCB 206L	2000	1249.452	62		25-150	0.75	1.039
PCB 209L	2000	1234.238	62		25-150	1.21	1.067
PCB 28L	2000	871.614	44	K	30-135	0.78	0.933
PCB 111L	2000	1267.239	63		30-135	1.54	1.075
PCB 178L	2000	1228.547	61		30-135	1.09	1.009



# Accuracy & Precision

**ALS Environmental - Houston HRMS**  
10450 Stancliff Rd., Suite 210, Houston TX 77099  
Phone (713)266-1599 Fax (713)266-0130  
[www.alsglobal.com](http://www.alsglobal.com)

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Analyzed:** 02/24/17  
**Date Extracted:** 02/16/17

**Duplicate Lab Control Sample Summary**  
**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Units:** pg/L  
**Basis:** NA  
**Analysis Lot:** 536514

Analyte Name	Lab Control Sample EQ1700064-02			Duplicate Lab Control Sample EQ1700064-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
PCB 1	592	1000	59	589	1000	59	50-150	<1	50
PCB 2	749	1000	75	681	1000	68	50-150	9	50
PCB 3	653	1000	65	587	1000	59	50-150	11	50
PCB 10	594	1000	59	575	1000	58	50-150	3	50
PCB 11	791	1000	79	760	1000	76	50-150	4	50
PCB 14	674	1000	67	624	1000	62	50-150	8	50
PCB 15	681	1000	68	631	1000	63	50-150	8	50
PCB 4	649	1000	65	609	1000	61	50-150	6	50
PCB 5	637	1000	64	569	1000	57	50-150	11	50
PCB 6	641	1000	64	574	1000	57	50-150	11	50
PCB 7	533	1000	53	536	1000	54	50-150	<1	50
PCB 8	584	1000	58	505	1000	50	50-150	15	50
PCB 9	642	1000	64	589	1000	59	50-150	9	50
PCBs 12 + 13	1490	2000	74	1400	2000	70	50-150	6	50
PCB 16	743	1000	74	685	1000	68	50-150	8	50
PCB 17	657	1000	66	593	1000	59	50-150	10	50
PCB 19	917	1000	92	733	1000	73	50-150	22	50
PCB 22	849	1000	85	801	1000	80	50-150	6	50
PCB 23	707	1000	71	641	1000	64	50-150	10	50
PCB 24	617	1000	62	572	1000	57	50-150	8	50
PCB 25	759	1000	76	747	1000	75	50-150	2	50
PCB 27	696	1000	70	572	1000	57	50-150	20	50
PCB 31	803	1000	80	824	1000	82	50-150	3	50
PCB 32	682	1000	68	623	1000	62	50-150	9	50
PCB 34	739	1000	74	691	1000	69	50-150	7	50
PCB 35	1030	1000	103	1030	1000	103	50-150	<1	50
PCB 36	995	1000	100	883	1000	88	50-150	12	50
PCB 37	769	1000	77	850	1000	85	50-150	10	50
PCB 38	899	1000	90	941	1000	94	50-150	5	50
PCB 39	898	1000	90	886	1000	89	50-150	1	50
PCBs 18 + 30	1200	2000	60	1110	2000	55	50-150	8	50
PCBs 20 + 28	1580	2000	79	1560	2000	78	50-150	2	50
PCBs 21 + 33	1750	2000	88	1670	2000	84	50-150	5	50
PCBs 26 + 29	1610	2000	80	1530	2000	76	50-150	5	50
PCB 42	1370	2000	68	1450	2000	73	50-150	6	50
PCB 46	1380	2000	69	1380	2000	69	50-150	<1	50
PCB 48	1320	2000	66	1340	2000	67	50-150	2	50
PCB 52	1490	2000	75	1340	2000	67	50-150	11	50

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Analyzed:** 02/24/17  
**Date Extracted:** 02/16/17

**Duplicate Lab Control Sample Summary**  
**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Units:** pg/L  
**Basis:** NA  
**Analysis Lot:** 536514

Analyte Name	Lab Control Sample EQ1700064-02			Duplicate Lab Control Sample EQ1700064-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
PCB 54	1420	2000	71	1470	2000	74	50-150	4	50
PCB 55	1510	2000	75	1570	2000	78	50-150	4	50
PCB 56	1960	2000	98	2070	2000	104	50-150	6	50
PCB 57	1460	2000	73	1510	2000	75	50-150	3	50
PCB 58	1560	2000	78	1660	2000	83	50-150	6	50
PCB 60	1740	2000	87	1890	2000	95	50-150	8	50
PCB 63	1420	2000	71	1530	2000	76	50-150	7	50
PCB 64	1440	2000	72	1470	2000	73	50-150	2	50
PCB 66	1560	2000	78	1680	2000	84	50-150	7	50
PCB 67	1560	2000	78	1540	2000	77	50-150	2	50
PCB 68	1400	2000	70	1460	2000	73	50-150	4	50
PCB 72	1510	2000	75	1590	2000	79	50-150	5	50
PCB 77	1820	2000	91	1740	2000	87	50-150	4	50
PCB 78	1850	2000	93	1960	2000	98	50-150	6	50
PCB 79	1990	2000	100	2070	2000	104	50-150	4	50
PCB 80	1870	2000	93	1940	2000	97	50-150	4	50
PCB 81	1880	2000	94	1940	2000	97	50-150	3	50
PCBs 41 + 71 + 40	4500	6000	75	4630	6000	77	50-150	3	50
PCBs 43 + 73	2460	4000	62	2520	4000	63	50-150	2	50
PCBs 44 + 47 + 65	4070	6000	68	4110	6000	69	50-150	<1	50
PCBs 45 + 51	2510	4000	63	2460	4000	62	50-150	2	50
PCBs 49 + 69	2580	4000	65	2650	4000	66	50-150	3	50
PCBs 50 + 53	2350	4000	59	2230	4000	56	50-150	5	50
PCBs 59 + 62 + 75	3990	6000	66	4100	6000	68	50-150	3	50
PCBs 70 + 61 + 74 + 76	6070	8000	76	6380	8000	80	50-150	5	50
PCB 103	1730	2000	87	1660	2000	83	50-150	4	50
PCB 104	1600	2000	80	1680	2000	84	50-150	5	50
PCB 105	1970	2000	99	1990	2000	99	50-150	<1	50
PCB 106	1920	2000	96	2080	2000	104	50-150	8	50
PCB 107	2240	2000	112	2230	2000	112	50-150	<1	50
PCB 111	1610	2000	80	1640	2000	82	50-150	2	50
PCB 112	1800	2000	90	1800	2000	90	50-150	<1	50
PCB 114	1830	2000	92	1750	2000	87	50-150	5	50
PCB 118	1610	2000	81	1610	2000	80	50-150	<1	50
PCB 120	1850	2000	93	1820	2000	91	50-150	2	50
PCB 121	1400	2000	70	1330	2000	66	50-150	5	50
PCB 122	2250	2000	113	2320	2000	116	50-150	3	50
PCB 123	1550	2000	77	1570	2000	79	50-150	2	50
PCB 126	1960	2000	98	1950	2000	97	50-150	<1	50
PCB 127	2050	2000	103	2120	2000	106	50-150	3	50

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Analyzed:** 02/24/17  
**Date Extracted:** 02/16/17

**Duplicate Lab Control Sample Summary**  
**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Units:** pg/L  
**Basis:** NA  
**Analysis Lot:** 536514

Analyte Name	Lab Control Sample EQ1700064-02			Duplicate Lab Control Sample EQ1700064-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
PCB 82	1900	2000	95	1930	2000	97	50-150	2	50
PCB 84	1890	2000	94	1860	2000	93	50-150	2	50
PCB 89	1930	2000	97	1870	2000	94	50-150	3	50
PCB 92	1780	2000	89	1830	2000	91	50-150	3	50
PCB 94	1700	2000	85	1720	2000	86	50-150	1	50
PCB 96	1660	2000	83	1630	2000	81	50-150	2	50
PCBs 108 + 124	4080	4000	102	4140	4000	103	50-150	1	50
PCBs 110 + 115	3290	4000	82	3420	4000	86	50-150	4	50
PCBs 83 + 99	3380	4000	84	3500	4000	88	50-150	4	50
PCBs 85 + 116 + 117	5090	6000	85	5160	6000	86	50-150	1	50
PCBs 86 + 87 + 97 + 109 + 119 + 125	10300	12000	86	10400	12000	87	50-150	1	50
PCBs 88 + 91	3480	4000	87	3540	4000	89	50-150	2	50
PCBs 90 + 101 + 113	5030	6000	84	5040	6000	84	50-150	<1	50
PCBs 95 + 93 + 100	5190	6000	87	5130	6000	85	50-150	1	50
PCBs 98 + 102	3380	4000	84	3410	4000	85	50-150	1	50
PCB 130	1880	2000	94	2050	2000	103	50-150	9	50
PCB 131	2030	2000	101	2010	2000	101	50-150	<1	50
PCB 132	1820	2000	91	1770	2000	89	50-150	3	50
PCB 133	2020	2000	101	1970	2000	99	50-150	2	50
PCB 134	2210	2000	111	2360	2000	118	50-150	6	50
PCB 136	2120	2000	106	2090	2000	105	50-150	1	50
PCB 137	1730	2000	87	1780	2000	89	50-150	3	50
PCB 141	1880	2000	94	1870	2000	94	50-150	<1	50
PCB 142	1760	2000	88	1690	2000	85	50-150	4	50
PCB 143	1650	2000	83	1530	2000	76	50-150	8	50
PCB 144	2010	2000	100	2010	2000	100	50-150	<1	50
PCB 145	1930	2000	97	1870	2000	94	50-150	3	50
PCB 146	1930	2000	96	2000	2000	100	50-150	4	50
PCB 148	1940	2000	97	1930	2000	97	50-150	<1	50
PCB 150	1730	2000	87	1860	2000	93	50-150	7	50
PCB 152	2140	2000	107	2050	2000	102	50-150	5	50
PCB 155	1820	2000	91	1790	2000	89	50-150	2	50
PCB 158	1880	2000	94	1880	2000	94	50-150	<1	50
PCB 159	2130	2000	107	2190	2000	110	50-150	3	50
PCB 160	1800	2000	90	1770	2000	89	50-150	2	50
PCB 161	1940	2000	97	1880	2000	94	50-150	3	50
PCB 162	1950	2000	97	2000	2000	100	50-150	3	50
PCB 164	1930	2000	96	1920	2000	96	50-150	<1	50
PCB 165	1850	2000	92	1820	2000	91	50-150	1	50
PCB 167	2010	2000	101	2000	2000	100	50-150	<1	50

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Analyzed:** 02/24/17  
**Date Extracted:** 02/16/17

**Duplicate Lab Control Sample Summary**  
**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Units:** pg/L  
**Basis:** NA  
**Analysis Lot:** 536514

Analyte Name	Lab Control Sample EQ1700064-02			Duplicate Lab Control Sample EQ1700064-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
PCB 169	1830	2000	91	1860	2000	93	50-150	2	50
PCBs 128 + 166	3530	4000	88	3640	4000	91	50-150	3	50
PCBs 129 + 138 + 163	5600	6000	93	5860	6000	98	50-150	5	50
PCBs 135 + 151 + 154	5900	6000	98	5790	6000	97	50-150	2	50
PCBs 139 + 140	3640	4000	91	3640	4000	91	50-150	<1	50
PCBs 147 + 149	3540	4000	88	3410	4000	85	50-150	4	50
PCBs 153 + 168	3780	4000	95	3740	4000	94	50-150	1	50
PCBs 156 + 157	3810	4000	95	3840	4000	96	50-150	<1	50
PCB 170	1930	2000	96	2070	2000	104	50-150	7	50
PCB 172	2110	2000	105	2100	2000	105	50-150	<1	50
PCB 174	2280	2000	114	2390	2000	120	50-150	5	50
PCB 175	2150	2000	107	2190	2000	109	50-150	2	50
PCB 176	2390	2000	119	2330	2000	117	50-150	2	50
PCB 177	2220	2000	111	2320	2000	116	50-150	5	50
PCB 178	2160	2000	108	2230	2000	111	50-150	3	50
PCB 179	2380	2000	119	2340	2000	117	50-150	2	50
PCB 181	2080	2000	104	2070	2000	104	50-150	<1	50
PCB 182	2190	2000	109	2200	2000	110	50-150	<1	50
PCB 184	2130	2000	107	2070	2000	104	50-150	3	50
PCB 186	2290	2000	115	2180	2000	109	50-150	5	50
PCB 187	2130	2000	107	2170	2000	109	50-150	2	50
PCB 188	2180	2000	109	2190	2000	110	50-150	<1	50
PCB 189	2200	2000	110	2190	2000	109	50-150	<1	50
PCB 190	1940	2000	97	2020	2000	101	50-150	4	50
PCB 191	2010	2000	101	2090	2000	104	50-150	4	50
PCB 192	2040	2000	102	2030	2000	101	50-150	<1	50
PCBs 171 + 173	4480	4000	112	4480	4000	112	50-150	<1	50
PCBs 180 + 193	4070	4000	102	4090	4000	102	50-150	<1	50
PCBs 183 + 185	4490	2000	224	4740	2000	237		5	
PCB 194	2450	3000	82	2610	3000	87	50-150	6	50
PCB 195	2640	3000	88	2810	3000	94	50-150	6	50
PCB 196	2740	3000	91	2890	3000	96	50-150	5	50
PCB 197	3010	3000	100	3030	3000	101	50-150	<1	50
PCB 200	2990	3000	100	3260	3000	109	50-150	9	50
PCB 201	3190	3000	106	3270	3000	109	50-150	2	50
PCB 202	2850	3000	95	2970	3000	99	50-150	4	50
PCB 203	2590	3000	86	2690	3000	90	50-150	3	50
PCB 204	3150	3000	105	3250	3000	108	50-150	3	50
PCB 205	3160	3000	105	3200	3000	107	50-150	1	50

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Analyzed:** 02/24/17  
**Date Extracted:** 02/16/17

**Duplicate Lab Control Sample Summary**  
**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar

**Units:** pg/L  
**Basis:** NA  
**Analysis Lot:** 536514

Analyte Name	Lab Control Sample EQ1700064-02			Duplicate Lab Control Sample EQ1700064-03			% Rec Limits	RPD	RPD Limit
	Result	Spike Amount	% Rec	Result	Spike Amount	% Rec			
PCBs 198 + 199	5510	4000	138	5850	4000	146	50-150	6	50
PCB 206	3370	3000	112	3340	3000	111	50-150	<1	50
PCB 207	3360	3000	112	3490	3000	116	50-150	4	50
PCB 208	3290	3000	110	3490	3000	116	50-150	6	50
PCB 209	3230	3000	108	3190	3000	106	50-150	1	50

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303475  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 1	592		62.2	62.2	2.92	1.000	1
PCB 2	749		75.2	75.2	2.96	0.989	1
PCB 3	653		69.8	69.8	3.00	1.001	1
PCB 4	649		42.0	42.0	-	1.001	1
PCB 10	594		28.9	50.0	-	1.012	1
PCB 9	642		17.9	20.0	-	1.126	1
PCB 7	533		16.4	20.0	-	1.137	1
PCB 6	641		16.8	20.0	-	1.153	1
PCB 5	637		17.4	20.0	-	1.173	1
PCB 8	584		17.0	50.0	-	1.183	1
PCB 14	674		16.9	20.0	-	0.932	1
PCB 11	791		17.4	100	-	0.972	1
PCBs 12 + 13	1490		17.3	50.0	-	0.986	1
PCB 15	681		15.8	20.0	-	1.001	1
PCB 19	917		108	108	1.16	1.001	1
PCBs 18 + 30	1200		74.2	74.2	1.08	1.091	1
PCB 17	657		88.7	88.7	1.11	1.117	1
PCB 27	696		61.7	61.7	1.10	1.128	1
PCB 24	617		64.1	64.1	1.06	1.135	1
PCB 16	743		101	101	1.15	1.143	1
PCB 32	682		58.9	58.9	0.96	1.167	1
PCB 34	739		49.7	49.7	1.06	1.230	1
PCB 23	707		48.9	48.9	1.14	1.237	1
PCBs 26 + 29	1610		50.9	50.9	1.07	1.254	1
PCB 25	759		47.7	47.7	1.11	0.844	1
PCB 31	803		47.6	50.0	1.07	0.855	1
PCBs 20 + 28	1580		48.3	50.0	1.03	0.866	1
PCBs 21 + 33	1750		51.0	51.0	1.07	0.872	1
PCB 22	849		49.0	49.0	1.07	0.887	1
PCB 36	995		48.7	48.7	1.09	0.938	1
PCB 39	898		45.7	45.7	0.97	0.951	1
PCB 38	899		50.0	50.0	1.07	0.970	1
PCB 35	1030		50.4	50.4	1.08	0.987	1
PCB 37	769		45.7	45.7	1.00	1.001	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** pg/L  
**Basis:** NA

**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

**Data File Name:** P303475  
**ICAL Date:** 04/09/16

**Native Analyte Results**

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 54	1420		37.3	37.3	0.83	1.001	1
PCBs 50 + 53	2350		43.7	100	0.78	0.914	1
PCBs 45 + 51	2510		45.2	50.0	0.75	0.941	1
PCB 46	1380		51.8	51.8	0.76	0.953	1
PCB 52	1490		41.9	50.0	0.75	1.002	1
PCBs 43 + 73	2460		37.7	50.0	0.74	1.006	1
PCBs 49 + 69	2580		38.3	100	0.76	1.016	1
PCB 48	1320		41.8	50.0	0.76	1.029	1
PCBs 44 + 47 + 65	4070		39.6	100	0.76	1.037	1
PCBs 59 + 62 + 75	3990		32.0	100	0.75	1.048	1
PCB 42	1370		45.3	100	0.82	1.057	1
PCBs 41 + 71 + 40	4500		41.8	100	0.77	1.076	1
PCB 64	1440		31.4	50.0	0.73	1.083	1
PCB 72	1510		30.2	50.0	0.77	1.110	1
PCB 68	1400		29.2	50.0	0.77	1.121	1
PCB 57	1460		30.8	50.0	0.77	1.136	1
PCB 58	1560		31.0	50.0	0.75	1.145	1
PCB 67	1560		31.4	50.0	0.82	1.150	1
PCB 63	1420		29.6	50.0	0.81	1.160	1
PCBs 70 + 61 + 74 + 76	6070		30.8	200	0.76	1.173	1
PCB 66	1560		29.6	50.0	0.77	1.185	1
PCB 55	1510		31.7	50.0	0.75	1.192	1
PCB 56	1960		40.0	50.0	0.78	0.916	1
PCB 60	1740		37.1	50.0	0.77	0.922	1
PCB 80	1870		33.9	50.0	0.77	0.930	1
PCB 79	1990		34.3	50.0	0.74	0.973	1
PCB 78	1850		35.4	50.0	0.74	0.988	1
PCB 81	1880		36.6	36.6	0.71	1.000	1
PCB 77	1820		37.1	37.1	0.75	1.000	1
PCB 104	1600		47.8	47.8	1.62	1.001	1
PCB 96	1660		40.8	50.0	1.65	1.018	1
PCB 103	1730		46.9	50.0	1.56	1.080	1
PCB 94	1700		55.0	55.0	1.41	1.090	1
PCBs 95 + 93 + 100	5190		50.4	200	1.52	1.110	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303475  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCBs 98 + 102	3380		49.6	200	1.62	1.118	1
PCBs 88 + 91	3480		50.1	50.1	1.56	1.135	1
PCB 84	1890		56.4	56.4	1.61	1.145	1
PCB 89	1930		53.2	53.2	1.56	1.161	1
PCB 121	1400		49.4	50.0	1.46	1.170	1
PCB 92	1780		66.9	66.9	1.52	0.984	1
PCBs 90 + 101 + 113	5030		54.4	200	1.55	1.000	1
PCBs 83 + 99	3380		62.1	100	1.60	1.016	1
PCB 112	1800		50.2	50.2	1.54	1.021	1
PCBs 86 + 87 + 97 + 109 + 119 + 125	10300		53.8	200	1.56	1.031	1
PCBs 85 + 116 + 117	5090		51.7	100	1.58	1.053	1
PCBs 110 + 115	3290		45.7	100	1.61	1.059	1
PCB 82	1900		71.9	71.9	1.59	1.069	1
PCB 111	1610		43.0	50.0	1.54	1.076	1
PCB 120	1850		43.1	50.0	1.54	1.089	1
PCBs 108 + 124	4080		155	155	1.47	0.992	1
PCB 107	2240		149	149	1.49	0.998	1
PCB 123	1550		132	132	1.49	1.001	1
PCB 106	1920		156	156	1.57	1.004	1
PCB 118	1610		128	128	1.48	1.001	1
PCB 122	2250		168	168	1.49	1.011	1
PCB 114	1830		138	138	1.47	1.000	1
PCB 105	1970		132	132	1.56	1.000	1
PCB 127	2050		152	152	1.52	1.034	1
PCB 126	1960		133	133	1.54	1.000	1
PCB 155	1820		24.3	24.3	1.28	1.000	1
PCB 152	2140		22.1	50.0	1.24	1.010	1
PCB 150	1730		22.7	50.0	1.29	1.014	1
PCB 136	2120		23.2	50.0	1.23	1.027	1
PCB 145	1930		22.7	50.0	1.21	1.034	1
PCB 148	1940		27.7	50.0	1.29	1.074	1
PCBs 135 + 151 + 154	5900		26.6	100	1.27	1.094	1
PCB 144	2010		26.9	50.0	1.25	1.109	1
PCBs 147 + 149	3540		152	152	1.21	0.902	1
PCB 134	2210		220	220	1.25	0.909	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303475  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 143	1650		145	145	1.21	0.910	1
PCBs 139 + 140	3640		149	149	1.21	0.916	1
PCB 131	2030		180	180	1.17	0.922	1
PCB 142	1760		163	163	1.19	0.925	1
PCB 132	1820		160	160	1.25	0.933	1
PCB 133	2020		162	162	1.15	0.942	1
PCB 165	1850		123	123	1.25	0.951	1
PCB 146	1930		135	135	1.25	0.957	1
PCB 161	1940		120	120	1.25	0.959	1
PCBs 153 + 168	3780		120	120	1.26	0.971	1
PCB 141	1880		150	150	1.25	0.977	1
PCB 130	1880		166	166	1.23	0.986	1
PCB 137	1730		142	142	1.21	0.991	1
PCB 164	1930		118	118	1.26	0.994	1
PCBs 129 + 138 + 163	5600		183	200	1.23	1.001	1
PCB 160	1800		73.0	200	1.20	1.004	1
PCB 158	1880		107	107	1.22	1.010	1
PCBs 128 + 166	3530		129	129	1.18	1.029	1
PCB 159	2130		36.6	50.0	1.23	0.984	1
PCB 162	1950		35.2	50.0	1.24	0.990	1
PCB 167	2010		25.4	25.4	1.21	1.000	1
PCBs 156 + 157	3810		44.1	44.1	1.31	1.000	1
PCB 169	1830		27.8	27.8	1.32	1.000	1
PCB 188	2180		25.1	25.1	1.03	1.001	1
PCB 179	2380		23.3	50.0	1.06	1.011	1
PCB 184	2130		22.0	50.0	1.02	1.022	1
PCB 176	2390		23.8	50.0	0.97	1.033	1
PCB 186	2290		24.2	50.0	1.01	1.044	1
PCB 178	2160		29.7	50.0	1.02	1.076	1
PCB 175	2150		28.3	50.0	1.04	1.092	1
PCB 187	2130		27.5	50.0	0.98	1.098	1
PCB 182	2190		29.1	50.0	1.06	1.103	1
PCBs 183 + 185	4490		49.6	100	1.04	1.113	1
PCB 174	2280		50.8	50.8	1.10	1.121	1
PCB 177	2220		51.7	51.7	1.05	1.132	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303475  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 181	2080		46.5	50.0	1.07	1.141	1
PCBs 171 + 173	4480		50.7	100	1.03	1.147	1
PCB 172	2110		48.0	50.0	0.99	0.906	1
PCB 192	2040		38.1	50.0	1.05	0.911	1
PCBs 180 + 193	4070		39.5	100	1.07	0.917	1
PCB 191	2010		35.3	50.0	1.03	0.925	1
PCB 170	1930		46.6	50.0	0.98	0.943	1
PCB 190	1940		33.6	50.0	1.07	0.952	1
PCB 189	2200		37.1	37.1	1.04	1.000	1
PCB 202	2850		26.7	26.7	0.87	1.001	1
PCB 201	3190		27.4	50.0	0.87	1.021	1
PCB 204	3150		27.9	50.0	0.89	1.035	1
PCB 197	3010		26.4	100	0.90	1.040	1
PCB 200	2990		27.1	100	0.93	1.044	1
PCBs 198 + 199	5510		34.0	100	0.89	1.102	1
PCB 196	2740		32.5	50.0	0.88	0.923	1
PCB 203	2590		30.2	50.0	0.86	0.926	1
PCB 195	2640		34.0	50.0	0.86	0.951	1
PCB 194	2450		30.3	50.0	0.90	0.992	1
PCB 205	3160		32.7	32.7	0.87	1.001	1
PCB 208	3290		26.2	26.2	0.79	1.001	1
PCB 207	3360		28.9	50.0	0.77	1.018	1
PCB 206	3370		83.9	83.9	0.76	1.000	1
PCB 209	3230		26.2	26.2	1.22	1.000	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303475  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total MonoCB	1990		62.2	62.2			1
Total DiCB	7920		15.8	20.0			1
Total TriCB	18900		45.7	50.0			1
Total TetraCB	62100		29.2	200			1
Total PentaCB	81400		40.8	200			1
Total HexaCB	79700		22.1	22.1			1
Total HeptaCB	47400		22.0	22.0			1
Total OctaCB	34300		26.4	26.4			1
Total NonaCB	10000		26.2	26.2			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Lab Control Sample  
**Lab Code:** EQ1700064-02

**Units:** Percent  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL

**Date Analyzed:** 02/24/17 22:19  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

**Data File Name:** P303475  
**ICAL Date:** 04/09/16

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
PCB 1L	2000	953.483	48		15-150	3.08	0.746
PCB 3L	2000	1022.311	51		15-150	3.18	0.874
PCB 4L	2000	1066.131	53		25-150	1.57	0.890
PCB 15L	2000	1224.304	61		25-150	1.58	1.222
PCB 19L	2000	950.199	48		25-150	0.90	1.069
PCB 37L	2000	1342.098	67		25-150	0.94	1.081
PCB 54L	2000	993.532	50		25-150	0.88	0.837
PCB 81L	2000	1588.763	79		25-150	0.74	1.322
PCB 77L	2000	1731.478	87		25-150	0.87	1.343
PCB 104L	2000	1043.640	52		25-150	1.55	0.830
PCB 123L	2000	1502.950	75		25-150	1.50	1.133
PCB 118L	2000	1530.431	77		25-150	1.59	1.142
PCB 114L	2000	1497.895	75		25-150	1.57	1.158
PCB 105L	2000	1540.640	77		25-150	1.61	1.177
PCB 126L	2000	1627.184	81		25-150	1.54	1.264
PCB 155L	2000	1193.938	60		25-150	1.27	0.806
PCB 167L	2000	1365.787	68		25-150	1.26	1.069
PCBs 156L + 157L	4000	2724.130	68		25-150	1.25	1.096
PCB 169L	2000	1404.941	70		25-150	1.21	1.171
PCB 188L	2000	1700.696	85		25-150	1.04	0.736
PCB 189L	2000	1672.357	84		25-150	1.01	0.963
PCB 202L	2000	1853.977	93		25-150	0.89	0.833
PCB 205L	2000	1445.096	72		25-150	0.86	1.008
PCB 208L	2000	1504.917	75		25-150	0.80	0.953
PCB 206L	2000	1317.136	66		25-150	0.84	1.039
PCB 209L	2000	1273.921	64		25-150	1.27	1.067
PCB 28L	2000	1621.754	81		30-135	1.13	0.933
PCB 111L	2000	1533.457	77		30-135	1.63	1.075
PCB 178L	2000	1524.058	76		30-135	1.06	1.009

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 1	589		68.6	68.6	3.02	1.000	1
PCB 2	681		81.9	81.9	3.11	0.989	1
PCB 3	587		74.9	74.9	3.04	1.001	1
PCB 4	609		51.9	51.9	-	1.001	1
PCB 10	575		35.1	50.0	-	1.011	1
PCB 9	589		10.8	20.0	-	1.126	1
PCB 7	536		9.83	20.0	-	1.137	1
PCB 6	574		10.1	20.0	-	1.153	1
PCB 5	569		10.4	20.0	-	1.173	1
PCB 8	505		10.2	50.0	-	1.182	1
PCB 14	624		10.2	20.0	-	0.932	1
PCB 11	760		10.5	100	-	0.972	1
PCBs 12 + 13	1400		10.4	50.0	-	0.986	1
PCB 15	631		9.22	20.0	-	1.001	1
PCB 19	733		78.7	78.7	1.16	1.001	1
PCBs 18 + 30	1110		55.3	55.3	1.10	1.090	1
PCB 17	593		66.1	66.1	1.08	1.116	1
PCB 27	572		46.0	46.0	1.20	1.128	1
PCB 24	572		47.7	47.7	1.02	1.135	1
PCB 16	685		74.9	74.9	1.08	1.143	1
PCB 32	623		43.9	43.9	1.04	1.167	1
PCB 34	691		71.8	71.8	0.96	1.229	1
PCB 23	641		70.5	70.5	0.95	1.237	1
PCBs 26 + 29	1530		73.5	73.5	1.06	1.254	1
PCB 25	747		68.9	68.9	1.05	0.844	1
PCB 31	824		68.7	68.7	1.04	0.855	1
PCBs 20 + 28	1560		69.7	69.7	1.04	0.866	1
PCBs 21 + 33	1670		73.5	73.5	1.05	0.872	1
PCB 22	801		70.7	70.7	1.00	0.887	1
PCB 36	883		70.3	70.3	1.03	0.938	1
PCB 39	886		65.9	65.9	1.00	0.950	1
PCB 38	941		72.2	72.2	0.97	0.970	1
PCB 35	1030		72.8	72.8	1.05	0.986	1
PCB 37	850		66.6	66.6	0.95	1.001	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 54	1470		44.6	44.6	0.80	1.001	1
PCBs 50 + 53	2230		45.0	100	0.79	0.914	1
PCBs 45 + 51	2460		46.7	50.0	0.74	0.940	1
PCB 46	1380		53.4	53.4	0.72	0.952	1
PCB 52	1340		43.2	50.0	0.74	1.001	1
PCBs 43 + 73	2520		38.9	50.0	0.75	1.006	1
PCBs 49 + 69	2650		39.5	100	0.76	1.016	1
PCB 48	1340		43.1	50.0	0.74	1.029	1
PCBs 44 + 47 + 65	4110		40.8	100	0.73	1.037	1
PCBs 59 + 62 + 75	4100		33.0	100	0.76	1.048	1
PCB 42	1450		46.7	100	0.76	1.057	1
PCBs 41 + 71 + 40	4630		43.1	100	0.75	1.075	1
PCB 64	1470		32.4	50.0	0.75	1.083	1
PCB 72	1590		31.2	50.0	0.81	1.110	1
PCB 68	1460		30.1	50.0	0.76	1.120	1
PCB 57	1510		31.8	50.0	0.77	1.136	1
PCB 58	1660		32.0	50.0	0.77	1.145	1
PCB 67	1540		32.4	50.0	0.78	1.150	1
PCB 63	1530		30.5	50.0	0.80	1.160	1
PCBs 70 + 61 + 74 + 76	6380		31.8	200	0.74	1.173	1
PCB 66	1680		30.5	50.0	0.76	1.185	1
PCB 55	1570		32.7	50.0	0.75	1.192	1
PCB 56	2070		46.0	50.0	0.78	0.916	1
PCB 60	1890		42.6	50.0	0.72	0.922	1
PCB 80	1940		39.0	50.0	0.74	0.930	1
PCB 79	2070		39.4	50.0	0.75	0.973	1
PCB 78	1960		40.7	50.0	0.77	0.988	1
PCB 81	1940		40.6	40.6	0.74	1.001	1
PCB 77	1740		41.0	41.0	0.75	1.001	1
PCB 104	1680		57.1	57.1	1.61	1.001	1
PCB 96	1630		46.7	50.0	1.55	1.017	1
PCB 103	1660		53.7	53.7	1.63	1.080	1
PCB 94	1720		63.0	63.0	1.55	1.090	1
PCBs 95 + 93 + 100	5130		57.7	200	1.54	1.106	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCBs 98 + 102	3410		56.8	200	1.63	1.118	1
PCBs 88 + 91	3540		57.4	57.4	1.51	1.135	1
PCB 84	1860		64.6	64.6	1.65	1.145	1
PCB 89	1870		60.9	60.9	1.55	1.161	1
PCB 121	1330		51.1	51.1	1.65	1.170	1
PCB 92	1830		69.2	69.2	1.58	0.984	1
PCBs 90 + 101 + 113	5040		56.2	200	1.56	1.000	1
PCBs 83 + 99	3500		64.2	100	1.50	1.016	1
PCB 112	1800		51.9	51.9	1.54	1.021	1
PCBs 86 + 87 + 97 + 109 + 119 + 125	10400		55.6	200	1.58	1.031	1
PCBs 85 + 116 + 117	5160		53.4	100	1.55	1.053	1
PCBs 110 + 115	3420		47.3	100	1.59	1.059	1
PCB 82	1930		74.3	74.3	1.59	1.069	1
PCB 111	1640		44.4	50.0	1.62	1.076	1
PCB 120	1820		44.5	50.0	1.57	1.089	1
PCBs 108 + 124	4140		153	153	1.49	0.992	1
PCB 107	2230		148	148	1.56	0.998	1
PCB 123	1570		129	129	1.48	1.001	1
PCB 106	2080		154	154	1.56	1.003	1
PCB 118	1610		125	125	1.56	1.000	1
PCB 122	2320		167	167	1.45	1.010	1
PCB 114	1750		133	133	1.58	1.001	1
PCB 105	1990		133	133	1.54	1.000	1
PCB 127	2120		150	150	1.42	1.034	1
PCB 126	1950		128	128	1.55	1.001	1
PCB 155	1790		21.0	21.0	1.27	1.001	1
PCB 152	2050		18.7	50.0	1.26	1.011	1
PCB 150	1860		19.3	50.0	1.30	1.014	1
PCB 136	2090		19.6	50.0	1.24	1.028	1
PCB 145	1870		19.2	50.0	1.27	1.034	1
PCB 148	1930		23.5	50.0	1.22	1.075	1
PCBs 135 + 151 + 154	5790		22.5	100	1.29	1.094	1
PCB 144	2010		22.8	50.0	1.27	1.110	1
PCBs 147 + 149	3410		88.0	100	1.21	0.902	1
PCB 134	2360		128	128	1.21	0.908	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 143	1530		83.9	100	1.22	0.910	1
PCBs 139 + 140	3640		86.2	100	1.22	0.916	1
PCB 131	2010		105	105	1.19	0.922	1
PCB 142	1690		94.6	94.6	1.22	0.925	1
PCB 132	1770		92.8	92.8	1.23	0.933	1
PCB 133	1970		94.1	94.1	1.19	0.941	1
PCB 165	1820		71.5	71.5	1.26	0.951	1
PCB 146	2000		78.6	78.6	1.22	0.956	1
PCB 161	1880		69.4	69.4	1.19	0.959	1
PCBs 153 + 168	3740		69.8	100	1.18	0.971	1
PCB 141	1870		86.8	86.8	1.21	0.976	1
PCB 130	2050		96.3	96.3	1.16	0.986	1
PCB 137	1780		82.5	82.5	1.22	0.991	1
PCB 164	1920		68.4	68.4	1.21	0.994	1
PCBs 129 + 138 + 163	5860		107	200	1.20	1.001	1
PCB 160	1770		42.6	200	1.26	1.004	1
PCB 158	1880		62.1	62.1	1.27	1.009	1
PCBs 128 + 166	3640		74.6	100	1.21	1.029	1
PCB 159	2190		69.8	69.8	1.31	0.984	1
PCB 162	2000		67.1	67.1	1.17	0.990	1
PCB 167	2000		49.3	49.3	1.18	1.000	1
PCBs 156 + 157	3840		82.1	82.1	1.24	1.000	1
PCB 169	1860		51.2	51.2	1.23	1.000	1
PCB 188	2190		19.9	20.0	1.04	1.000	1
PCB 179	2340		17.9	50.0	1.00	1.011	1
PCB 184	2070		16.8	50.0	1.03	1.022	1
PCB 176	2330		18.2	50.0	1.03	1.033	1
PCB 186	2180		18.5	50.0	1.02	1.044	1
PCB 178	2230		22.8	50.0	1.04	1.076	1
PCB 175	2190		21.7	50.0	1.09	1.091	1
PCB 187	2170		21.0	50.0	0.98	1.098	1
PCB 182	2200		22.3	50.0	1.13	1.103	1
PCBs 183 + 185	4740		53.0	100	1.08	1.113	1
PCB 174	2390		54.3	54.3	1.00	1.121	1
PCB 177	2320		55.2	55.2	1.04	1.132	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA  
**Units:** pg/L  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
PCB 181	2070		49.6	50.0	1.04	1.141	1
PCBs 171 + 173	4480		54.2	100	1.04	1.147	1
PCB 172	2100		51.3	51.3	1.00	0.906	1
PCB 192	2030		40.7	50.0	1.04	0.911	1
PCBs 180 + 193	4090		42.2	100	1.04	0.917	1
PCB 191	2090		37.7	50.0	0.99	0.925	1
PCB 170	2070		49.7	50.0	1.01	0.943	1
PCB 190	2020		35.9	50.0	1.11	0.952	1
PCB 189	2190		37.3	37.3	1.01	1.000	1
PCB 202	2970		21.0	21.0	0.92	1.000	1
PCB 201	3270		21.7	50.0	0.87	1.021	1
PCB 204	3250		22.1	50.0	0.91	1.035	1
PCB 197	3030		20.9	100	0.91	1.040	1
PCB 200	3260		21.4	100	0.91	1.044	1
PCBs 198 + 199	5850		26.8	100	0.90	1.102	1
PCB 196	2890		25.7	50.0	0.93	0.923	1
PCB 203	2690		23.9	50.0	0.87	0.926	1
PCB 195	2810		26.8	50.0	0.87	0.951	1
PCB 194	2610		24.0	50.0	0.88	0.992	1
PCB 205	3200		25.9	25.9	0.90	1.001	1
PCB 208	3490		25.9	25.9	0.75	1.000	1
PCB 207	3490		28.1	50.0	0.81	1.018	1
PCB 206	3340		88.1	88.1	0.77	1.001	1
PCB 209	3190		28.5	28.5	1.13	1.000	1

**ALS Group USA, Corp. dba ALS Environmental**

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water  
  
**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA  
  
**Units:** pg/L  
**Basis:** NA

**Chlorinated Biphenyl Congeners by HRGC/HRMS**

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

**Native Analyte Results**

<b>Analyte Name</b>	<b>Result</b>	<b>Q</b>	<b>EDL</b>	<b>MRL</b>	<b>Ion Ratio</b>	<b>RRT</b>	<b>Dilution Factor</b>
Total MonoCB	1860		68.6	68.6			1
Total DiCB	7370		9.22	20.0			1
Total TriCB	17900		43.9	50.0			1
Total TetraCB	63700		30.1	200			1
Total PentaCB	82100		44.4	200			1
Total HexaCB	79900		18.7	20.0			1
Total HeptaCB	47800		16.8	20.0			1
Total OctaCB	35800		20.9	20.9			1
Total NonaCB	10300		25.9	25.9			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

**Client:** Portland, City of  
**Project:** Portland Harbor/W17B060  
**Sample Matrix:** Water

**Service Request:** K1701325  
**Date Collected:** NA  
**Date Received:** NA

**Sample Name:** Duplicate Lab Control Sample  
**Lab Code:** EQ1700064-03

**Units:** Percent  
**Basis:** NA

Chlorinated Biphenyl Congeners by HRGC/HRMS

**Analysis Method:** 1668A  
**Prep Method:** Method Sep Funnel/Jar  
**Sample Amount:** 1000mL  
  
**Data File Name:** P303476  
**ICAL Date:** 04/09/16

**Date Analyzed:** 02/24/17 23:27  
**Date Extracted:** 2/16/17  
**Instrument Name:** E-HRMS-05  
**GC Column:** SPB-OCTYL  
**Blank File Name:** P303468  
**Cal Ver. File Name:** P303467

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
PCB 1L	2000	769.323	38		15-150	3.02	0.746
PCB 3L	2000	841.867	42		15-150	3.11	0.874
PCB 4L	2000	841.876	42		25-150	1.59	0.890
PCB 15L	2000	1038.662	52		25-150	1.53	1.222
PCB 19L	2000	871.260	44		25-150	0.97	1.069
PCB 37L	2000	1150.659	58		25-150	1.12	1.081
PCB 54L	2000	813.331	41		25-150	0.87	0.837
PCB 81L	2000	1458.716	73		25-150	0.78	1.321
PCB 77L	2000	1634.170	82		25-150	0.84	1.342
PCB 104L	2000	911.561	46		25-150	1.63	0.830
PCB 123L	2000	1373.667	69		25-150	1.55	1.133
PCB 118L	2000	1373.592	69		25-150	1.56	1.142
PCB 114L	2000	1380.802	69		25-150	1.69	1.157
PCB 105L	2000	1411.837	71		25-150	1.52	1.177
PCB 126L	2000	1563.474	78		25-150	1.49	1.264
PCB 155L	2000	1067.238	53		25-150	1.33	0.805
PCB 167L	2000	1252.139	63		25-150	1.30	1.069
PCBs 156L + 157L	4000	2613.259	65		25-150	1.27	1.096
PCB 169L	2000	1337.316	67		25-150	1.29	1.171
PCB 188L	2000	1560.332	78		25-150	1.05	0.736
PCB 189L	2000	1642.006	82		25-150	1.05	0.963
PCB 202L	2000	1694.178	85		25-150	0.89	0.833
PCB 205L	2000	1349.351	67		25-150	0.86	1.008
PCB 208L	2000	1402.963	70		25-150	0.80	0.953
PCB 206L	2000	1268.952	63		25-150	0.78	1.039
PCB 209L	2000	1202.887	60		25-150	1.21	1.067
PCB 28L	2000	1052.789	53		30-135	1.12	0.933
PCB 111L	2000	1378.830	69		30-135	1.63	1.075
PCB 178L	2000	1396.319	70		30-135	1.08	1.009

**Attachment A4**

**Summary of Stormwater Analytical Data**

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Table A4-1  
2016 Stormwater Sample Results  
Outfall Basin 16, Basin-Scale Monitoring Location (16\_SW1)

Class	Analyte	Units	Outfall Basin 16, Location 16_SW1 <sup>(1)</sup> Stormwater Grab Samples				Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		Results in Range of Typical Results on DEQ Guidance Curve?(5)
			Event 1 W16C092-07	Event 2 W16I149-04	Event 3 W16J112-07	Event 4 W16K206-01			JSCS Stormwater SLVs		
			3/9/2016	9/17/2016	10/13/2016	11/22/2016			SLV	Endpoint <sup>(4)</sup>	
Field Measurements											
	Conductivity	umhos/cm	31	33	21	27	28	--	--	--	--
	pH	pH units	6.9	7.3	7.3	6.3	6.9	--	--	--	--
	Temperature	Deg. C	10.4	17.5	14.7	12.4	13.5	--	--	--	--
Total Suspended Solids (SM 2540D)											
	TSS	mg/L	38	29	21	58	34	--	--	--	Yes
Total Metals (EPA 200.8)											
	Arsenic	µg/L	<b>1.46</b>	<b>1.52</b>	<b>0.926</b>	<b>1.92</b>	<b>1.41</b>	0.018	0.045	Human Health - Ingestion	Yes
	Cadmium	µg/L	<b>0.230</b>	<b>0.300</b>	<b>0.196</b>	<b>0.707</b>	<b>0.313</b>	--	0.094	Ecological	Yes
	Chromium	µg/L	3.75	3.92	2.14	5.74	3.67	100	100	Human Health - Ingestion	Yes
	Copper	µg/L	<b>18.2</b>	<b>25.1</b>	<b>11</b>	<b>48.9</b>	<b>22.3</b>	2.74	2.7	Ecological	Yes
	Lead	µg/L	<b>13.4</b>	<b>5.64</b>	<b>4.93</b>	<b>33.7</b>	<b>10.6</b>	--	0.54	Ecological	Yes
	Mercury (WPCLSOP M-10)	µg/L	0.00998	0.00781	0.00732	0.0601	0.0136	--	0.77	Ecological	Yes
	Nickel	µg/L	2.61	3.76	1.81	6.62	3.29	--	16	Ecological	Yes
	Silver	µg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	--	0.12	Ecological	Yes
	Zinc	µg/L	<b>112</b>	<b>127</b>	<b>56.6</b>	<b>149</b>	<b>105</b>	36.5	36	Ecological	Yes
Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270-SIM)											
	Acenaphthene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020	--	0.2	Human Health - Ingestion	--
	Acenaphthylene	µg/L	0.020	0.024 U	0.020 U	0.036	0.024	--	0.2	Human Health - Ingestion	--
	Anthracene	µg/L	0.038	0.02 U	0.020 U	0.044	0.029	--	0.2	Human Health - Ingestion	--
	Benzo(a)anthracene	µg/L	<b>0.044</b>	0.02 U	<b>0.018</b>	<b>0.099</b>	<b>0.035</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(a)pyrene	µg/L	<b>0.053</b>	<b>0.012</b>	<b>0.032</b>	<b>0.098</b>	<b>0.038</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Benzo(b)fluoranthene	µg/L	<b>0.097</b>	<b>0.032</b>	<b>0.077</b>	<b>0.24</b>	<b>0.087</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(g,h,i)perylene	µg/L	0.084	0.031	0.065	0.18	0.074	--	0.2	Human Health - Ingestion	--
	Benzo(k)fluoranthene	µg/L	<b>0.020</b>	0.01 U	<b>0.018</b>	<b>0.059</b>	<b>0.021</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Chrysene	µg/L	<b>0.070</b>	<b>0.027</b>	<b>0.033</b>	<b>0.20 J</b>	<b>0.059</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Dibenzo(a,h)anthracene	µg/L	0.010 U	0.010 U	0.010 U	<b>0.031</b>	<b>0.013</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Fluoranthene	µg/L	0.16	0.069	0.054	<b>0.38</b>	0.12	--	0.2	Human Health - Ingestion	--
	Fluorene	µg/L	0.023	0.020 U	0.020 U	0.026	0.022	--	0.2	Human Health - Ingestion	--
	Indeno(1,2,3-cd)pyrene	µg/L	<b>0.038</b>	0.012 U	<b>0.042</b>	<b>0.096</b>	<b>0.037</b>	0.0012	0.018	Human Health - Fish Consumption	--
	1-Methylnaphthalene	µg/L	0.040 U	0.04 UJ	0.040 U	0.040 UJ-	0.040	--	--	--	--
	2-Methylnaphthalene	µg/L	0.040 U	0.04 U	0.040 U	0.040 UJ-	0.040	--	0.2	Human Health - Ingestion	--
	Naphthalene	µg/L	0.040 U	0.04 U	0.040 U	0.063	0.045	12	0.2	Human Health - Ingestion	--
	Phenanthrene	µg/L	0.079	0.050	0.046	0.12	0.068	--	0.2	Human Health - Ingestion	--
	Pyrene	µg/L	<b>0.24</b>	0.077	0.069	<b>0.48</b>	0.16	--	0.2	Human Health - Ingestion	--
	Total PAHs <sup>(6)</sup>	µg/L	0.97	0.30	0.45	2.2	0.73	--	--	--	No

**Table A4-1**  
**2016 Stormwater Sample Results**  
**Outfall Basin 16, Basin-Scale Monitoring Location (16\_SW1)**

Class	Analyte	Units	Outfall Basin 16, Location 16_SW1 <sup>(1)</sup> Stormwater Grab Samples				Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		Results in Range of Typical Results on DEQ Guidance Curve?(5)
			Event 1 W16C092-07	Event 2 W16I149-04	Event 3 W16J112-07	Event 4 W16K206-01			JSCS Stormwater SLVs		
			3/9/2016	9/17/2016	10/13/2016	11/22/2016			SLV	Endpoint <sup>(4)</sup>	
Phthalates (EPA 8270-SIM)											
	Bis(2-ethylhexyl)phthalate	µg/L	<b>3.3</b> J+	<b>2.1</b> J+	<b>2.6</b> J+	<b>5.8</b> J+	<b>3.2</b>	0.2	2.2	Human Health - Fish Consumption	No
	Butylbenzylphthalate	µg/L	0.50 U	0.50 U	0.50 U	1.8 J+	0.69	--	3	Ecological	--
	Di-n-butylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50	--	3	Ecological	--
	Di-n-octylphthalate	µg/L	0.57	0.50 U	0.50 U	1.3 J+	0.66	--	3	Ecological	--
	Diethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50	--	3	Ecological	--
	Dimethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.66 J	0.54	--	3	Ecological	--
Polychlorinated Biphenyl (PCB) Congeners											
	Total PCB Congeners <sup>(6)</sup>	µg/L	<b>0.0219</b>	0.00308 ND	0.00326 ND	<b>0.0283</b>	<b>0.00888</b>	0.000064	0.000064	Human Health - Fish Consumption	Yes

## Notes:

DEQ = Oregon Department of Environmental Quality

J = Result is an estimate.

J+ = Detection of analyte is considered a high estimate.

ND = not detected

U = The analyte was not detected above the reported sample quantification limit.

UJ = The analyte was not detected, and the detection limit is considered an estimate.

-- = not established

µg/L = micrograms per liter

mg/L = milligrams per liter

<sup>(1)</sup> Sampling location is shown on Figure A-2 of main report. Samples were collected at manhole AAX408 (outgoing 48-inch pipe) and represent the majority of the Basin 16 drainage area.

<sup>(2)</sup> For the purposes of calculating the geometric mean concentrations, non-detect results are set to the value of the method reporting limit, with the exception of total PAHs and total PCB congeners. This assumption is conservative and may overestimate the true geometric mean concentration. For total PAHs and total PCB congeners, results including one or more detections of an individual constituent were calculated by assigning a value of zero to non-detected concentrations. For results in which no individual constituents were detected, the total concentration is reported as the highest MRL among the individual constituents. Duplicate sample results were averaged with the corresponding primary sample results, and the average concentration for that event was then included as a single value in the geometric mean calculations.

<sup>(3)</sup> Portland Harbor screening criteria are the cleanup levels for surface water specified in Table 17 the Portland Harbor Record of Decision (ROD; EPA, 2017), where established. Where no cleanup level for a constituent is established in the ROD, the screening level value (SLV) from the Portland Harbor Joint Source Control Strategy (DEQ/EPA, 2005) is used, if established.

<sup>(4)</sup> Endpoint = source of the JSCS SLV to be used for initial upland source control screening evaluations (DEQ/EPA, 2005):

*Human Health - Fish Consumption* = SLVs for chemicals in water taken up by fish for human consumption; these SLVs represent EPA's National Recommended Water Quality Criteria (NRWQC) values. If no NRWQC values are available, then DEQ's ambient water quality criteria (AWQC) values are listed for the constituent.

*Human Health - Ingestion* = SLVs for chemicals in water for human ingestion; these SLVs represent the most conservative value between EPA's Maximum Contaminant Levels (MCLs) and Region 9 Preliminary Remediation Goals (PRGs).

*Ecological* = SLVs for chemicals in water for ecological exposure; these SVLs represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent. If no AWQC values are available, then Oak Ridge National Laboratory Tier II SCV Technology Benchmark values are listed for the constituent.

<sup>(5)</sup> Range below typical concentrations in graphs developed by DEQ of concentrations of selected contaminants detected in stormwater from a larger number of industrial sites in Portland Harbor to assist with data evaluation [Appendix E to *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (DEQ, 2009, updated December 2015)].

<sup>(6)</sup> For purposes of calculating total PAH values and total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

**bold** = Concentration exceeds the Portland Harbor screening criterion.

**Table A4-2**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 16, Basin-Scale Monitoring Location (16\_SW1)**

		Outfall Basin 16, Location 16_SW1 <sup>(2)</sup>				
		Stormwater Grab Samples				
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3	Event 4
			W16C092-07 3/9/2016	W16I149-04 9/17/2016	W16J112-07 10/13/16	W16K206-01 11/22/16
<b>Polychlorinated Biphenyl Congeners (PCBs) (EPA 1668A)</b>						
PCB 1	2-MoCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 2	3-MoCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 3	4-MoCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 4	2,2-DiCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 5	2,3-DiCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 6	2,3-DiCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 7	2,4-DiCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 8	2,4-DiCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000506
PCB 9	2,5-DiCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 10	2,6-DiCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 11	3,3-DiCB	µg/L	0.00255 U	0.00251 U	0.002670 U	0.002450 U
PCB 12/13	3,4-DiCB + 3,4'-DiCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 14	3,5-DiCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 15	4,4-DiCB	µg/L	0.000343 U	0.000338 U	0.000359 U	0.000381
PCB 16	2,2,3-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000440
PCB 17	2,2,4-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000441
PCB 18/30	2,2,5-TrnCB + 2,4,6-TrnCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 19	2,2,6-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 20/28	2,3,3'-TrnCB + 2,4,4'-TrnCB	µg/L	0.00134 U	0.00132 U	0.001400 U	0.001630
PCB 21/33	2,3,4-TrnCB + 2,3,4'-TrnCB	µg/L	0.0014 U	0.00138 U	0.001470 U	0.001350 U
PCB 22	2,3,4'-TrnCB	µg/L	0.000988 U	0.000974 U	0.001030 U	0.000950 U
PCB 23	2,3,5-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 24	2,3,6-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 25	2,3,4-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 26/29	2,3,5-TrnCB + 2,4,5-TrnCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 27	2,3,6-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 31	2,4,5-TrnCB	µg/L	0.00135 U	0.00133 U	0.001410 U	0.001420
PCB 32	2,4,6-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000289
PCB 34	2,3,5-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 35	3,3,4-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 36	3,3,5-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 37	3,4,4'-TrnCB	µg/L	0.000551 U	0.000544 U	0.000577 U	0.000566
PCB 38	3,4,5-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 39	3,4,5-TrnCB	µg/L	0.00026 U	0.000256 U	0.000272 U	0.000250 U
PCB 40/41/71	2,2',3,3'-TeCB + 2,2',3,4'-TeCB + 2,3',4',6'-TeCB	µg/L	0.00156 U	0.00154 U	0.001630 U	0.001500 U
PCB 42	2,2',3,4'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 43/73	2,2',3,5'-TeCB + 2,3',5',6'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 44/47/65	2,2',3,5'-TeCB + 2,2',4,4'-TeCB + 2,3,5,6'-TeCB	µg/L	0.00156 U	0.00154 U	0.001630 U	0.001500 U
PCB 45/51	2,2',3,6'-TeCB + 2,2',4,6'-TeCB	µg/L	0.00104 U	0.00103 U	0.001090 U	0.001000 U
PCB 46	2,2',3,6'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 48	2,2',4,5'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 49/69	2,2',4,5'-TeCB + 2,3',4,6'-TeCB	µg/L	0.00104 U	0.00103 U	0.001090 U	0.001000 U
PCB 50/53	2,2',4,6'-TeCB + 2,2',5,6'-TeCB	µg/L	0.00104 U	0.00103 U	0.001090 U	0.001000 U
PCB 52	2,2',5,5'-TeCB	µg/L	0.0016 U	0.00158 U	0.001680 U	0.001540 U
PCB 54	2,2',6,6'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 55	2,3,3',4'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 56	2,3,3',4'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 57	2,3,3',5'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 58	2,3,3',5'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 59/62/75	2,3,3',6'-TeCB + 2,3,4,6'-TeCB + 2,4,4',6'-TeCB	µg/L	0.00156 U	0.00154 U	0.001630 U	0.001500 U
PCB 60	2,3,4,4'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 61/70/74/76	2,3,4,5'-TeCB + 2,3',4',5'-TeCB + 2,4,4',5'-TeCB + 2,3,4,5'-TeCB	µg/L	0.00208 U	0.00205 U	0.002180 U	0.002000 U
PCB 63	2,3,4,5'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 64	2,3,4,6'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000692
PCB 66	2,3,4,4'-TeCB	µg/L	0.000874 U	0.000862 U	0.000914 U	0.000840 U
PCB 67	2,3,4,5'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 68	2,3,4,5'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 72	2,3,5,5'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 77	3,3,4,4'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 78	3,3,4,5'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 79	3,3,4,5'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 80	3,3,5,5'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 81	3,4,4,5'-TeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 82	2,2',3,3',4'-PeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 83	2,2',3,3',5'-PeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 84	2,2',3,3',6'-PeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 85/116/117	2,2',3,4,4'-PeCB + 2,3,4,5,6'-PeCB + 2,3,4',5,6'-PeCB	µg/L	0.00156 U	0.00154 U	0.001630 U	0.001500 U
PCB 86/87/97/108/119/125	2,2',3,4,5'-PeCB + 2,2',3,4,5'-PeCB + 2,2',3',4',5'-PeCB + 2,3,3',4,5'-PeCB + 2,3',4,4',6'-PeCB + 2,3,4,5,6'-PeCB	µg/L	0.00312 U	0.00308 U	0.003260 U	0.00300 U
PCB 88/91	2,2',3,4,6'-PeCB + 2,2',3,4',6'-PeCB	µg/L	0.00104 U	0.00103 U	0.001090 U	0.001000 U
PCB 89	2,2',3,4,6'-PeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 90/101/113	2,2',3,4,5'-PeCB + 2,2',4,5,5'-PeCB + 2,3,3',5',6'-PeCB	µg/L	0.00156 U	0.00154 U	0.001630 U	0.001500 U
PCB 92	2,2',3,5,5'-PeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 93/98/100/102	2,2',3,5,6'-PeCB + 2,2',3',4,6'-PeCB + 2,2',4,4',6'-PeCB + 2,2',4,5,6'-PeCB	µg/L	0.00208 U	0.00205 U	0.002180 U	0.002000 U
PCB 94	2,2',3,5,6'-PeCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 95	2,2',3,5,6'-PeCB	µg/L	0.000988 U	0.000974 U	0.001030 U	0.001150

**Table A4-2**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 16, Basin-Scale Monitoring Location (16\_SW1)**

		Outfall Basin 16, Location 16_SW1 <sup>(2)</sup>				
		Stormwater Grab Samples				
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3	Event 4
			W16C092-07 3/9/2016	W16I149-04 9/17/2016	W16J112-07 10/13/16	W16K206-01 11/22/16
PCB 96	2,2',3,6,6'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 99	2,2',4,4',5'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000511 U
PCB 103	2,2',4,5',6'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 104	2,2',4,6,6'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 105	2,3,3',4,4'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000655 U
PCB 106	2,3,3',4,5'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 107/124	2,3,3',4',5'-PcCB + 2',3,4,5,5'-PcCB	µg/L	0.00104 U	0.00103 U	0.001090 U	0.001000 U
PCB 109	2,3,3',4,6'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 110/115	2,3,3',4',6'-PcCB + 2,3,4,4',6'-PcCB	µg/L	0.001390 U	0.00103 U	0.001090 U	0.001930 U
PCB 111	2,3,3',5,5'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 112	2,3,3',5,6'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 114	2,3,4,4',5'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 118	2,3',4,4',5'-PcCB	µg/L	0.000992 U	0.000656 U	0.000696 U	0.001430 U
PCB 120	2,3',4,5,5'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 121	2,3',4,5',6'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 122	2',3,3',4,5'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 123	2',3,4,4',5'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 126	3,3',4,4',5'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 127	3,3',4,5,5'-PcCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 128/166	2,2',3,3',4,4'-HxCB + 2,3,4,4',5,6'-HxCB	µg/L	0.00104 U	0.00103 U	0.001090 U	0.00100 U
PCB 129/138/163	2,2',3,3',4,4'-HxCB + 2,2',3,4,4',5',6'-HxCB + 2,3,3',4',5,6'-HxCB	µg/L	0.00311 U	0.00154 U	0.001630 U	0.003150 U
PCB 130	2,2',3,3',4,5'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 131	2,2',3,3',4,6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 132	2,2',3,3',4,6'-HxCB	µg/L	0.000925 U	0.000513 U	0.000544 U	0.001020 U
PCB 133	2,2',3,3',5,5'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 134/143	2,2',3,3',5,6'-HxCB + 2,2',3,4,5,6'-HxCB	µg/L	0.00104 U	0.00103 U	0.001090 U	0.001000 U
PCB 135/151	2,2',3,3',5,6'-HxCB + 2,2',3,5,5',6'-HxCB	µg/L	0.00104 U	0.00103 U	0.001090 U	0.001000 U
PCB 136	2,2',3,3',6,6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 137	2,2',3,4,4',5'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 139/140	2,2',3,4,4',6'-HxCB + 2,2',3,4,4',6'-HxCB	µg/L	0.00104 U	0.00103 U	0.001090 U	0.001000 U
PCB 141	2,2',3,4,5,5'-HxCB	µg/L	0.000616 U	0.000513 U	0.000544 U	0.000690 U
PCB 142	2,2',3,4,5,6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 144	2,2',3,4,5',6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 145	2,2',3,4,6,6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 146	2,2',3,4',5,5'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 147/149	2,2',3,4',5,6'-HxCB + 2,2',3,4',5',6'-HxCB	µg/L	0.00227 U	0.00103 U	0.001090 U	0.002250 U
PCB 148	2,2',3,4',5,6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 150	2,2',3,4',6,6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 152	2,2',3,5,6,6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 153/168	2,2',4,4',5,5'-HxCB + 2,3',4,4',5',6'-HxCB	µg/L	0.00268 U	0.00103 U	0.001090 U	0.002470 U
PCB 154	2,2',4,4',5,6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 155	2,2',4,4',6,6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 156/157	2,3,3',4,4',5'-HxCB + 2,3,3',4,4',5'-HxCB	µg/L	0.00104 U	0.00103 U	0.001090 U	0.001000 U
PCB 158	2,3,3',4,4',6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 159	2,3,3',4,5,5'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 160	2,3,3',4,5,6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 161	2,3,3',4,5',6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 162	2,3,3',4',5,5'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 164	2,3,3',4',5',6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 165	2,3,3',5,5',6'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 167	2,3',4,4',5,5'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 169	3,3',4,4',5,5'-HxCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 170	2,2',3,3',4,4',5'-HpCB	µg/L	0.001050 U	0.000513 U	0.000544 U	0.000973 U
PCB 171/173	2,2',3,3',4,4',6'-HpCB + 2,2',3,3',4,5,6'-HpCB	µg/L	0.001040 U	0.00103 U	0.001090 U	0.001000 U
PCB 172	2,2',3,3',4,5,5'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 174	2,2',3,3',4,5,6'-HpCB	µg/L	0.00119 U	0.000513 U	0.000544 U	0.001160 U
PCB 175	2,2',3,3',4,5',6'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 176	2,2',3,3',4,6,6'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 177	2,2',3,3',4',5,6'-HpCB	µg/L	0.000633 U	0.000513 U	0.000544 U	0.000635 U
PCB 178	2,2',3,3',5,5',6'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 179	2,2',3,3',5,6,6'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 180/193	2,2',3,4,4',5,5'-HpCB + 2,3,3',4',5,5',6'-HpCB	µg/L	0.00284 U	0.00103 U	0.001090 U	0.002450 U
PCB 181	2,2',3,4,4',5,6'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 182	2,2',3,4,4',5,6'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 183/185	2,2',3,4,4',5',6'-HpCB + 2,2',3,4,5,5',6'-HpCB	µg/L	0.00104 U	0.00103 U	0.001090 U	0.001000 U
PCB 184	2,2',3,4,4',6,6'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 186	2,2',3,4,5,6,6'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 187	2,2',3,4',5,5',6'-HpCB	µg/L	0.00158 U	0.000513 U	0.000544 U	0.001420 U
PCB 188	2,2',3,4',5,6,6'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 189	2,3,3',4,4',5,5'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 190	2,3,3',4,4',5,6'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 191	2,3,3',4,4',5',6'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 192	2,3,3',4,5,5',6'-HpCB	µg/L	0.00052 U	0.000513 U	0.000544 U	0.000500 U
PCB 194	2,2',3,3',4,4',5,5'-OcCB	µg/L	0.000821 U	0.000769 U	0.000816 U	0.000750 U
PCB 195	2,2',3,3',4,4',5,6'-OcCB	µg/L	0.00078 U	0.000769 U	0.000816 U	0.000750 U
PCB 196	2,2',3,3',4,4',5,6'-OcCB	µg/L	0.00078 U	0.000769 U	0.000816 U	0.000750 U
PCB 197/200	2,2',3,3',4,4',6,6'-OcCB + 2,2',3,3',4,5,6,6'-OcCB	µg/L	0.00156 U	0.00154 U	0.00163 U	0.00150 U
PCB 198/199	2,2',3,3',4,5,5',6'-OcCB + 2,2',3,3',4,5,5',6'-OcCB	µg/L	0.00156 U	0.00154 U	0.001630 U	0.001500 U

**Table A4-2**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 16, Basin-Scale Monitoring Location (16\_SW1)**

		Outfall Basin 16, Location 16_SW1 <sup>(2)</sup>				
		Stormwater Grab Samples				
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3	Event 4
			W16C092-07 3/9/2016	W16I149-04 9/17/2016	W16J112-07 10/13/16	W16K206-01 11/22/16
PCB 201	2,2',3,3',4,5',6,6'-OxCB	µg/L	0.00078 U	0.000769 U	0.000816 U	0.000750 U
PCB 202	2,2',3,3',5,5',6,6'-OxCB	µg/L	0.00078 U	0.000769 U	0.000816 U	0.000750 U
PCB 203	2,2',3,4,4',5,5',6-OxCB	µg/L	0.000789 U	0.000769 U	0.000816 U	0.000750 U
PCB 204	2,2',3,4,4',5,6,6'-OxCB	µg/L	0.00078 U	0.000769 U	0.000816 U	0.000750 U
PCB 205	2,3,3',4,4',5,5',6-OxCB	µg/L	0.00078 U	0.000769 U	0.000816 U	0.000750 U
PCB 206	2,2',3,3',4,4',5,5',6-NoCB	µg/L	0.000999 U	0.000769 U	0.000816 U	0.000750 U
PCB 207	2,2',3,3',4,4',5,6,6'-NoCB	µg/L	0.00078 U	0.000769 U	0.000816 U	0.000750 U
PCB 208	2,2',3,3',4,5,5',6,6'-NoCB	µg/L	0.00078 U	0.000769 U	0.000816 U	0.000750 U
PCB 209	Decachlorobiphenyl	µg/L	0.00078 U	0.000769 U	0.000816 U	0.000750 U
	Total Monochlorobiphenyls	µg/L	ND	ND	ND	ND
	Total Dichlorobiphenyls	µg/L	ND	ND	ND	0.000887
	Total Trichlorobiphenyls	µg/L	ND	ND	ND	0.00479
	Total Tetrachlorobiphenyls	µg/L	ND	ND	ND	0.000692
	Total Pentachlorobiphenyls	µg/L	0.00238	ND	ND	0.00567
	Total Hexachlorobiphenyls	µg/L	0.0096	ND	ND	0.00958
	Total Heptachlorobiphenyls	µg/L	0.0073	ND	ND	0.00665
	Total Octachlorobiphenyls	µg/L	0.00161	ND	ND	ND
	Total Nonachlorobiphenyls	µg/L	0.000999	ND	ND	ND
	Total Decachlorobiphenyls	µg/L	ND	ND	ND	ND
	Total PCBs <sup>(3)</sup>	µg/L	0.0219	0.0031 ND	0.00326 ND	0.0283

## Notes:

MoCB = Monochlorobiphenyl

DiCB = Dichlorobiphenyl

TriCB = Trichlorobiphenyl

TeCB = Tetrachlorobiphenyl

PeCB = Pentachlorobiphenyl

HeCB = Hexachlorobiphenyl

HpCB = Heptachlorobiphenyl

OcCB = Octachlorobiphenyl

NoCB = Nonachlorobiphenyl

-- = No JSCS screening level available.

U = The analyte was not detected above the reported sample quantification limit.

µg/L = Micrograms per liter

ND = Not detected

<sup>(1)</sup> IUPAC = International Union of Pure and Applied Chemistry.<sup>(2)</sup> Sampling location is shown on Figure A-2 of main report. Samples were collected at manhole AAX408 (outgoing 48-inch pipe) and represent the majority of the Basin 16 drainage area.<sup>(3)</sup> For purposes of calculating total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

**Table A4-3**  
**2016 Stormwater Sample Results**  
**Outfall Basin 16, Site-Specific Monitoring Location (16\_SW2)**

Class	Analyte	Units	Outfall Basin 16, Location 16_SW2 <sup>(1)</sup> Stormwater Grab Samples				Geometric Mean Concentration <sup>(2)</sup>	Portland Harbor Screening Criteria <sup>(3)</sup>			All Results in Range of Typical Results on DEQ Guidance Curve?(5)
			Event 1 W16C092-08	Event 2 W16I149-03	Event 3 W16J112-08	Event 4 W16K206-02		ROD Cleanup Levels	JSCS SLVs		
			3/9/2016	9/17/2016	10/13/2016	11/22/2016			SLV	Endpoint <sup>(4)</sup>	
Field Measurements											
	Conductivity	umhos/cm	71	174	144	106	117	--	--	--	--
	pH	pH units	6.9	6.9	7.1	6.6	6.9	--	--	--	--
	Temperature	Deg. C	10.1	17.3	15.1	11.7	13.3	--	--	--	--
Total Suspended Solids (SM 2540D)											
	TSS	mg/L	2 U	16	43	8	10	--	--	--	Yes
Total Metals (EPA 200.8)											
	Arsenic	µg/L	<b>0.218</b>	<b>1.29</b>	<b>0.316</b>	<b>0.395</b>	<b>0.433</b>	0.018	0.045	Human Health - Domestic Water Use	Yes
	Cadmium	µg/L	<b>0.343</b>	<b>3.63</b>	<b>1.42</b>	<b>0.578</b>	<b>1.01</b>	--	0.094	Ecological	No
	Chromium	µg/L	1.30	10.10	2.23	1.92	2.74	100	100	Human Health - Domestic Water Use	Yes
	Copper	µg/L	<b>62.7</b>	<b>240</b>	<b>44.0</b>	<b>46.7</b>	<b>74.6</b>	2.74	2.7	Ecological	No
	Lead	µg/L	<b>15.8</b>	<b>41.1</b>	<b>26.2</b>	<b>30.1</b>	<b>26.8</b>	--	0.54	Ecological	No
	Mercury (WPCL SOP M-10)	µg/L	0.0324	0.128	0.039	0.0567	0.0550	--	0.77	Ecological	Yes
	Nickel	µg/L	4.96	<b>26.5</b>	2.71	4.73	6.41	--	16	Ecological	No
	Silver	µg/L	0.100 U	<b>0.22</b>	0.100 U	0.100 U	<b>0.121</b>	--	0.12	Ecological	No
	Zinc	µg/L	<b>70.9</b>	<b>384</b>	<b>77.9</b>	<b>61.7</b>	<b>107</b>	36.5	36	Ecological	Yes
Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270-SIM)											
	Acenaphthene	µg/L	0.020 U	0.032 U	0.020 U	0.020 U	0.022 U	--	0.2	Human Health - Domestic Water Use	--
	Acenaphthylene	µg/L	0.020 U	0.10 U	0.020 U	0.020 U	0.030 U	--	0.2	Human Health - Domestic Water Use	--
	Anthracene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	--	0.2	Human Health - Domestic Water Use	--
	Benzo(a)anthracene	µg/L	0.010 U	<b>0.28</b>	<b>0.017</b>	<b>0.019</b>	<b>0.031</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(a)pyrene	µg/L	0.010 U	<b>0.082</b>	0.01 U	<b>0.012</b>	<b>0.018</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Benzo(b)fluoranthene	µg/L	0.010 U	<b>0.40</b>	<b>0.046</b>	<b>0.065</b>	<b>0.059</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(g,h,i)perylene	µg/L	0.010 U	0.12	0.022	0.034	0.031	--	0.2	Human Health - Domestic Water Use	--
	Benzo(k)fluoranthene	µg/L	0.010 U	<b>0.11</b>	<b>0.015</b>	<b>0.019</b>	<b>0.024</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Chrysene	µg/L	0.010 U	<b>0.52</b>	<b>0.044</b>	<b>0.047</b>	<b>0.057</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Dibenzo(a,h)anthracene	µg/L	0.010 U	<b>0.03</b>	0.010 U	0.010 U	<b>0.013</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Fluoranthene	µg/L	0.015 U	<b>1.3</b>	0.074	0.11	0.11	--	0.2	Human Health - Domestic Water Use	--
	Fluorene	µg/L	0.020 U	0.040 U	0.020 U	0.020 U	0.024 U	--	0.2	Human Health - Domestic Water Use	--
	Indeno(1,2,3-cd)pyrene	µg/L	0.010 U	<b>0.1</b>	<b>0.014</b>	<b>0.021</b>	<b>0.023</b>	0.0012	0.018	Human Health - Fish Consumption	--
	1-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.04 U	0.041 U	0.040	--	--	--	--
	2-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	--	0.2	Human Health - Domestic Water Use	--
	Naphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	12	0.2	Human Health - Domestic Water Use	--
	Phenanthrene	µg/L	0.020 U	<b>0.29</b>	0.020 U	0.020 U	<b>0.039</b>	--	0.2	Human Health - Domestic Water Use	--
	Pyrene	µg/L	0.022	<b>1.1</b>	0.064	0.095	<b>0.11</b>	--	0.2	Human Health - Domestic Water Use	--
	Total PAHs <sup>(6)</sup>	µg/L	0.022	4.3	0.30	0.46	0.34	--	--	--	No

**Table A4-3**  
**2016 Stormwater Sample Results**  
**Outfall Basin 16, Site-Specific Monitoring Location (16\_SW2)**

Class	Analyte	Units	Outfall Basin 16, Location 16_SW2 <sup>(1)</sup> Stormwater Grab Samples				Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve?(5)
			Event 1 W16C092-08	Event 2 W16I149-03	Event 3 W16J112-08	Event 4 W16K206-02			JCS SLVs	Endpoint <sup>(4)</sup>	
			3/9/2016	9/17/2016	10/13/2016	11/22/2016					
Phthalates (EPA 8270-SIM)											
	Bis(2-ethylhexyl)phthalate	µg/L	<b>1.4</b> J+	<b>5.2</b> J+	<b>2.0</b> J+	<b>2.4</b> J+	<b>2.4</b>	0.2	2.2	Human Health - Fish Consumption	No
	Butylbenzylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	--	3	Ecological	--
	Di-n-butylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	--	3	Ecological	--
	Di-n-octylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	--	3	Ecological	--
	Diethylphthalate	µg/L	0.50 U	1.9	0.50 U	0.50 U	0.7	--	3	Ecological	--
	Dimethylphthalate	µg/L	0.50 U	1.4	0.50 U	0.50 U	0.6	--	3	Ecological	--
Polychlorinated Biphenyl (PCB) Congeners											
	Total PCB Congeners <sup>(6)(7)</sup>	µg/L	<b>0.00972</b>	<b>0.0717</b>	<b>0.00646</b>	<b>0.0157</b>	<b>0.0163</b>	0.0000064	0.000064	Human Health - Fish Consumption	Yes

## Notes:

DEQ = Oregon Department of Environmental Quality

J+ = Detection of analyte is considered a high estimate.

J- = Detection of analyte is considered a low estimate.

U = The analyte was not detected above the reported sample quantification limit.

UJ = The analyte was not detected, and the detection limit is considered an estimate.

-- = not established

µg/L = micrograms per liter

mg/L = milligrams per liter

<sup>(1)</sup> Sampling location is shown on Figure A-2 of main report. Samples were collected at manhole ANH937 (incoming 12-inch line) and represent discharges only from the Calbag Nicolai site (ECSI #5059).

<sup>(2)</sup> For the purposes of calculating the geometric mean concentrations, non-detect results are set to the value of the method reporting limit, with the exception of total PAHs and total PCB congeners. This assumption is conservative and may overestimate the true geometric mean concentration. For total PAHs and total PCB congeners, results including one or more detections of an individual constituent were calculated by assigning a value of zero to non-detected concentrations. For results in which no individual constituents were detected, the total concentration is reported as the highest MRL among the individual constituents. Duplicate sample results were averaged with the corresponding primary sample results, and the average concentration for that event was then included as a single value in the geometric mean calculations.

<sup>(3)</sup> Portland Harbor screening criteria are the cleanup levels for surface water specified in Table 17 of the Portland Harbor Record of Decision (ROD; EPA, 2017), where established. Where no cleanup level for a constituent is established in the ROD, the screening level value (SLV) from the Portland Harbor Joint Source Control Strategy (DEQ/EPA, 2005) is used, if established.

<sup>(4)</sup> Endpoint = source of the JCS SLV to be used for initial upland source control screening evaluations (DEQ/EPA, 2005):

*Human Health - Fish Consumption* = SLVs for chemicals in water taken up by fish for human consumption; these SLVs represent EPA's National Recommended Water Quality Criteria (NRWQC) values. If no NRWQC values are available, then DEQ's ambient water quality criteria (AWQC) values are listed for the constituent.

*Human Health - Ingestion* = SLVs for chemicals in water for human ingestion; these SLVs represent the most conservative value between EPA's Maximum Contaminant Levels (MCLs) and Region 9 Preliminary Remediation Goals (PRGs).

*Ecological* = SLVs for chemicals in water for ecological exposure; these SVLs represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent. If no AWQC values are available, then Oak Ridge National Laboratory Tier II SCV Technology Benchmark values are listed for the constituent.

<sup>(5)</sup> Range below typical concentrations in graphs developed by DEQ of concentrations of selected contaminants detected in stormwater from a larger number of industrial sites in Portland Harbor to assist with data evaluation [Appendix E to *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (DEQ, 2009, updated December 2015)].

<sup>(6)</sup> For purposes of calculating total PAH values and total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

<sup>(7)</sup> Refer to Table A4-4 for individual PCB congener results.

**bold** = Concentration exceeds the Portland Harbor screening criterion.

**Table A4-4**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 16, Site-Specific Monitoring Location (16\_SW2)**

IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Outfall Basin 16, Location 16_SW2 <sup>(2)</sup>			
			Stormwater Grab Samples			
			Event 1 W16C092-08 3/9/2016	Event 2 W16I149-03 9/17/2016	Event 3 W16J112-08 10/13/2016	Event 4 W16K206-02 11/22/16
<b>Polychlorinated Biphenyl Congeners (PCBs) (EPA 1668A)</b>						
PCB 1	2-MeCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 2	3-MeCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 3	4-MeCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 4	2,2'-DiCB	µg/L	0.000276 U	0.000875	0.000245 U	0.000250 U
PCB 5	2,3-DiCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 6	2,3'-DiCB	µg/L	0.000276 U	0.000808	0.000245 U	0.000250 U
PCB 7	2,4-DiCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 8	2,4'-DiCB	µg/L	0.000276 U	0.0012	0.000245 U	0.000250 U
PCB 9	2,5-DiCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 10	2,6-DiCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 11	3,3'-DiCB	µg/L	0.00271 U	0.00255 U	0.002400 U	0.002450 U
PCB 12/13	3,4-DiCB + 3,4'-DiCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 14	3,5-DiCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 15	4,4'-DiCB	µg/L	0.000365 U	0.00103	0.000323 U	0.000330 U
PCB 16	2,2,3-TriCB	µg/L	0.000276 U	0.000941	0.000245 U	0.000250 U
PCB 17	2,2,4-TriCB	µg/L	0.000276 U	0.00078	0.000245 U	0.000250 U
PCB 18/30	2,2,5-TriCB + 2,4,6-TriCB	µg/L	0.000553 U	0.00174	0.000490 U	0.000500 U
PCB 19	2,2,6-TriCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 20/28	2,3,3'-TriCB + 2,4,4'-TriCB	µg/L	0.001430 U	0.00315	0.001260 U	0.001290 U
PCB 21/33	2,3,4-TriCB + 2',3,4-TriCB	µg/L	0.001490 U	0.00214	0.001320 U	0.001350 U
PCB 22	2,3,4'-TriCB	µg/L	0.001050 U	0.00149	0.000930 U	0.000950 U
PCB 23	2,3,5-TriCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 24	2,3,6-TriCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 25	2,3,4-TriCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 26/29	2,3,5-TriCB + 2,4,5-TriCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 27	2,3,6-TriCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 31	2,4,5-TriCB	µg/L	0.001440 U	0.00269	0.001270 U	0.001300 U
PCB 32	2,4,6-TriCB	µg/L	0.000276 U	0.000588	0.000245 U	0.000250 U
PCB 34	2,3,5-TriCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 35	3,3,4-TriCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 36	3,3,5-TriCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 37	3,4,4'-TriCB	µg/L	0.000586 U	0.00167	0.000519 U	0.000530 U
PCB 38	3,4,5-TriCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 39	3,4,5-TriCB	µg/L	0.000276 U	0.00026 U	0.000245 U	0.000250 U
PCB 40/41/71	2,2',3,3'-TeCB + 2,2',3,4'-TeCB + 2,3',4',6'-TeCB	µg/L	0.001660 U	0.00201	0.001470 U	0.001500 U
PCB 42	2,2',3,4'-TeCB	µg/L	0.000553 U	0.000884	0.000490 U	0.000500 U
PCB 43/73	2,2',3,5'-TeCB + 2,3',5',6'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 44/47/65	2,2',3,5'-TeCB + 2,2',4,4'-TeCB + 2,3,5,6'-TeCB	µg/L	0.001660 U	0.00282	0.001470 U	0.001500 U
PCB 45/51	2,2',3,6'-TeCB + 2,2',4,6'-TeCB	µg/L	0.001110 U	0.00104	0.000979 U	0.001000 U
PCB 46	2,2',3,6'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 48	2,2',4,5'-TeCB	µg/L	0.000553 U	0.000679	0.000490 U	0.000500 U
PCB 49/69	2,2',4,5'-TeCB + 2,3',4,6'-TeCB	µg/L	0.001110 U	0.00148	0.000979 U	0.001000 U
PCB 50/53	2,2',4,6'-TeCB + 2,2',5,6'-TeCB	µg/L	0.001110 U	0.00104	0.000979 U	0.001000 U
PCB 52	2,2',5,5'-TeCB	µg/L	0.001700 U	0.00263	0.001510 U	0.001540 U
PCB 54	2,2',6,6'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 55	2,3,3',4'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 56	2,3,3',4'-TeCB	µg/L	0.000553 U	0.00112	0.000490 U	0.000500 U
PCB 57	2,3,3',5'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 58	2,3,3',5'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 59/62/75	2,3,3',6'-TeCB + 2,3,4,6'-TeCB + 2,4,4',6'-TeCB	µg/L	0.001660 U	0.00156 U	0.001470 U	0.001500 U
PCB 60	2,3,4,4'-TeCB	µg/L	0.000553 U	0.000656	0.000490 U	0.000500 U
PCB 61/70/74/76	2,3,4,5'-TeCB + 2,3',4',5'-TeCB + 2,4,4',5'-TeCB + 2',3,4,5'-TeCB	µg/L	0.002210 U	0.00441	0.001960 U	0.002000 U
PCB 63	2,3,4',5'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 64	2,3,4',6'-TeCB	µg/L	0.000553 U	0.00146	0.000490 U	0.000628
PCB 66	2,3',4,4'-TeCB	µg/L	0.000929 U	0.00202	0.000823 U	0.000840 U
PCB 67	2,3',4,5'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 68	2,3',4,5'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 72	2,3',5,5'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 77	3,3',4,4'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 78	3,3',4,5'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 79	3,3',4,5'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 80	3,3',5,5'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 81	3,4,4',5'-TeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 82	2,2',3,3',4'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 83	2,2',3,3',5'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 84	2,2',3,3',6'-PeCB	µg/L	0.000553 U	0.000778	0.000490 U	0.000500 U
PCB 85/116/117	2,2',3,4,4'-PeCB + 2,3,4,5,6-PeCB + 2,3,4',5,6-PeCB	µg/L	0.001660 U	0.00156 U	0.001470 U	0.001500 U
PCB 86/87/97/108/119/125	2,2',3,4,5'-PeCB + 2,2',3,4,5'-PeCB + 2,2',3',4,5'-PeCB + 2,3',4,4',6-PeCB + 2,3,4,5,6-PeCB	µg/L	0.00332 U	0.00312 U	0.00294 U	0.003000 U
PCB 88/91	2,2',3,4,6-PeCB + 2,2',3,4',6-PeCB	µg/L	0.001110 U	0.00104 U	0.000979 U	0.001000 U
PCB 89	2,2',3,4,6'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 90/101/113	2,2',3,4',5'-PeCB + 2,2',4,5,5'-PeCB + 2,3,3',5',6-PeCB	µg/L	0.001660 U	0.00288	0.001470 U	0.001500 U
PCB 92	2,2',3,5,5'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 93/98/100/102	2,2',3,5,6-PeCB + 2,2',3',4,6-PeCB + 2,2',4,4',6-PeCB + 2,2',4,5,6'-PeCB	µg/L	0.002210 U	0.00208 U	0.001960 U	0.002000 U

**Table A4-4**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 16, Site-Specific Monitoring Location (16\_SW2)**

		Outfall Basin 16, Location 16_SW2 <sup>(2)</sup>				
		Stormwater Grab Samples				
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3	Event 4
			W16C092-08 3/9/2016	W16I149-03 9/17/2016	W16J112-08 10/13/2016	W16K206-02 11/22/16
PCB 94	2,2',3,5,6'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 95	2,2',3,5',6'-PeCB	µg/L	0.001050 U	0.00193	0.000930 U	0.001010
PCB 96	2,2',3,6,6'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 99	2,2',4,4',5'-PeCB	µg/L	0.000553 U	0.00124	0.000490 U	0.000633
PCB 103	2,2',4,5',6'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 104	2,2',4,6,6'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 105	2,3,3',4,4'-PeCB	µg/L	0.00075	0.00184	0.000558	0.000784
PCB 106	2,3,3',4,5'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 107/124	2,3,3',4',5'-PeCB + 2,3,4,5,5'-PeCB	µg/L	0.001110 U	0.00104	0.000979 U	0.001000 U
PCB 109	2,3,3',4,6'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 110/115	2,3,3',4',6'-PeCB + 2,3,4,4',6'-PeCB	µg/L	0.001860	0.00418	0.001270	0.001940
PCB 111	2,3,3',4,5'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 112	2,3,3',5,6'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 114	2,3,4,4',5'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 118	2,3,4,4',5'-PeCB	µg/L	0.001780	0.00408	0.001230	0.001630
PCB 120	2,3',4,5,5'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 121	2,3',4,5',6'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 122	2,3,3',4,5'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 123	2,3,4,4',5'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 126	3,3',4,4',5'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 127	3,3',4,5,5'-PeCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 128/166	2,2',3,3',4,4'-HxCB + 2,3,4,4',5,6'-HxCB	µg/L	0.00111 U	0.00104	0.00098 U	0.001000 U
PCB 129/138/163	2,2',3,3',4,4'-HxCB + 2,2',3,4,4',5'-HxCB + 2,3,3',4',5,6'-HxCB	µg/L	0.00209	0.00448	0.001740	0.002390
PCB 130	2,2',3,3',4,5'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 131	2,2',3,3',4,6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 132	2,2',3,3',4,6'-HxCB	µg/L	0.000697	0.00142	0.000507	0.000836
PCB 133	2,2',3,3',5,5'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 134/143	2,2',3,3',5,6'-HxCB + 2,2',3,4,5,6'-HxCB	µg/L	0.00111 U	0.00104	0.000979 U	0.001000 U
PCB 135/151	2,2',3,3',5,6'-HxCB + 2,2',3,5,5',6'-HxCB	µg/L	0.00111 U	0.00104	0.000979 U	0.001000 U
PCB 136	2,2',3,3',6,6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 137	2,2',3,4,4',5'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 139/140	2,2',3,4,4',6'-HxCB + 2,2',3,4,4',6'-HxCB	µg/L	0.00111 U	0.00104	0.000979 U	0.001000 U
PCB 141	2,2',3,4,5,5'-HxCB	µg/L	0.000553 U	0.000722	0.000490 U	0.000500 U
PCB 142	2,2',3,4,5,6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 144	2,2',3,4,5',6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 145	2,2',3,4,6,6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 146	2,2',3,4',5,5'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 147/149	2,2',3,4',5,6'-HxCB + 2,2',3,4',5',6'-HxCB	µg/L	0.001230	0.00167	0.000979 U	0.001490
PCB 148	2,2',3,4',5,6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 150	2,2',3,4',6,6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 152	2,2',3,5,6,6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 153/168	2,2',4,4',5,5'-HxCB + 2,3',4,4',5',6'-HxCB	µg/L	0.00132	0.00273	0.001150	0.001690
PCB 154	2,2',4,4',5,6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 155	2,2',4,4',6,6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 156/157	2,3,3',4,4',5'-HxCB + 2,3,3',4,4',5'-HxCB	µg/L	0.00111 U	0.00104	0.000979 U	0.001000 U
PCB 158	2,3,3',4,4',6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 159	2,3,3',4,5,5'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 160	2,3,3',4,5,6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 161	2,3,3',4,5',6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 162	2,3,3',4,5,5'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 164	2,3,3',4,5',6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 165	2,3,3',5,5',6'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 167	2,3',4,4',5,5'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 169	3,3',4,4',5,5'-HxCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 170	2,2',3,3',4,4',5'-HpCB	µg/L	0.000553 U	0.000821	0.000490 U	0.000500 U
PCB 171/173	2,2',3,3',4,4',6'-HpCB + 2,2',3,3',4,4',5,6'-HpCB	µg/L	0.00111 U	0.00104	0.000979 U	0.001000 U
PCB 172	2,2',3,3',4,5,5'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 174	2,2',3,3',4,5,6'-HpCB	µg/L	0.000553 U	0.000823	0.000490 U	0.000628
PCB 175	2,2',3,3',4,5',6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 176	2,2',3,3',4,6,6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 177	2,2',3,3',4',5,6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 178	2,2',3,3',5,5',6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 179	2,2',3,3',5,6,6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 180/193	2,2',3,4,4',5,5'-HpCB + 2,3,3',4',5,5',6'-HpCB	µg/L	0.00111 U	0.00185	0.000979 U	0.001270
PCB 181	2,2',3,4,4',5,6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 182	2,2',3,4,4',5,6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 183/185	2,2',3,4,4',5',6'-HpCB + 2,2',3,4,5',6'-HpCB	µg/L	0.001110 U	0.00104	0.000979 U	0.001000 U
PCB 184	2,2',3,4,4',6,6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 186	2,2',3,4,5,6,6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 187	2,2',3,4',5,5',6'-HpCB	µg/L	0.000553 U	0.000971	0.000490 U	0.000790
PCB 188	2,2',3,4',5,6,6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 189	2,3,3',4,4',5,5'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 190	2,3,3',4,4',5,6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 191	2,3,3',4,4',5',6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 192	2,3,3',4,5,5',6'-HpCB	µg/L	0.000553 U	0.000521 U	0.000490 U	0.000500 U
PCB 194	2,2',3,3',4,4',5,5'-OxCB	µg/L	0.000829 U	0.000781 U	0.000735 U	0.000750 U
PCB 195	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000829 U	0.000781 U	0.000735 U	0.000750 U

**Table A4-4**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 16, Site-Specific Monitoring Location (16\_SW2)**

		Outfall Basin 16, Location 16_SW2 <sup>(2)</sup>				
		Stormwater Grab Samples				
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3	Event 4
			W16C092-08 3/9/2016	W16I149-03 9/17/2016	W16J112-08 10/13/2016	W16K206-02 11/22/16
PCB 196	2,2',3,3',4,4',5,6'-O <sub>2</sub> CB	µg/L	0.000829 U	0.000781 U	0.000735 U	0.000750 U
PCB 197/200	2,2',3,3',4,4',6,6'-O <sub>2</sub> CB + 2,2',3,3',4,5,6,6'-O <sub>2</sub> CB	µg/L	0.00166 U	0.00156 U	0.00147 U	0.001500 U
PCB 198/199	2,2',3,3',4,5,5',6-O <sub>2</sub> CB + 2,2',3,3',4,5,5',6'-O <sub>2</sub> CB	µg/L	0.00166 U	0.00156 U	0.001470 U	0.001500 U
PCB 201	2,2',3,3',4,5',6,6'-O <sub>2</sub> CB	µg/L	0.000829 U	0.000781 U	0.000735 U	0.000750 U
PCB 202	2,2',3,3',5,5',6,6'-O <sub>2</sub> CB	µg/L	0.000829 U	0.000781 U	0.000735 U	0.000750 U
PCB 203	2,2',3,4,4',5,5',6-O <sub>2</sub> CB	µg/L	0.000829 U	0.000781 U	0.000735 U	0.000750 U
PCB 204	2,2',3,4,4',5,6,6'-O <sub>2</sub> CB	µg/L	0.000829 U	0.000781 U	0.000735 U	0.000750 U
PCB 205	2,3,3',4,4',5,5',6-O <sub>2</sub> CB	µg/L	0.000829 U	0.000781 U	0.000735 U	0.000750 U
PCB 206	2,2',3,3',4,4',5,5',6-NoCB	µg/L	0.000829 U	0.000781 U	0.000735 U	0.000750 U
PCB 207	2,2',3,3',4,4',5,6,6'-NoCB	µg/L	0.000829 U	0.000781 U	0.000735 U	0.000750 U
PCB 208	2,2',3,3',4,5,5',6,6'-NoCB	µg/L	0.000829 U	0.000781 U	0.000735 U	0.000750 U
PCB 209	Decachlorobiphenyl	µg/L	0.000829 U	0.000781 U	0.000735 U	0.000750 U
	Total Monochlorobiphenyls	µg/L	ND	ND	ND	ND
	Total Dichlorobiphenyls	µg/L	ND	0.00391	ND	ND
	Total Trichlorobiphenyls	µg/L	ND	0.0152	ND	ND
	Total Tetrachlorobiphenyls	µg/L	ND	0.0202	ND	0.000628
	Total Pentachlorobiphenyls	µg/L	0.00439	0.0169	0.00306	0.00600
	Total Hexachlorobiphenyls	µg/L	0.00534	0.011	0.0034	0.00640
	Total Heptachlorobiphenyls	µg/L	0.000000	0.00446	ND	0.00269
	Total Octachlorobiphenyls	µg/L	ND	ND	ND	ND
	Total Nonachlorobiphenyls	µg/L	ND	ND	ND	ND
	Total Decachlorobiphenyls	µg/L	ND	ND	ND	ND
	Total PCBs <sup>(3)</sup>	µg/L	0.00972	0.0717	0.00646	0.0157

## Notes:

MoCB = Monochlorobiphenyl

DiCB = Dichlorobiphenyl

TriCB = Trichlorobiphenyl

TeCB = Tetrachlorobiphenyl

PeCB = Pentachlorobiphenyl

HeCB = Hexachlorobiphenyl

HpCB = Heptachlorobiphenyl

OcCB = Octachlorobiphenyl

NoCB = Nonachlorobiphenyl

U = The analyte was not detected above the reported sample quantification limit.

µg/L = Micrograms per liter

ND = Not detected

<sup>(1)</sup> IUPAC = International Union of Pure and Applied Chemistry.<sup>(2)</sup> Sampling location is shown on Figure A-2 of main report. Samples were collected at manhole ANH937 (incoming 12-inch line) and represent discharges only from the Calbag Metals-Nicolai site (ECSI #5059).<sup>(3)</sup> For purposes of calculating total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

Table A4-5  
2015/2016 Stormwater Sample Results  
Outfall Basin 17, Basin-Scale Monitoring

		Outfall 17 Stormwater Grab Samples <sup>(1)</sup>					Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve <sup>(5)</sup>	
Class	Analyte	Units	17_16SW (Outfall)		17_17SW (Manhole AAT596)				JSCS SLVs	SLV		Endpoint <sup>(4)</sup>
			Event 1 W151174-01	Event 1 DUP W151174-02	Event 2 W151074-01	Event 3 W15J213-01						
Field Measurements												
	Conductivity	umhos/cm	123	NA	240	34	91	NA	--	--	--	
	pH	units	8.8	NA	7	7.2	7.4	NA	--	--	--	
	Temperature	Deg. C	18	NA	18.5	16	9.5	NA	--	--	--	
Total Suspended Solids (SM 2540D)												
	TSS	mg/L	63	61	21	45	58	43	--	--	Yes	
Total Metals (EPA 200.8)												
	Arsenic	µg/L	<b>1.67</b>	<b>1.65</b>	<b>2.25</b>	<b>0.827</b>	<b>1.28</b>	<b>1.41</b>	0.018	0.045	Human Health - Ingestion	No
	Cadmium	µg/L	<b>0.13</b>	<b>0.13</b>	0.10 U	<b>0.11</b>	<b>0.148</b>	<b>0.12</b>	--	0.094	Ecological	Yes
	Chromium	µg/L	3.86	3.84	1.11	3.22	4.55	2.81	100	100	Human Health - Ingestion	Yes
	Copper	µg/L	<b>20.3</b>	<b>20.2</b>	<b>6.10</b>	<b>12.2</b>	<b>7.85</b>	<b>10.43</b>	2.74	2.7	Ecological	Yes
	Lead	µg/L	<b>6.58</b>	<b>6.46</b>	<b>1.71</b>	<b>7.07</b>	<b>8.69</b>	<b>5.12</b>	--	0.54	Ecological	Yes
	Mercury (WPCLSOP M-10)	µg/L	0.0274	0.0261	0.00487	0.0108	0.0110	0.0112	--	0.77	Ecological	Yes
	Nickel	µg/L	2.92	2.89	1.59	1.83	3.42	2.32	--	16	Ecological	Yes
	Silver	µg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	--	0.12	Ecological	Yes
	Zinc	µg/L	<b>95.2</b>	<b>95.3</b>	27.5	<b>74.6</b>	<b>62.6</b>	<b>59.1</b>	36.5	36	Ecological	Yes
Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270-SIM)												
	Acenaphthene	µg/L	0.035	0.035	0.049	0.020 U	0.020 U	0.029	--	0.2	Human Health - Ingestion	--
	Acenaphthylene	µg/L	0.023	0.022	0.020 U	0.020 U	0.020 U	0.021	--	0.2	Human Health - Ingestion	--
	Anthracene	µg/L	0.028	0.029	0.039	0.020 U	0.022	0.026	--	0.2	Human Health - Ingestion	--
	Benzo(a)anthracene	µg/L	<b>0.019</b>	<b>0.021</b>	0.010 U	<b>0.022</b>	0.010 U	0.014	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(a)pyrene	µg/L	<b>0.024</b>	<b>0.026</b>	0.010 UJ	<b>0.028</b>	<b>0.016</b>	0.018	0.00012	0.018	Human Health - Fish Consumption	--
	Benzo(b)fluoranthene	µg/L	<b>0.045</b>	<b>0.049</b>	0.010 U	<b>0.055</b>	<b>0.019</b>	0.026	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(g,h,i)perylene	µg/L	0.063 J	0.066 J	0.013 J	0.064	0.022	0.033	--	0.2	Human Health - Ingestion	--
	Benzo(k)fluoranthene	µg/L	<b>0.013</b>	<b>0.012</b>	0.010 U	<b>0.022</b>	0.010 U	0.013	0.0013	0.018	Human Health - Fish Consumption	--
	Chrysene	µg/L	<b>0.043</b>	<b>0.043</b>	0.010 U	<b>0.039</b>	<b>0.013</b>	0.022	0.0013	0.018	Human Health - Fish Consumption	--
	Dibenzo(a,h)anthracene	µg/L	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.00012	0.018	Human Health - Fish Consumption	--
	Fluoranthene	µg/L	0.12	0.12	0.031	0.094	0.039	0.061	--	0.2	Human Health - Ingestion	--
	Fluorene	µg/L	0.026	0.027	0.025	0.020 U	0.020 U	0.023	--	0.2	Human Health - Ingestion	--
	Indeno(1,2,3-cd)pyrene	µg/L	<b>0.023</b> J	<b>0.023</b>	0.010 UJ	<b>0.027</b>	0.010 U	<b>0.016</b>	0.0012	0.018	Human Health - Fish Consumption	--
	1-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.048	0.040 U	0.040 U	0.042	--	--	--	--
	2-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	--	0.2	Human Health - Ingestion	--
	Naphthalene	µg/L	0.080 U	0.046	0.040 U	0.040 U	0.040 U	0.045	12	0.2	Human Health - Ingestion	--
	Phenanthrene	µg/L	0.11	0.11	0.046	0.057	0.022	0.050	--	0.2	Human Health - Ingestion	--
	Pyrene	µg/L	0.16	0.16	0.048	0.11	0.062	0.085	--	0.2	Human Health - Ingestion	--
	Total PAHs <sup>(6)</sup>	µg/L	0.73	0.79	0.30	0.52	0.22	0.40	--	--	--	Yes

Table A4-5  
2015/2016 Stormwater Sample Results  
Outfall Basin 17, Basin-Scale Monitoring

		Outfall 17 Stormwater Grab Samples <sup>(1)</sup>					Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve?(5)	
		17_16SW (Outfall)			17_17SW (Manhole AAT596)	JSCS SLVs			SLV	Endpoint <sup>(4)</sup>		
Class	Analyte	Units	Event 1 W151174-01	Event 1 DUP W151174-02	Event 2 W151074-01							Event 3 W151213-01
			9/25/2015	9/25/2015	10/10/2015	10/31/2105	3/9/2016					
Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270)												
	Acenaphthene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.2	Human Health - Ingestion	--
	Acenaphthylene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.2	Human Health - Ingestion	--
	Anthracene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.2	Human Health - Ingestion	--
	Benzo(a)anthracene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(a)pyrene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	0.00012	0.018	Human Health - Fish Consumption	--
	Benzo(b)fluoranthene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(g,h,i)perylene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.2	Human Health - Ingestion	--
	Benzo(k)fluoranthene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	0.0013	0.018	Human Health - Fish Consumption	--
	Chrysene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	0.0013	0.018	Human Health - Fish Consumption	--
	Dibenzo(a,h)anthracene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	0.00012	0.018	Human Health - Fish Consumption	--
	Fluoranthene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.2	Human Health - Ingestion	--
	Fluorene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.2	Human Health - Ingestion	--
	Indeno(1,2,3-cd)pyrene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	0.0012	0.018	Human Health - Fish Consumption	--
	1-Methylnaphthalene	µg/L	NA	NA	NA	NA	NA	NA	--	--	--	--
	2-Methylnaphthalene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.2	Human Health - Ingestion	--
	Naphthalene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	12	0.2	Human Health - Ingestion	--
	Phenanthrene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.2	Human Health - Ingestion	--
	Pyrene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.2	Human Health - Ingestion	--
	Total PAHs <sup>(6)</sup>	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	--	--	Yes
Phthalates (EPA 8270-SIM)												
	Bis(2-ethylhexyl)phthalate	µg/L	<b>1.8</b>	<b>1.7</b>	0.50 UJ	<b>1.9</b>	<b>1.3 J+</b>	<b>1.2</b>	0.2	2.2	Human Health - Fish Consumption	Yes
	Butylbenzylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	--	3	Ecological	--
	Di-n-butylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	--	3	Ecological	--
	Di-n-octylphthalate	µg/L	0.50 U	0.50 U	0.50 UJ	0.50 U	0.50 U	0.5 U	--	3	Ecological	--
	Diethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	--	3	Ecological	--
	Dimethylphthalate	µg/L	1.9	2.0	0.50 U	0.50 U	0.50 U	0.7	--	3	Ecological	--
Phthalates (EPA 8270)												
	Bis(2-ethylhexyl)phthalate	µg/L	<b>2.3</b>	<b>2.3</b>	1.0 U	<b>1.4 J</b>	NA	<b>1.5</b>	0.2	2.2	Human Health - Fish Consumption	Yes
	Butylbenzylphthalate	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	3	Ecological	--
	Di-n-butylphthalate	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	3	Ecological	--
	Di-n-octylphthalate	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	3	Ecological	--
	Diethylphthalate	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	3	Ecological	--
	Dimethylphthalate	µg/L	1.9	1.9	1.0 U	1.0 U	NA	1.2	--	3	Ecological	--

**Table A4-5**  
**2015/2016 Stormwater Sample Results**  
**Outfall Basin 17, Basin-Scale Monitoring**

Class	Analyte	Units	Outfall 17 Stormwater Grab Samples <sup>(1)</sup>					Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve <sup>(5)</sup>	
			17_16SW (Outfall)				17_17SW (Manhole AAT596)			JSCS SLVs	SLV		Endpoint <sup>(4)</sup>
			Event 1 W151174-01	Event 1 DUP W151174-02	Event 2 W151074-01	Event 3 W15J213-01	Event 4 W16C092-09						
			9/25/2015	9/25/2015	10/10/2015	10/31/2105	3/9/2016						
Semivolatile Organic Compounds (SVOCs) (EPA 8270)													
	1,2,4-Trichlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	8.2	Human Health - Ingestion	--	
	1,2-Dichlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 UJ	NA	1.0 U	--	49	Human Health - Ingestion	--	
	1,3-Dichlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 UJ	NA	1.0 U	--	14	Human Health - Ingestion	--	
	1,4-Dichlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 UJ	NA	1.0 U	--	2.8	Human Health - Ingestion	--	
	2,3,4,6-Tetrachlorophenol	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	--	1100	Human Health - Ingestion	--	
	2,4,5-Trichlorophenol	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	--	3600	Human Health - Fish Consumption	--	
	2,4,6-Trichlorophenol	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	2.4	Human Health - Fish Consumption	--	
	2,4-Dichlorophenol	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	110	Human Health - Ingestion	--	
	2,4-Dimethylphenol	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	--	730	Human Health - Ingestion	--	
	2,4-Dinitrophenol	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	NA	5.0 U	--	73	Human Health - Ingestion	--	
	2,4-Dinitrotoluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	3.4	Human Health - Fish Consumption	--	
	2,6-Dinitrotoluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	37	Human Health - Ingestion	--	
	2-Chloronaphthalene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	490	Human Health - Ingestion	--	
	2-Chlorophenol	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	30	Human Health - Ingestion	--	
	2-Methylnaphthalene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.2	Human Health - Ingestion	--	
	2-Methylphenol	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	--	13	Ecological	--	
	2-Nitroaniline	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	--	110	Human Health - Ingestion	--	
	2-Nitrophenol	µg/L	2.0 U	2.0 U	1.0 U	1.0 U	NA	1.3 U	--	150	Ecological	--	
	3,3'-Dichlorobenzidine	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.028	Human Health - Fish Consumption	--	
	3-Nitroaniline	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	--	3.2	Human Health - Ingestion	--	
	3- & 4-Methylphenol	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	--	110	Human Health - Ingestion	--	
	4,6-Dinitro-2-methylphenol	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	NA	2.0 U	--	150	Ecological	--	
	4-Bromophenylphenyl ether	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	--	--	--	
	4-Chloro-3-methylphenol	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	--	--	--	
	4-Chloroaniline	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	150	Human Health - Ingestion	--	
	4-Chlorophenyl phenyl ether	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.06	Human Health - Ingestion	--	
	4-Nitroaniline	µg/L	2.0 U	2.0 U	2.0 UJ	2.0 U	NA	2.0 U	--	3.2	Human Health - Ingestion	--	
	4-Nitrophenol	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	NA	5.0 U	--	150	Ecological	--	
	Bis(2-chloroethoxy) methane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0	Ecological	--	
	Bis(2-chloroethyl) ether	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.06	Human Health - Ingestion	--	
	Bis(2-chloroisopropyl) ether	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.95	Human Health - Ingestion	--	
	Dibenzofuran	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	3.7	Ecological	--	
	Hexachlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	0.000029	0.00029	Human Health - Fish Consumption	--	
	Hexachlorobutadiene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.86	Human Health - Ingestion	--	
	Hexachlorocyclopentadiene	µg/L	2.0 U	2.0 U	2.0 U	2.0 UJ	NA	2.0 U	--	5.2	Ecological	--	
	Hexachloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 UJ	NA	1.0 U	--	3.3	Human Health - Fish Consumption	--	
	Isophorone	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	71	Human Health - Ingestion	--	
	Nitrobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	3.4	Human Health - Ingestion	--	
	N-Nitrosodimethylamine	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.00042	Human Health - Ingestion	--	
	N-Nitrosodi-n-propylamine	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	0.0096	Human Health - Ingestion	--	
	N-Nitrosodiphenylamine	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	--	6	Human Health - Fish Consumption	--	
	Pentachlorophenol	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	0.03	0.56	Human Health - Ingestion	--	
	Phenol	µg/L	1.3	1.1	1.0 U	1.0 U	NA	1.1	--	2560	Ecological	--	

Table A4-5  
2015/2016 Stormwater Sample Results  
Outfall Basin 17, Basin-Scale Monitoring

Class	Analyte	Units	Outfall 17 Stormwater Grab Samples <sup>(1)</sup>					Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve <sup>(5)</sup>
			17_16SW (Outfall)			17_17SW (Manhole AAT596)				SLV	JSCS SLVs Endpoint <sup>(4)</sup>	
			Event 1 W151174-01	Event 1 DUP W151174-02	Event 2 W151074-01	Event 3 W15J213-01	Event 4 W16C092-09					
			9/25/2015	9/25/2015	10/10/2015	10/31/2105	3/9/2016					
Polychlorinated Biphenyl (PCB) Congeners												
	Total PCB Congeners <sup>(6)(7)</sup>	µg/L	0.00307 ND	0.00308 ND	0.00294 ND	<b>0.00686</b>	0.00296 ND	<b>0.00396</b>	0.0000064	0.000064	Human Health - Fish Consumption	Yes
Polychlorinated Biphenyl (PCBs) (EPA 8082)												
	Aroclor 1016/1242	µg/L	0.0245 U	0.0250 U	0.0251 U	0.0255 U	NA	0.0251 U	--	0.994	Human Health - Ingestion	--
	Aroclor 1221	µg/L	0.0490 U	0.0500 U	0.0503 U	0.0510 U	NA	0.0503 U	--	0.034	Human Health - Ingestion	--
	Aroclor 1232	µg/L	0.0245 U	0.0250 U	0.0251 U	0.0255 U	NA	0.0251 U	--	0.034	Human Health - Ingestion	--
	Aroclor 1248	µg/L	0.0245 U	0.0250 U	0.0251 U	0.0255 U	NA	0.0251 U	--	0.034	Human Health - Ingestion	--
	Aroclor 1254	µg/L	0.0245 U	0.0250 U	0.0251 U	0.0255 U	NA	0.0251 U	--	0.033	Ecological	--
	Aroclor 1260	µg/L	0.0245 U	0.0250 U	0.0251 U	0.0255 U	NA	0.0251 U	--	0.034	Human Health - Ingestion	--
	Aroclor 1262	µg/L	0.0245 U	0.0250 U	0.0251 U	0.0255 U	NA	0.0251 U	--	--	--	--
	Aroclor 1268	µg/L	0.0245 U	0.0250 U	0.0251 U	0.0255 U	NA	0.0251 U	--	--	--	--
	Total PCB Aroclors <sup>(6)</sup>	µg/L	0.0490 ND	0.0500 ND	0.0503 ND	0.0510 ND	NA	0.0503 ND	0.0000064	0.000064	Human Health - Fish Consumption	Yes
Organochlorine Pesticides (EPA 8081B)												
	4,4'-DDD	µg/L	0.00058 U	0.00056 U	0.00028 U	0.00028 U	0.00028 U	0.00033 U	0.000031	0.00031	Human Health - Fish Consumption	--
	4,4'-DDE	µg/L	0.00023 U	0.00022 U	0.00011 U	0.00011 U	0.00011 U	0.00013 U	0.000018	0.00022	Human Health - Fish Consumption	--
	4,4'-DDT	µg/L	0.00062 U	0.0022 U	0.00030 U	0.0032 U	0.0021 U	0.0013 U	0.000022	0.00022	Human Health - Fish Consumption	--
	Estimated Total DDx <sup>(6)</sup>	µg/L	0.00062 ND	0.0022 ND	0.00030 ND	0.0032 ND	0.0021 ND	0.0013 ND	0.01	0.2	Human Health - Ingestion	--
	Aldrin	µg/L	0.0055 UJ	0.0017 UJ	0.00020 U	0.00020 U	0.0014 U	0.00067 U	0.0000077	0.00005	Human Health - Fish Consumption	--
	alpha-BHC (α-BHC)	µg/L	0.0025 UJ	0.0020 UJ	0.0027 UJ	0.00019 U	0.00041 U	0.00083 U	--	0.0049	Human Health - Fish Consumption	--
	beta-BHC (β-BHC)	µg/L	0.00096 U	0.00094 U	0.0012 UJ	0.0005 U	0.00047 U	0.00071 U	--	0.017	Human Health - Fish Consumption	--
	delta-BHC (δ-BHC)	µg/L	0.027 U	0.024 UJ	0.00020 U	0.0024 U	0.00020 U	0.0013 U	--	0.037	Human Health - Ingestion	--
	gamma-BHC (γ-BHC, Lindane)	µg/L	0.015 UJ	0.0130 UJ	0.00600 UJ	0.0032 U	0.00022 U	0.0028 U	--	0.052	Human Health - Ingestion	--
	alpha-Chlordane	µg/L	0.0014 UJ	0.00034 U	0.00017 U	0.0027 U	0.00017 U	0.00051 U	0.000081	--	--	--
	beta-Chlordane	µg/L	0.00043 U	0.00042 U	0.00021 U	0.00021 U	0.00021 U	0.00025 U	0.000081	--	--	--
	Total Chlordane <sup>(6)</sup>	µg/L	0.0014 ND	0.00042 ND	0.00021 ND	0.0027 ND	0.00021 ND	0.00057 ND	0.000081	0.00081	Human Health - Fish Consumption	--
	Dieldrin	µg/L	0.00047 U	0.00046 U	0.00023 U	0.0032 U	0.00023 U	0.00055 U	--	0.000054	Human Health - Fish Consumption	--
	Endosulfan I	µg/L	0.00031 U	0.00030 U	0.00015 U	0.00074 U	0.00015 U	0.00027 U	--	0.051	Ecological	--
	Endosulfan II	µg/L	0.00041 U	0.00040 U	0.00020 U	0.00020 U	0.00020 U	0.00024 U	--	0.051	Ecological	--
	Endosulfan Sulfate	µg/L	0.0018 U	0.0017 U	0.00084 U	0.00084 U	0.00084 U	0.0010 U	--	89	Human Health - Fish Consumption	--
	Endrin	µg/L	0.00037 U	0.00036 U	0.00018 U	0.00018 U	0.00025 U	0.00023 U	--	0.036	Ecological	--
	Endrin Aldehyde	µg/L	0.00045 U	0.0055 UJ	0.00022 U	0.0029 U	0.0017 U	0.0013 U	--	--	--	--
	Endrin Ketone	µg/L	0.00058 U	0.00056 U	0.00028 U	0.00028 U	0.00028 U	0.00033 U	--	0.3	Human Health - Fish Consumption	--
	Heptachlor	µg/L	0.0046 U	0.0038 UJ	0.00013 U	0.0022 U	0.0013 U	0.0011 U	--	0.000079	Human Health - Fish Consumption	--
	Heptachlor Epoxide	µg/L	0.0015 U	0.0014 U	0.00069 U	0.00069 U	0.00069 U	0.00083 U	--	0.000039	Human Health - Fish Consumption	--
	Methoxychlor	µg/L	0.00045 U	0.0014 UJ	0.00022 U	0.00022 U	0.00022 U	0.00032 U	--	0.03	Ecological	--
	Toxaphene	µg/L	0.039 U	0.038 U	0.019 U	0.019 U	0.019 U	0.023 U	--	0.0002	Ecological	--

**Table A4-5**  
**2015/2016 Stormwater Sample Results**  
**Outfall Basin 17, Basin-Scale Monitoring**

		Outfall 17					Geometric Mean Concentration <sup>(2)</sup>	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve <sup>(5)</sup>
		Stormwater Grab Samples <sup>(1)</sup>						ROD Cleanup Levels	JSCS SLVs	
Class	Analyte	Units	17_16SW (Outfall)		17_17SW (Manhole AAT596)					
			Event 1 W151174-01	Event 1 DUP W151174-02	Event 2 W151074-01	Event 3 W151213-01	Event 4 W16C092-09			
			9/25/2015	9/25/2015	10/10/2015	10/31/2105	3/9/2016			

Notes:

- DEQ = Oregon Department of Environmental Quality
- DUP = field duplicate sample
- NA = not analyzed or not applicable
- ND = not detected
- J = Result is an estimate
- J+ = Detection of analyte is considered a high estimate.
- U = The analyte was not detected above the reported sample quantification limit.
- UJ = Analyte was not detected, and the detection limit is an estimated value.
- = not established
- µg/L = micrograms per liter
- mg/L = milligrams per liter

<sup>(1)</sup> Samplings locations are shown on Figure A-3 of main report. Samples were collected at the outfall for first three events (2015 samples), and at the designated alternative location (manhole AAT596, outgoing 90-inch pipe) for the final event (2016); both locations represent all of the Basin 17 drainage area.

<sup>(2)</sup> For the purposes of calculating the geometric mean concentrations, non-detect results are set to the value of the method reporting limit, with the exception of total PAHs and total PCB congeners. This assumption is conservative and may overestimate the true geometric mean concentration. For total PAHs and total PCB congeners, results including one or more detections of an individual constituent were calculated by assigning a value of zero to non-detected concentrations. For results in which no individual constituents were detected, the total concentration is reported as the highest MRL among the individual constituents. Duplicate sample results were averaged with the corresponding primary sample results, and the average concentration for that event was then included as a single value in the geometric mean calculations.

<sup>(3)</sup> Portland Harbor screening criteria are the cleanup levels for surface water specified in Table 17 the Portland Harbor Record of Decision (ROD; EPA, 2017), where established. Where no cleanup level for a constituent is established in the ROD, the screening level value (SLV) from the Portland Harbor Joint Source Control Strategy (DEQ/EPA, 2005) is used, if established.

<sup>(4)</sup> Endpoint = source of the JSCS SLV to be used for initial upland source control screening evaluations (DEQ/EPA, 2005):

- Human Health - Fish Consumption* = SLVs for chemicals in water taken up by fish for human consumption; these SLVs represent EPA's National Recommended Water Quality Criteria (NRWQC) values. If no NRWQC values are available, then DEQ's ambient water quality criteria (AWQC) values are listed for the constituent.
- Human Health - Ingestion* = SLVs for chemicals in water for human ingestion; these SLVs represent the most conservative value between EPA's Maximum Contaminant Levels (MCLs) and Region 9 Preliminary Remediation Goals (PRGs).
- Ecological* = SLVs for chemicals in water for ecological exposure; these SVLs represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent. If no AWQC values are available, then Oak Ridge National Laboratory Tier II SCV Technology Benchmark values are listed for the constituent.

<sup>(5)</sup> Range below typical concentrations in graphs developed by DEQ of concentrations of selected contaminants detected in stormwater from a larger number of industrial sites in Portland Harbor to assist with data evaluation [Appendix E to *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (DEQ, 2009, updated December 2015)].

<sup>(6)</sup> For purposes of calculating total PAHs, total PCB congeners, total DDx and total Chlordane values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

<sup>(7)</sup> Refer to Table A4-6 for individual PCB congener results.

**bold** = Concentration exceeds the Portland Harbor screening criterion.

**Table A4-6**  
**2015/2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 17, Basin-Scale Monitoring**

IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Outfall 17 Stormwater Grab Samples <sup>(2)</sup>				
			Event 1	Event 1 DUP	Event 2	Event 3	Event 4
			W151174-01 9/25/2015	W151174-02 9/25/2015	W15J074-01 10/10/2015	W15J213-01 10/31/2105	W16C092-09 3/9/2016
Polychlorinated Biphenyl Congeners (PCBs) (EPA 1668A)							
PCB 1	2-MoCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 2	3-MoCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 3	4-MoCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 4	2,2-DiCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 5	2,3-DiCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 6	2,3'-DiCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 7	2,4-DiCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 8	2,4'-DiCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 9	2,5-DiCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 10	2,6-DiCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 11	3,3'-DiCB	µg/L	0.002510 U	0.002510 U	0.002400 U	0.002540 U	0.002420 U
PCB 12/13	3,4-DiCB + 3,4'-DiCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 14	3,5-DiCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 15	4,4'-DiCB	µg/L	0.000338 U	0.000338 U	0.000323 U	0.000342 U	0.000326 U
PCB 16	2,2',3-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 17	2,2',4-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 18/30	2,2',5-TrCB + 2,4,6-TrCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 19	2,2',6-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 20/28	2,3,3'-TrCB + 2,4,4'-TrCB	µg/L	0.001320 U	0.001320 U	0.001260 U	0.001340 U	0.001270 U
PCB 21/33	2,3,4-TrCB + 2,3,4'-TrCB	µg/L	0.001380 U	0.001380 U	0.001320 U	0.001400 U	0.001330 U
PCB 22	2,3,4'-TrCB	µg/L	0.000972 U	0.000974 U	0.000930 U	0.000983 U	0.000939 U
PCB 23	2,3,5-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 24	2,3,6-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 25	2,3',4-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 26/29	2,3',5-TrCB + 2,4,5-TrCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 27	2,3',6-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 31	2,4',5-TrCB	µg/L	0.001330 U	0.001330 U	0.001270 U	0.001350 U	0.001280 U
PCB 32	2,4',6-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 34	2,3',5-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 35	3,3',4-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 36	3,3',5-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 37	3,4,4'-TrCB	µg/L	0.000542 U	0.000543 U	0.000519 U	0.000549 U	0.000524 U
PCB 38	3,4,5-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 39	3,4',5-TrCB	µg/L	0.000256 U	0.000256 U	0.000245 U	0.000259 U	0.000247 U
PCB 40/41/71	2,2',3,3'-TeCB + 2,2',3,4'-TeCB + 2,3',4',6-TeCB	µg/L	0.001540 U	0.001540 U	0.001470 U	0.001550 U	0.001480 U
PCB 42	2,2',3,4'-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 43/73	2,2',3,5'-TeCB + 2,3',5',6-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 44/47/65	2,2',3,5'-TeCB + 2,2',4,4'-TeCB + 2,3,5,6-TeCB	µg/L	0.001540 U	0.001540 U	0.001470 U	0.001550 U	0.001480 U
PCB 45/51	2,2',3,6-TeCB + 2,2',4,6'-TeCB	µg/L	0.001020 U	0.001030 U	0.000979 U	0.001040 U	0.000988 U
PCB 46	2,2',3,6'-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 48	2,2',4,5-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 49/69	2,2',4,5'-TeCB + 2,3',4,6-TeCB	µg/L	0.001020 U	0.001030 U	0.000979 U	0.001040 U	0.000988 U
PCB 50/53	2,2',4,6-TeCB + 2,2',5,6'-TeCB	µg/L	0.001020 U	0.001030 U	0.000979 U	0.001040 U	0.000988 U
PCB 52	2,2',5,5'-TeCB	µg/L	0.001580 U	0.001580 U	0.001510 U	0.001590 U	0.001520 U
PCB 54	2,2',6,6'-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 55	2,3,3',4-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 56	2,3,3',4'-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 57	2,3,3',5-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 58	2,3,3',5'-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 59/62/75	2,3,3',6-TeCB + 2,3,4,6-TeCB + 2,4,4',6-TeCB	µg/L	0.001540 U	0.001540 U	0.001470 U	0.001550 U	0.001480 U
PCB 60	2,3,4,4'-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 61/70/74/76	2,3,4,5-TeCB + 2,3',4',5-TeCB + 2,4,4',5-TeCB + 2',3,4,5-TeCB	µg/L	0.002050 U	0.002050 U	0.001960 U	0.002070 U	0.001980 U
PCB 63	2,3,4',5-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 64	2,3,4',6-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 66	2,3',4,4'-TeCB	µg/L	0.000860 U	0.000861 U	0.000822 U	0.000870 U	0.000830 U
PCB 67	2,3',4,5-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 68	2,3',4,5'-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 72	2,3',5,5'-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 77	3,3',4,4'-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 78	3,3',4,5-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 79	3,3',4,5'-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 80	3,3',5,5'-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 81	3,4,4',5-TeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 82	2,2',3,3',4-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 83	2,2',3,3',5-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 84	2,2',3,3',6-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 85/116/117	2,2',3,4,4'-PeCB + 2,3,4,5,6-PeCB + 2,3',4',5,6-PeCB	µg/L	0.001540 U	0.001540 U	0.001470 U	0.001550 U	0.001480 U
PCB 86/87/97/108/119/125	2,2',3,4,5-PeCB + 2,2',3,4,5'-PeCB + 2,2',3',4,5-PeCB + 2,3,3',4,5'-PeCB + 2,3',4,4',6-PeCB + 2',3,4,5,6'-PeCB	µg/L	0.00307 U	0.00308 U	0.002940 U	0.00311 U	0.00296 U
PCB 88/91	2,2',3,4,6-PeCB + 2,2',3,4',6-PeCB	µg/L	0.001020 U	0.001030 U	0.000979 U	0.001040 U	0.000988 U
PCB 89	2,2',3,4,6'-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 90/101/113	2,2',3,4',5-PeCB + 2,2',4,5,5'-PeCB + 2,3,3',5',6-PeCB	µg/L	0.001540 U	0.00154 U	0.001470 U	0.001550 U	0.001480 U
PCB 92	2,2',3,5,5'-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 93/98/100/102	2,2',3,5,6-PeCB + 2,2',3',4,6-PeCB + 2,2',4,4',6-PeCB + 2,2',4,5,6'-PeCB	µg/L	0.002050 U	0.002050 U	0.001960 U	0.002070 U	0.001980 U
PCB 94	2,2',3,5,6'-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U

**Table A4-6**  
**2015/2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 17, Basin-Scale Monitoring**

IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Outfall 17				
			Stormwater Grab Samples <sup>(2)</sup>				
			Event 1 W151174-01 9/25/2015	Event 1 DUP W151174-02 9/25/2015	Event 2 W15J074-01 10/10/2015	Event 3 W15J213-01 10/31/2105	Event 4 W16C092-09 3/9/2016
PCB 95	2,2',3,5',6-PeCB	µg/L	0.000972 U	0.00097 U	0.000930 U	0.000983 U	0.000939 U
PCB 96	2,2',3,6,6'-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 99	2,2',4,4',5-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 103	2,2',4,5',6-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 104	2,2',4,6,6'-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 105	2,3,3',4,4'-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 106	2,3,3',4,5'-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 107/124	2,3,3',4,5'-PeCB + 2',3,4,5,5'-PeCB	µg/L	0.001020 U	0.001030 U	0.000979 U	0.001040 U	0.000988 U
PCB 109	2,3,3',4,6-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 110/115	2,3,3',4,6-PeCB + 2,3,4,4',6-PeCB	µg/L	0.001020 U	0.00103 U	0.000979 U	0.001160 U	0.000988 U
PCB 111	2,3,3',5,5'-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 112	2,3,3',5,6-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 114	2,3,4,4',5-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 118	2,3',4,4',5-PeCB	µg/L	0.000655 U	0.000656 U	0.000627 U	0.009690 U	0.000632 U
PCB 120	2,3',4,5,5'-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 121	2,3',4,5',6-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 122	2,3,3',4,5-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 123	2,3,4,4',5-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 126	3,3',4,4',5-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 127	3,3',4,5,5'-PeCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 128/166	2,2',3,3',4,4'-HxCB + 2,3,4,4',5,6-HxCB	µg/L	0.00102 U	0.00103 U	0.000979 U	0.00104 U	0.00099 U
PCB 129/138/163	2,2',3,3',4,5-HxCB + 2,2',3,4,4',5'-HxCB + 2,3,3',4',5,6-HxCB	µg/L	0.00154 U	0.00154 U	0.001470 U	0.001800 U	0.001480 U
PCB 130	2,2',3,3',4,5'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 131	2,2',3,3',4,6-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 132	2,2',3,3',4,6'-HxCB	µg/L	0.000512 U	0.00051 U	0.000490 U	0.000592 U	0.000494 U
PCB 133	2,2',3,3',5,5'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 134/143	2,2',3,3',5,6-HxCB + 2,2',3,4,5,6'-HxCB	µg/L	0.001020 U	0.001030 U	0.000979 U	0.001040 U	0.000988 U
PCB 135/151	2,2',3,3',5,6'-HxCB + 2,2',3,5,5',6'-HxCB	µg/L	0.001020 U	0.00103 U	0.000979 U	0.001040 U	0.000988 U
PCB 136	2,2',3,3',6,6'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 137	2,2',3,4,4',5-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 139/140	2,2',3,4,4',6-HxCB + 2,2',3,4,4',6'-HxCB	µg/L	0.001020 U	0.001030 U	0.000979 U	0.001040 U	0.000988 U
PCB 141	2,2',3,4,5,5'-HxCB	µg/L	0.000512 U	0.00051 U	0.000490 U	0.000518 U	0.000494 U
PCB 142	2,2',3,4,5,6-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 144	2,2',3,4,5',6-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 145	2,2',3,4,6,6'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 146	2,2',3,4',5,5'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 147/149	2,2',3,4',5,6-HxCB + 2,2',3,4',5',6-HxCB	µg/L	0.001020 U	0.00103 U	0.000979 U	0.001170 U	0.000988 U
PCB 148	2,2',3,4',5,6'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 150	2,2',3,4',6,6'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 152	2,2',3,5,6,6'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 153/168	2,2',4,4',5,5'-HxCB + 2,3',4,4',5',6-HxCB	µg/L	0.001020 U	0.00103 U	0.000979 U	0.001170 U	0.000988 U
PCB 154	2,2',4,4',5,6'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 155	2,2',4,4',6,6'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 156/157	2,3,3',4,4',5-HxCB + 2,3,3',4,4',5'-HxCB	µg/L	0.001020 U	0.001030 U	0.000979 U	0.001040 U	0.000988 U
PCB 158	2,3,3',4,4',6-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 159	2,3,3',4,5,5'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 160	2,3,3',4,5,6-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 161	2,3,3',4,5',6-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 162	2,3,3',4',5,5'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 164	2,3,3',4',5',6-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 165	2,3,3',5,5',6-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 167	2,3',4,4',5,5'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 169	3,3',4,4',5,5'-HxCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 170	2,2',3,3',4,4',5-HpCB	µg/L	0.000512 U	0.00051 U	0.000490 U	0.000518 U	0.000494 U
PCB 171/173	2,2',3,3',4,4',6-HpCB + 2,2',3,3',4,5,6-HpCB	µg/L	0.001020 U	0.001030 U	0.000979 U	0.001040 U	0.000988 U
PCB 172	2,2',3,3',4,5,5'-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 174	2,2',3,3',4,5,6'-HpCB	µg/L	0.000512 U	0.00051 U	0.000490 U	0.000518 U	0.000494 U
PCB 175	2,2',3,3',4,5',6-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 176	2,2',3,3',4,6,6'-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 177	2,2',3,3',4',5,6-HpCB	µg/L	0.000512 U	0.00051 U	0.000490 U	0.000518 U	0.000494 U
PCB 178	2,2',3,3',5,5',6-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 179	2,2',3,3',5,6,6'-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 180/193	2,2',3,4,4',5,5'-HpCB + 2,3,3',4',5,5',6-HpCB	µg/L	0.001020 U	0.00103 U	0.000979 U	0.001040 U	0.000988 U
PCB 181	2,2',3,4,4',5,6-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 182	2,2',3,4,4',5,6'-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 183/185	2,2',3,4,4',5',6-HpCB + 2,2',3,4,4',5,6'-HpCB	µg/L	0.001020 U	0.00103 U	0.000979 U	0.001040 U	0.000988 U
PCB 184	2,2',3,4,4',6,6'-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 186	2,2',3,4,5,6,6'-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 187	2,2',3,4',5,5',6-HpCB	µg/L	0.000512 U	0.00051 U	0.000490 U	0.000518 U	0.000494 U
PCB 188	2,2',3,4',5,6,6'-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 189	2,3,3',4,4',5,5'-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 190	2,3,3',4,4',5,6-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 191	2,3,3',4,4',5',6-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 192	2,3,3',4,5,5',6-HpCB	µg/L	0.000512 U	0.000513 U	0.000490 U	0.000518 U	0.000494 U
PCB 194	2,2',3,3',4,4',5,5'-OxCB	µg/L	0.000768 U	0.00077 U	0.000734 U	0.000776 U	0.000741 U
PCB 195	2,2',3,3',4,4',5,6-OxCB	µg/L	0.000768 U	0.000769 U	0.000734 U	0.000776 U	0.000741 U
PCB 196	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000768 U	0.000769 U	0.000734 U	0.000776 U	0.000741 U
PCB 197/200	2,2',3,3',4,4',6,6'-OxCB + 2,2',3,3',4,5,6,6'-OxCB	µg/L	0.00154 U	0.00154 U	0.00147 U	0.00155 U	0.00148 U

**Table A4-6**  
**2015/2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 17, Basin-Scale Monitoring**

			<b>Outfall 17</b>				
			<b>Stormwater Grab Samples<sup>(2)</sup></b>				
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 1 DUP	Event 2	Event 3	Event 4
			W151174-01 9/25/2015	W151174-02 9/25/2015	W15J074-01 10/10/2015	W15J213-01 10/31/2105	W16C092-09 3/9/2016
PCB 198/199	2,2',3,3',4,5,5',6-OcCB + 2,2',3,3',4,5,5',6'-OcCB	µg/L	0.001540 U	0.00154 U	0.001470 U	0.001550 U	0.001480 U
PCB 201	2,2',3,3',4,5',6,6'-OcCB	µg/L	0.000768 U	0.000769 U	0.000734 U	0.000776 U	0.000741 U
PCB 202	2,2',3,3',5,5',6,6'-OcCB	µg/L	0.000768 U	0.000769 U	0.000734 U	0.000776 U	0.000741 U
PCB 203	2,2',3,4,4',5,5',6-OcCB	µg/L	0.000768 U	0.000769 U	0.000734 U	0.000776 U	0.000741 U
PCB 204	2,2',3,4,4',5,6,6'-OcCB	µg/L	0.000768 U	0.000769 U	0.000734 U	0.000776 U	0.000741 U
PCB 205	2,3,3',4,4',5,5',6-OcCB	µg/L	0.000768 U	0.000769 U	0.000734 U	0.000776 U	0.000741 U
PCB 206	2,2',3,3',4,4',5,5',6-NoCB	µg/L	0.000768 U	0.000769 U	0.000734 U	0.000776 U	0.000741 U
PCB 207	2,2',3,3',4,4',5,6,6'-NoCB	µg/L	0.000768 U	0.000769 U	0.000734 U	0.000776 U	0.000741 U
PCB 208	2,2',3,3',4,5,5',6,6'-NoCB	µg/L	0.000768 U	0.000769 U	0.000734 U	0.000776 U	0.000741 U
PCB 209	Decachlorobiphenyl	µg/L	0.000768 U	0.000769 U	0.000734 U	0.000776 U	0.000741 U
	Total Monochlorobiphenyls	µg/L	ND	ND	ND	ND	ND
	Total Dichlorobiphenyls	µg/L	ND	ND	ND	ND	ND
	Total Trichlorobiphenyls	µg/L	ND	ND	ND	ND	ND
	Total Tetrachlorobiphenyls	µg/L	ND	ND	ND	ND	ND
	Total Pentachlorobiphenyls	µg/L	ND	ND	ND	0.00212	ND
	Total Hexachlorobiphenyls	µg/L	ND	ND	ND	0.00474	ND
	Total Heptachlorobiphenyls	µg/L	ND	ND	ND	ND	ND
	Total Octachlorobiphenyls	µg/L	ND	ND	ND	ND	ND
	Total Nonachlorobiphenyls	µg/L	ND	ND	ND	ND	ND
	Total Decachlorobiphenyls	µg/L	ND	ND	ND	ND	ND
	Total PCBs <sup>(3)</sup>	µg/L	ND	ND	ND	0.00686	ND

**Notes:**

MoCB = Monochlorobiphenyl

DiCB = Dichlorobiphenyl

TriCB = Trichlorobiphenyl

TeCB = Tetrachlorobiphenyl

PeCB = Pentachlorobiphenyl

HeCB = Hexachlorobiphenyl

HpCB = Heptachlorobiphenyl

OcCB = Octachlorobiphenyl

NoCB = Nonachlorobiphenyl

-- = No JSCS screening level available.

U = The analyte was not detected above the reported sample quantification limit.

µg/L = Micrograms per liter

ND = Not detected

DUP = Duplicate

<sup>(1)</sup> IUPAC = International Union of Pure and Applied Chemistry.<sup>(2)</sup> Samplings locations are shown on Figure A-3 of main report. Samples were collected at the outfall for first three events (2015 samples), and at the designated alternative location (manhole AAT596, outgoing 90-inch pipe) for the final event (2016); both locations represent all of the Basin 17 drainage area.<sup>(3)</sup> For purposes of calculating total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

**Table A4-7**  
**2016 Stormwater Sample Results**  
**Outfall Basin 19, Basin-Scale Monitoring Location (19\_SW3)**

Class	Analyte	Units	Outfall Basin 19, Location 19_SW3 <sup>(1)</sup> Composite Stormwater Samples					Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(5)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve? <sup>(6)</sup>
			Event 1 W16C101-01	Event 1 DUP W16C101-02	Event 2 W16I160-01	Event 3 W16J118-01	Event 4 W16K060-01			JCS SLVs		
			3/9/2016	3/9/2016	9/17/2016	10/13/2016	11/5/2016			SLV	Endpoint <sup>(4)</sup>	
Field Measurements												
	Conductivity	umhos/cm	NA	NA	NA	NA	NA	NA	--	--	--	--
	pH	units	NA	NA	NA	NA	NA	NA	--	--	--	--
	Temperature	Deg. C	NA	NA	NA	NA	NA	NA	--	--	--	--
Total Suspended Solids (SM 2540D)												
	TSS	mg/L	59	59	30	28	48	39	--	--	--	Yes
Total Metals (EPA 200.8)												
	Arsenic	µg/L	<b>1.31</b>	<b>1.33</b>	<b>2.28</b>	<b>0.824</b>	<b>1.51</b>	<b>1.39</b>	0.018	0.045	Human Health - Ingestion	Yes
	Cadmium	µg/L	<b>0.127</b>	<b>0.130</b>	<b>0.324</b>	<b>0.111</b>	<b>0.152</b>	<b>0.163</b>	--	0.094	Ecological	Yes
	Chromium	µg/L	3.60	3.63	3.56	2.23 J	2.96	3.04	100	100	Human Health - Ingestion	Yes
	Copper	µg/L	<b>9.47</b>	<b>9.48</b>	<b>52.4</b>	<b>8.64</b>	<b>11.4</b>	<b>14.9</b>	2.74	2.7	Ecological	Yes
	Lead	µg/L	<b>12.6</b>	<b>12.9</b>	<b>27.1</b>	<b>8.18</b>	<b>10.8</b>	<b>13.2</b>	--	0.54	Ecological	Yes
	Mercury (WPCLSOP M-10)	µg/L	0.0175	0.0223	0.0808 J-	0.0151	0.0161	0.0250	--	0.77	Ecological	Yes
	Nickel	µg/L	2.20	2.22	4.11	1.55	2.02	2.31	--	16	Ecological	Yes
	Silver	µg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	--	0.12	Ecological	Yes
	Zinc	µg/L	<b>114</b>	<b>116</b>	<b>250</b>	<b>126</b>	<b>159</b>	<b>155</b>	36.5	36	Ecological	Yes
Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270-SIM)												
	Acenaphthene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	--	0.2	Human Health - Ingestion	--
	Acenaphthylene	µg/L	0.036	0.034	0.02 U	0.038	0.02	0.027	--	0.2	Human Health - Ingestion	--
	Anthracene	µg/L	0.085	0.081	0.033 U	0.086	0.055	0.060	--	0.2	Human Health - Ingestion	--
	Benzo(a)anthracene	µg/L	<b>0.046</b>	<b>0.043</b>	0.022 UJ-	<b>0.044</b>	<b>0.033</b>	<b>0.035</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(a)pyrene	µg/L	<b>0.050</b>	<b>0.048</b>	<b>0.027</b> J-	<b>0.051</b>	<b>0.037</b>	<b>0.040</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Benzo(b)fluoranthene	µg/L	<b>0.076</b>	<b>0.073</b>	<b>0.044</b> J-	<b>0.089</b>	<b>0.065</b>	<b>0.066</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(g,h,i)perylene	µg/L	0.062	0.059	0.047	0.065	0.053	0.056	--	0.2	Human Health - Ingestion	--
	Benzo(k)fluoranthene	µg/L	<b>0.021</b>	<b>0.020</b>	<b>0.012</b>	<b>0.026</b>	0.016	<b>0.018</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Chrysene	µg/L	<b>0.061</b>	<b>0.054</b>	<b>0.03</b> J-	<b>0.059</b>	<b>0.043</b>	<b>0.046</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Dibenzo(a,h)anthracene	µg/L	0.010 U	0.010 U	0.010 UJ-	0.010 U	0.010 U	0.010 U	0.00012	0.018	Human Health - Fish Consumption	--
	Fluoranthene	µg/L	0.12	0.11	0.063	0.1	0.078	0.087	--	0.2	Human Health - Ingestion	--
	Fluorene	µg/L	0.020 U	0.020 U	0.020 U	0.022	0.020 U	0.020	--	0.2	Human Health - Ingestion	--
	Indeno(1,2,3-cd)pyrene	µg/L	<b>0.030</b>	<b>0.030</b>	0.020 UJ-	<b>0.042</b>	<b>0.028</b>	<b>0.029</b>	0.0012	0.018	Human Health - Fish Consumption	--
	1-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 UJ-	0.040 U	0.040 U	0.040 U	--	--	--	--
	2-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	--	0.2	Human Health - Ingestion	--
	Naphthalene	µg/L	0.040 U	0.041	0.060 U	0.040 U	0.040 U	0.044	12	0.2	Human Health - Ingestion	--
	Phenanthrene	µg/L	0.049	0.046	0.054	0.054	0.049	0.051	--	0.2	Human Health - Ingestion	--
	Pyrene	µg/L	0.180	0.16	0.087	0.13	0.11	0.12	--	0.2	Human Health - Ingestion	--
	Total PAHs <sup>(6)</sup>	µg/L	0.82	0.80	0.36	0.81	0.59	0.61	--	--	--	Yes

**Table A4-7**  
**2016 Stormwater Sample Results**  
**Outfall Basin 19, Basin-Scale Monitoring Location (19\_SW3)**

Class	Analyte	Units	Outfall Basin 19, Location 19_SW3 <sup>(1)</sup> Composite Stormwater Samples					Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve? <sup>(5)</sup>
			Event 1 W16C101-01	Event 1 DUP W16C101-02	Event 2 W16I160-01	Event 3 W16J118-01	Event 4 W16K060-01			JSCS SLVs		
			3/9/2016	3/9/2016	9/17/2016	10/13/2016	11/5/2016			SLV	Endpoint <sup>(4)</sup>	
Phthalates (EPA 8270-SIM)												
	Bis(2-ethylhexyl)phthalate	µg/L	<b>2.1</b>	<b>1.7</b>	<b>3.2</b> J+	<b>2.3</b> J+	<b>1.8</b>	<b>2.2</b>	0.2	2.2	Human Health - Fish Consumption	Yes
	Butylbenzylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Di-n-butylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Di-n-octylphthalate	µg/L	0.50 U	0.50 U	0.51 J+	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Diethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Dimethylphthalate	µg/L	2.8	2.3	<b>12</b>	0.50 U	0.50 U	1.7	--	3	Ecological	--
Polychlorinated Biphenyl (PCB) Congeners												
	Total PCB Congeners <sup>(6)(7)</sup>	µg/L	0.00297 ND	<b>0.000816</b>	<b>0.288</b>	0.00300 ND	0.00302 ND	<b>0.00838</b>	0.0000064	0.000064	Human Health - Fish Consumption	Yes

## Notes:

DEQ = Oregon Department of Environmental Quality

NA = not analyzed

ND = not detected

DUP = field duplicate sample

J = Result is an estimate.

J+ = Detection of analyte is considered a high estimate.

U = The analyte was not detected above the reported sample quantification limit.

UJ = The analyte was not detected, and the detection limit is considered an estimate.

-- = not established

µg/L = micrograms per liter

mg/L = milligrams per liter

<sup>(1)</sup> Sampling location is shown on Figure A-4 of main report. Samples were collected at manhole AAP918 (outgoing 42-inch pipe) and represent all of the Basin 19 drainage area.

<sup>(2)</sup> For the purposes of calculating the geometric mean concentrations, non-detect results are set to the value of the method reporting limit, with the exception of total PAHs and total PCB congeners. This assumption is conservative and may overestimate the true geometric mean concentration. For total PAHs and total PCB congeners, results including one or more detections of an individual constituent were calculated by assigning a value of zero to non-detected concentrations. For results in which no individual constituents were detected, the total concentration is reported as the highest MRL among the individual constituents. Duplicate sample results were averaged with the corresponding primary sample results, and the average concentration for that event was then included as a single value in the geometric mean calculations.

<sup>(3)</sup> Portland Harbor screening criteria are the cleanup levels for surface water specified in Table 17 the Portland Harbor Record of Decision (ROD; EPA, 2017), where established. Where no cleanup level for a constituent is established in the ROD, the screening level value (SLV) from the Portland Harbor Joint Source Control Strategy (DEQ/EPA, 2005) is used, if established.

<sup>(4)</sup> Endpoint = source of the JSCS SLV to be used for initial upland source control screening evaluations (DEQ/EPA, 2005):

*Human Health - Fish Consumption* = SLVs for chemicals in water taken up by fish for human consumption; these SLVs represent EPA's National Recommended Water Quality Criteria (NRWQC) values. If no NRWQC values are available, then DEQ's ambient water quality criteria (AWQC) values are listed for the constituent.

*Human Health - Ingestion* = SLVs for chemicals in water for human ingestion; these SLVs represent the most conservative value between EPA's Maximum Contaminant Levels (MCLs) and Region 9 Preliminary Remediation Goals (PRGs).

*Ecological* = SLVs for chemicals in water for ecological exposure; these SLVs represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent. If no AWQC values are available, then Oak Ridge National Laboratory Tier II SCV Technology Benchmark values are listed for the constituent.

<sup>(5)</sup> Range below typical concentrations in graphs developed by DEQ of concentrations of selected contaminants detected in stormwater from a larger number of industrial sites in Portland Harbor to assist with data evaluation [Appendix E to *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (DEQ, 2009, updated December 2015)].

<sup>(6)</sup> For purposes of calculating total PAH values and total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

<sup>(7)</sup> Refer to Table A4-8 for individual PCB congener results.

**bold** = Concentration exceeds the Portland Harbor screening criterion.

**Table A4-8**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 19, Basin-Scale Monitoring Location (19\_SW3)**

		Outfall Basin 19, Location 19_SW3 <sup>(2)</sup>					
		Composite Stormwater Samples					
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 1 DUP	Event 2	Event 3	Event 4
			W16C101-01 3/9/2016	W16C101-02 3/9/2016	W16I160-01 9/17/2016	W16J118-01 10/13/2016	W16K060-01 11/5/2016
<b>Polychlorinated Biphenyl Congeners (PCBs) (EPA 1668A)</b>							
PCB 1	2-MoCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 2	3-MoCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 3	4-MoCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 4	2,2'-DiCB	µg/L	0.000247 U	0.000249 U	0.002180	0.000250 U	0.000251 U
PCB 5	2,3'-DiCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 6	2,3'-DiCB	µg/L	0.000247 U	0.000249 U	0.000376	0.000250 U	0.000251 U
PCB 7	2,4'-DiCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 8	2,4'-DiCB	µg/L	0.000247 U	0.000249 U	0.002000	0.000250 U	0.000251 U
PCB 9	2,5'-DiCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 10	2,6'-DiCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 11	3,3'-DiCB	µg/L	0.00242 U	0.00244 U	0.002610 U	0.002450 U	0.002460 U
PCB 12/13	3,4'-DiCB + 3,4'-DiCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 14	3,5'-DiCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 15	4,4'-DiCB	µg/L	0.000327 U	0.000328 U	0.002790	0.000330 U	0.000332 U
PCB 16	2,2',3'-TriCB	µg/L	0.000247 U	0.000249 U	0.005820	0.000250 U	0.000251 U
PCB 17	2,2',4'-TriCB	µg/L	0.000247 U	0.000249 U	0.005810	0.000250 U	0.000251 U
PCB 18/30	2,2',5'-TriCB + 2,4,6'-TriCB	µg/L	0.000495 U	0.000497 U	0.012200	0.000500 U	0.000503 U
PCB 19	2,2',6'-TriCB	µg/L	0.000247 U	0.000249 U	0.001690 J	0.000250 U	0.000251 U
PCB 20/28	2,3',3'-TriCB + 2,4,4'-TriCB	µg/L	0.00128 U	0.00128 U	0.016600	0.001290 U	0.001300 U
PCB 21/33	2,3,4'-TriCB + 2',3,4'-TriCB	µg/L	0.00134 U	0.00134 U	0.008240	0.001350 U	0.001360 U
PCB 22	2,3,4'-TriCB	µg/L	0.00094 U	0.000945 U	0.005760	0.000949 U	0.000956 U
PCB 23	2,3,5'-TriCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 24	2,3,6'-TriCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 25	2,3',4'-TriCB	µg/L	0.000247 U	0.000249 U	0.001190	0.000250 U	0.000251 U
PCB 26/29	2,3',5'-TriCB + 2,4,5'-TriCB	µg/L	0.000495 U	0.000497 U	0.002910	0.000500 U	0.000503 U
PCB 27	2,3',6'-TriCB	µg/L	0.000247 U	0.000249 U	0.000896	0.000250 U	0.000251 U
PCB 31	2,4',5'-TriCB	µg/L	0.00129 U	0.00129 U	0.014400	0.001300 U	0.001310 U
PCB 32	2,4',6'-TriCB	µg/L	0.000247 U	0.000249 U	0.003920	0.000250 U	0.000251 U
PCB 34	2',3,5'-TriCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 35	3,3',4'-TriCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 36	3,3',5'-TriCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 37	3,4,4'-TriCB	µg/L	0.000524 U	0.000816	0.004760	0.000530 U	0.000533 U
PCB 38	3,4,5'-TriCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 39	3,4,5'-TriCB	µg/L	0.000247 U	0.000249 U	0.000267 U	0.000250 U	0.000251 U
PCB 40/41/71	2,2',3,3'-TeCB + 2,2',3,4'-TeCB + 2,3',4',6'-TeCB	µg/L	0.00148 U	0.00149 U	0.007510	0.001500 U	0.001510 U
PCB 42	2,2',3,4'-TeCB	µg/L	0.000495 U	0.000497 U	0.003770	0.000500 U	0.000503 U
PCB 43/73	2,2',3,5'-TeCB + 2,3',5',6'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 44/47/65	2,2',3,5'-TeCB + 2,2',4,4'-TeCB + 2,3,5,6'-TeCB	µg/L	0.00148 U	0.001490 U	0.013000	0.001500 U	0.001510 U
PCB 45/51	2,2',3,6'-TeCB + 2,2',4,6'-TeCB	µg/L	0.000989 U	0.000995 U	0.002860	0.000999 U	0.001010 U
PCB 46	2,2',3,6'-TeCB	µg/L	0.000495 U	0.000497 U	0.000968	0.000500 U	0.000503 U
PCB 48	2,2',4,5'-TeCB	µg/L	0.000495 U	0.000497 U	0.003130	0.000500 U	0.000503 U
PCB 49/69	2,2',4,5'-TeCB + 2,3',4,6'-TeCB	µg/L	0.000989 U	0.000995 U	0.007220	0.000999 U	0.001010 U
PCB 50/53	2,2',4,6'-TeCB + 2,2',5,6'-TeCB	µg/L	0.000989 U	0.000995 U	0.001920	0.000999 U	0.001010 U
PCB 52	2,2',5,5'-TeCB	µg/L	0.00152 U	0.00153 U	0.014700	0.001540 U	0.001550 U
PCB 54	2,2',6,6'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 55	2,3,3',4'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 56	2,3,3',4'-TeCB	µg/L	0.000495 U	0.000497 U	0.004590	0.000500 U	0.000503 U
PCB 57	2,3,3',5'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 58	2,3,3',5'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 59/62/75	2,3,3',6'-TeCB + 2,3,4,6'-TeCB + 2,4,4',6'-TeCB	µg/L	0.00148 U	0.00149 U	0.001600 U	0.001500 U	0.001510 U
PCB 60	2,3,4,4'-TeCB	µg/L	0.000495 U	0.000497 U	0.002700	0.000500 U	0.000503 U
PCB 61/70/74/76	2,3,4,5'-TeCB + 2,3',4',5'-TeCB + 2,4,4',5'-TeCB + 2',3,4,5'-TeCB	µg/L	0.00198 U	0.00199 U	0.017700	0.002000 U	0.002010 U
PCB 63	2,3,4,5'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 64	2,3,4,6'-TeCB	µg/L	0.000495 U	0.000497 U	0.005640	0.000500 U	0.000503 U
PCB 66	2,3',4,4'-TeCB	µg/L	0.000831 U	0.000836 U	0.008490	0.000839 U	0.000845 U
PCB 67	2,3',4,5'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 68	2,3',4,5'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 72	2,3',5,5'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 77	3,3',4,4'-TeCB	µg/L	0.000495 U	0.000497 U	0.000952 J	0.000500 U	0.000503 U
PCB 78	3,3',4,5'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 79	3,3',4,5'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 80	3,3',5,5'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 81	3,4,4',5'-TeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 82	2,2',3,3',4'-PeCB	µg/L	0.000495 U	0.000497 U	0.001410	0.000500 U	0.000503 U
PCB 83	2,2',3,3',5'-PeCB	µg/L	0.000495 U	0.000497 U	0.000601	0.000500 U	0.000503 U
PCB 84	2,2',3,3',6'-PeCB	µg/L	0.000495 U	0.000497 U	0.003040	0.000500 U	0.000503 U
PCB 85/116/117	2,2',3,4,4'-PeCB + 2,3,4,4,5,6'-PeCB + 2,3,4',5,6'-PeCB	µg/L	0.00148 U	0.00149 U	0.001970	0.001500 U	0.001510 U
PCB 86/87/97/108/119/125	2,2',3,4,5'-PeCB + 2,2',3,4,5'-PeCB + 2,2',3',4,5'-PeCB + 2,3,3',4,5'-PeCB + 2,3',4,4',6'-PeCB + 2',3,4,5,6'-PeCB	µg/L	0.00297 U	0.00298 U	0.007510	0.00300 U	0.003020 U
PCB 88/91	2,2',3,4,6'-PeCB + 2,2',3,4',6'-PeCB	µg/L	0.000989 U	0.000995 U	0.001470	0.000999 U	0.001010 U
PCB 89	2,2',3,4,6'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 90/101/113	2,2',3,4',5'-PeCB + 2,2',4,5,5'-PeCB + 2,3,3',5',6'-PeCB	µg/L	0.00148 U	0.00149 U	0.009560	0.001500 U	0.001510 U
PCB 92	2,2',3,5,5'-PeCB	µg/L	0.000495 U	0.000497 U	0.001570	0.000500 U	0.000503 U
PCB 93/98/100/102	2,2',3,5,6'-PeCB + 2,2',3',4,6'-PeCB + 2,2',4,4',6'-PeCB + 2,2',4,5,6'-PeCB	µg/L	0.00198 U	0.00199 U	0.002130 U	0.002000 U	0.002010 U
PCB 94	2,2',3,5,6'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U

**Table A4-8**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 19, Basin-Scale Monitoring Location (19\_SW3)**

		Outfall Basin 19, Location 19_SW3 <sup>(2)</sup>					
		Composite Stormwater Samples					
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 1 DUP	Event 2	Event 3	Event 4
			W16C101-01 3/9/2016	W16C101-02 3/9/2016	W16I160-01 9/17/2016	W16I118-01 10/13/2016	W16K060-01 11/5/2016
PCB 95	2,2',3,5',6'-PeCB	µg/L	0.000940 U	0.00095 U	0.007440	0.000949 U	0.000956 U
PCB 96	2,2',3,6,6'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 99	2,2',4,4',5'-PeCB	µg/L	0.000495 U	0.000497 U	0.004460	0.000500 U	0.000503 U
PCB 103	2,2',4,5',6'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 104	2,2',4,6,6'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 105	2,3,3',4,4'-PeCB	µg/L	0.000495 U	0.000497 U	0.004710	0.000500 U	0.000503 U
PCB 106	2,3,3',4,5'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 107/124	2,3,3',4,5'-PeCB + 2,3,4,4',5,5'-PeCB	µg/L	0.000989 U	0.000995 U	0.001070 U	0.000999 U	0.001010 U
PCB 109	2,3,3',4,6'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 110/115	2,3,3',4,6'-PeCB + 2,3,4,4',6'-PeCB	µg/L	0.000989 U	0.00100 U	0.012100	0.000999 U	0.001010 U
PCB 111	2,3,3',5,5'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 112	2,3,3',5,6'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 114	2,3,4,4',5'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 118	2,3',4,4',5'-PeCB	µg/L	0.000633 U	0.000637 U	0.009930	0.000640 U	0.000644 U
PCB 120	2,3,4,5,5'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 121	2,3,4,5,6'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 122	2,3,3',4,5'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 123	2,3,4,4',5'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 126	3,3',4,4',5'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 127	3,3',4,5,5'-PeCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 128/166	2,2',3,3',4,4'-HxCB + 2,3,4,4',5,6'-HxCB	µg/L	0.00099 U	0.00100 U	0.001430	0.00100 U	0.001010 U
PCB 129/138/163	2,2',3,3',4,5'-HxCB + 2,2',3,4,4',5'-HxCB + 2,3,3',4',5,6'-HxCB	µg/L	0.00148 U	0.00149 U	0.008830	0.00150 U	0.001510 U
PCB 130	2,2',3,3',4,5'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 131	2,2',3,3',4,6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 132	2,2',3,3',4,6'-HxCB	µg/L	0.000495 U	0.00050 U	0.003020	0.000500 U	0.000503 U
PCB 133	2,2',3,3',5,5'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 134/143	2,2',3,3',5,6'-HxCB + 2,2',3,4,5,6'-HxCB	µg/L	0.000989 U	0.000995 U	0.001070 U	0.000999 U	0.001010 U
PCB 135/151	2,2',3,3',5,6'-HxCB + 2,2',3,5,5',6'-HxCB	µg/L	0.000989 U	0.00100 U	0.001830	0.000999 U	0.001010 U
PCB 136	2,2',3,3',6,6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000802	0.000500 U	0.000503 U
PCB 137	2,2',3,4,4',5'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 139/140	2,2',3,4,4',6'-HxCB + 2,2',3,4,4',6'-HxCB	µg/L	0.000989 U	0.000995 U	0.001070 U	0.000999 U	0.001010 U
PCB 141	2,2',3,4,5,5'-HxCB	µg/L	0.000495 U	0.00050 U	0.001180	0.000500 U	0.000503 U
PCB 142	2,2',3,4,5,6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 144	2,2',3,4,5,6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 145	2,2',3,4,6,6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 146	2,2',3,4,5,5'-HxCB	µg/L	0.000495 U	0.000497 U	0.000862	0.000500 U	0.000503 U
PCB 147/149	2,2',3,4,5,6'-HxCB + 2,2',3,4',5,6'-HxCB	µg/L	0.000989 U	0.00100 U	0.005340	0.00100 U	0.001010 U
PCB 148	2,2',3,4,5,6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 150	2,2',3,4',6,6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 152	2,2',3,5,6,6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 153/168	2,2',4,4',5,5'-HxCB + 2,3',4,4',5',6'-HxCB	µg/L	0.000989 U	0.00100 U	0.005420	0.00100 U	0.001010 U
PCB 154	2,2',4,4',5,6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 155	2,2',4,4',6,6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 156/157	2,3,3',4,4',5'-HxCB + 2,3,3',4,4',5'-HxCB	µg/L	0.000989 U	0.000995 U	0.001150	0.000999 U	0.001010 U
PCB 158	2,3,3',4,4',6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000840	0.000500 U	0.000503 U
PCB 159	2,3,3',4,5,5'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 160	2,3,3',4,5,6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 161	2,3,3',4,5,6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 162	2,3,3',4,5,5'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 164	2,3,3',4,5',6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 165	2,3,3',5,5',6'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 167	2,3,4,4',5,5'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 169	3,3',4,4',5,5'-HxCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 170	2,2',3,3',4,4',5'-HpCB	µg/L	0.000495 U	0.00050 U	0.000932	0.000500 U	0.000503 U
PCB 171/173	2,2',3,3',4,4',6'-HpCB + 2,2',3,3',4,5,6'-HpCB	µg/L	0.000989 U	0.000995 U	0.001070 U	0.000999 U	0.001010 U
PCB 172	2,2',3,3',4,5,5'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 174	2,2',3,3',4,5,6'-HpCB	µg/L	0.000495 U	0.00050 U	0.000857	0.000500 U	0.000503 U
PCB 175	2,2',3,3',4,5',6'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 176	2,2',3,3',4,6,6'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 177	2,2',3,3',4,5,6'-HpCB	µg/L	0.000495 U	0.00050 U	0.000533 U	0.000500 U	0.000503 U
PCB 178	2,2',3,3',5,5',6'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 179	2,2',3,3',5,6,6'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 180/193	2,2',3,4,4',5,5'-HpCB + 2,3,3',4',5,5',6'-HpCB	µg/L	0.000989 U	0.0010 U	0.001840	0.00100 U	0.001010 U
PCB 181	2,2',3,4,4',5,6'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 182	2,2',3,4,4',5,6'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 183/185	2,2',3,4,4',5,6'-HpCB + 2,2',3,4,5,5',6'-HpCB	µg/L	0.000989 U	0.0010 U	0.001070 U	0.000999 U	0.001010 U
PCB 184	2,2',3,4,4',6,6'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 186	2,2',3,4,5,6,6'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 187	2,2',3,4,5,5',6'-HpCB	µg/L	0.000495 U	0.00050 U	0.001120	0.000500 U	0.000503 U
PCB 188	2,2',3,4',5,6,6'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 189	2,3,3',4,4',5,5'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 190	2,3,3',4,4',5,6'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 191	2,3,3',4,4',5',6'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 192	2,3,3',4,5,5',6'-HpCB	µg/L	0.000495 U	0.000497 U	0.000533 U	0.000500 U	0.000503 U
PCB 194	2,2',3,3',4,4',5,5'-OxCB	µg/L	0.000742 U	0.00075 U	0.000800 U	0.000749 U	0.000754 U
PCB 195	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000742 U	0.000746 U	0.000800 U	0.000749 U	0.000754 U
PCB 196	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000742 U	0.000746 U	0.000800 U	0.000749 U	0.000754 U
PCB 197/200	2,2',3,3',4,4',6,6'-OxCB + 2,2',3,3',4,5,6,6'-OxCB	µg/L	0.00148 U	0.00149 U	0.001600 U	0.00150 U	0.001510 U

**Table A4-8**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 19, Basin-Scale Monitoring Location (19\_SW3)**

		Outfall Basin 19, Location 19_SW3 <sup>(2)</sup>					
		Composite Stormwater Samples					
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 1 DUP	Event 2	Event 3	Event 4
			W16C101-01 3/9/2016	W16C101-02 3/9/2016	W16I160-01 9/17/2016	W16J118-01 10/13/2016	W16K060-01 11/5/2016
PCB 198/199	2,2',3,3',4,5,5',6-OcCB + 2,2',3,3',4,5,5',6'-OcCB	µg/L	0.00148 U	0.00149 U	0.00160 U	0.001500 U	0.001510 U
PCB 201	2,2',3,3',4,5',6,6'-OcCB	µg/L	0.000742 U	0.000746 U	0.000800 U	0.000749 U	0.000754 U
PCB 202	2,2',3,3',5,5',6,6'-OcCB	µg/L	0.000742 U	0.000746 U	0.000800 U	0.000749 U	0.000754 U
PCB 203	2,2',3,4,4',5,5',6-OcCB	µg/L	0.000742 U	0.000746 U	0.000800 U	0.000749 U	0.000754 U
PCB 204	2,2',3,4,4',5,6,6'-OcCB	µg/L	0.000742 U	0.000746 U	0.000800 U	0.000749 U	0.000754 U
PCB 205	2,3,3',4,4',5,5',6-OcCB	µg/L	0.000742 U	0.000746 U	0.000800 U	0.000749 U	0.000754 U
PCB 206	2,2',3,3',4,4',5,5',6-NoCB	µg/L	0.000742 U	0.000746 U	0.000800 U	0.000749 U	0.000754 U
PCB 207	2,2',3,3',4,4',5,6,6'-NoCB	µg/L	0.000742 U	0.000746 U	0.000800 U	0.000749 U	0.000754 U
PCB 208	2,2',3,3',4,5,5',6,6'-NoCB	µg/L	0.000742 U	0.000746 U	0.000800 U	0.000749 U	0.000754 U
PCB 209	Decachlorobiphenyl	µg/L	0.000742 U	0.000746 U	0.000800 U	0.000749 U	0.000754 U
	Total Monochlorobiphenyls	µg/L	ND	ND	ND	ND	ND
	Total Dichlorobiphenyls	µg/L	ND	ND	0.00734	ND	ND
	Total Trichlorobiphenyls	µg/L	ND	0.000816	0.0843	ND	ND
	Total Tetrachlorobiphenyls	µg/L	ND	ND	0.0951	ND	ND
	Total Pentachlorobiphenyls	µg/L	ND	ND	0.0658	ND	ND
	Total Hexachlorobiphenyls	µg/L	ND	ND	0.0307	ND	ND
	Total Heptachlorobiphenyls	µg/L	ND	ND	0.00474	ND	ND
	Total Octachlorobiphenyls	µg/L	ND	ND	ND	ND	ND
	Total Nonachlorobiphenyls	µg/L	ND	ND	ND	ND	ND
	Total Decachlorobiphenyls	µg/L	ND	ND	ND	ND	ND
	Total PCBs <sup>(3)</sup>	µg/L	0.00297 ND	0.000816	0.288	0.00300 ND	0.00302 ND

## Notes:

MoCB = Monochlorobiphenyl

DiCB = Dichlorobiphenyl

TriCB = Trichlorobiphenyl

TeCB = Tetrachlorobiphenyl

PeCB = Pentachlorobiphenyl

HeCB = Hexachlorobiphenyl

HpCB = Heptachlorobiphenyl

OcCB = Octachlorobiphenyl

NoCB = Nonachlorobiphenyl

-- = No JSCS screening level available.

U = The analyte was not detected above the reported sample quantification limit.

µg/L = Micrograms per liter

ND = Not detected

DUP = Duplicate

<sup>(1)</sup> IUPAC = International Union of Pure and Applied Chemistry.<sup>(2)</sup> Sampling location is shown on Figure A-4 of main report. Samples were collected at manhole AAP918 (outgoing 42-inch pipe) and represent all of the Basin 19 drainage area.<sup>(3)</sup> For purposes of calculating total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

**Table A4-9**  
**2016 Stormwater Sample Results**  
**Outfall Basin 19, Site-Specific Monitoring Location (19\_SW2)**

Class	Analyte	Units	Outfall Basin 19, Location 19_SW2 <sup>(1)</sup> Stormwater Grab Samples					Geometric Mean Concentration <sup>(2)</sup>	Portland Harbor Screening Criteria <sup>(3)</sup>			All Results in Range of Typical Results on DEQ Guidance Curve? <sup>(5)</sup>
			Event 1 W16C092-10	Event 2 W16I149-05	Event 3 W16J112-09	Event 3 DUP W16J112-11	Event 4 W16K053-01		ROD Cleanup Levels	JSCS SLVs		
			3/9/2016	9/17/2016	10/13/2016	10/13/2016	11/5/2016			SLV	Endpoint <sup>(4)</sup>	
<b>Field Measurements</b>												
	Conductivity	umhos/cm	8	34	12	NA	15	NA	--	--	--	--
	pH	pH units	7.7	7.3	7.5	NA	4.8	NA	--	--	--	--
	Temperature	Deg. C	10.1	18.5	15.5	NA	13.8	NA	--	--	--	--
<b>Total Suspended Solids (SM 2540D)</b>												
	TSS	mg/L	59	4	47	43	19	21	--	--	--	Yes
<b>Total Metals (EPA 200.8)</b>												
	Arsenic	µg/L	<b>0.628</b>	<b>0.486</b>	<b>0.568</b>	<b>0.602</b>	<b>0.307</b>	<b>0.484</b>	0.018	0.045	Human Health - Ingestion	Yes
	Cadmium	µg/L	<b>0.231</b>	<b>0.183</b>	<b>0.267</b>	<b>0.277</b>	<b>0.124</b>	<b>0.194</b>	--	0.094	Ecological	Yes
	Chromium	µg/L	4.80	0.871	3.07	3.13 J	1.01	1.90	100	100	Human Health - Ingestion	Yes
	Copper	µg/L	<b>54.5</b>	<b>36.8</b>	<b>57.1</b>	<b>48.8</b>	<b>17.5</b>	<b>36.9</b>	2.74	2.7	Ecological	No
	Lead	µg/L	<b>72.6</b>	<b>3.99</b>	<b>76.7 J</b>	<b>41.1 J</b>	<b>7.01</b>	<b>18.6</b>	--	0.54	Ecological	No
	Mercury (WPCLSOP M-10)	µg/L	0.0747	0.0215	0.0235	0.0257	0.0132	0.0269	--	0.77	Ecological	Yes
	Nickel	µg/L	3.10	2.88	2.72	2.91	1.40	2.44	--	16	Ecological	Yes
	Silver	µg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	--	0.12	Ecological	Yes
	Zinc	µg/L	<b>132</b>	<b>159</b>	<b>167</b>	<b>173</b>	<b>136</b>	<b>148</b>	36.5	36	Ecological	Yes
<b>Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270-SIM)</b>												
	Acenaphthene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	--	0.2	Human Health - Ingestion	--
	Acenaphthylene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	--	0.2	Human Health - Ingestion	--
	Anthracene	µg/L	0.029	0.020 U	0.020 U	0.020 U	0.020 U	0.022	--	0.2	Human Health - Ingestion	--
	Benzo(a)anthracene	µg/L	<b>0.035</b>	0.010 U	<b>0.026</b>	<b>0.025</b>	0.010 U	<b>0.017</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(a)pyrene	µg/L	<b>0.041</b>	0.010 U	0.038	<b>0.037</b>	0.010 U	<b>0.020</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Benzo(b)fluoranthene	µg/L	<b>0.065</b>	0.010 U	<b>0.075</b>	<b>0.072</b>	<b>0.020</b>	<b>0.031</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(g,h,i)perylene	µg/L	0.097	0.010 U	0.085	0.086	0.036	0.042	--	0.2	Human Health - Ingestion	--
	Benzo(k)fluoranthene	µg/L	<b>0.016</b>	0.010 U	<b>0.029</b>	<b>0.030</b>	0.010 U	<b>0.015</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Chrysene	µg/L	<b>0.063</b>	0.010 U	<b>0.041</b>	<b>0.043</b>	<b>0.019</b>	<b>0.027</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Dibenzo(a,h)anthracene	µg/L	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.00012	0.018	Human Health - Fish Consumption	--
	Fluoranthene	µg/L	0.16	0.030 U	0.082	0.081	0.058	0.069	--	0.2	Human Health - Ingestion	--
	Fluorene	µg/L	0.026	0.024 U	0.025	0.023	0.027	0.025	--	0.2	Human Health - Ingestion	--
	Indeno(1,2,3-cd)pyrene	µg/L	<b>0.030</b>	0.010 U	<b>0.047</b>	<b>0.048</b>	0.011	<b>0.020</b>	0.0012	0.018	Human Health - Fish Consumption	--
	1-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	--	--	--	--
	2-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	--	0.2	Human Health - Ingestion	--
	Naphthalene	µg/L	0.050	0.040 U	0.040 U	0.040 U	0.040 U	0.042	12	0.2	Human Health - Ingestion	--
	Phenanthrene	µg/L	0.12	0.058	0.095	0.097	0.079	0.085	--	0.2	Human Health - Ingestion	--
	Pyrene	µg/L	<b>0.28</b>	0.030 U	0.11	0.11	0.089	0.095	--	0.2	Human Health - Ingestion	--
	Total PAHs <sup>(6)</sup>	µg/L	1.0	0.058	0.65	0.65	0.34	0.34	--	--	--	Yes

**Table A4-9**  
**2016 Stormwater Sample Results**  
**Outfall Basin 19, Site-Specific Monitoring Location (19\_SW2)**

Class	Analyte	Units	Outfall Basin 19, Location 19_SW2 <sup>(1)</sup> Stormwater Grab Samples					Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve? <sup>(5)</sup>
			Event 1 W16C092-10	Event 2 W16I149-05	Event 3 W16J112-09	Event 4 W16K053-01	Event 3 DUP W16J112-11			JSCS SLVs		
			3/9/2016	9/17/2016	10/13/2016	10/13/2016	11/5/2016			SLV	Endpoint <sup>(4)</sup>	
<b>Phthalates (EPA 8270-SIM)</b>												
	Bis(2-ethylhexyl)phthalate	µg/L	<b>4.8</b> J+	<b>1.6</b> J+	<b>3.7</b> J+	<b>3.3</b> J+	<b>2.0</b> J+	<b>2.7</b>	0.2	2.2	Human Health - Fish Consumption	No
	Butylbenzylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	--	3	Ecological	--
	Di-n-butylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	--	3	Ecological	--
	Di-n-octylphthalate	µg/L	0.51	0.50 U	0.50 U	0.50 U	0.50 U	0.5	--	3	Ecological	--
	Diethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.5 U	--	3	Ecological	--
	Dimethylphthalate	µg/L	0.54	<b>10.0</b>	0.50 U	0.50 U	0.50 U	1.1	--	3	Ecological	--
<b>Polychlorinated Biphenyl (PCB) Congeners</b>												
	Total PCB Congeners <sup>(6)(7)</sup>	µg/L	<b>0.138</b>	<b>0.0129</b>	<b>0.0176</b>	<b>0.0180</b>	<b>0.0104</b>	<b>0.0240</b>	0.0000064	0.000064	Human Health - Fish Consumption	Yes

## Notes:

DEQ = Oregon Department of Environmental Quality

DUP = field duplicate sample

NA = not analyzed

J = The result is an estimate.

J+ = Detection of analyte is considered a high estimate.

U = The analyte was not detected above the reported sample quantification limit.

UJ = The analyte was not detected, and the detection limit is considered an estimate.

-- = not established

µg/L = micrograms per liter

mg/L = milligrams per liter

<sup>(1)</sup> Sampling location is shown on Figure A-4 of main report. Samples were collected at the stormwater sampling manhole at 4927 NW Front Avenue and represent discharges only from the Calbag Metals-Front Avenue site (ECSI #2454).

<sup>(2)</sup> For the purposes of calculating the geometric mean concentrations, non-detect results are set to the value of the method reporting limit, with the exception of total PAHs and total PCB congeners. This assumption is conservative and may overestimate the true geometric mean concentration. For total PAHs and total PCB congeners, results including one or more detections of an individual constituent were calculated by assigning a value of zero to non-detected concentrations. For results in which no individual constituents were detected, the total concentration is reported as the highest MRL among the individual constituents. Duplicate sample results were averaged with the corresponding primary sample results, and the average concentration for that event was then included as a single value in the geometric mean calculations.

<sup>(3)</sup> Portland Harbor screening criteria are the cleanup levels for surface water specified in Table 17 the Portland Harbor Record of Decision (ROD; EPA, 2017), where established. Where no cleanup level for a constituent is established in the ROD, the screening level value (SLV) from the Portland Harbor Joint Source Control Strategy (DEQ/EPA, 2005) is used, if established.

<sup>(4)</sup> Endpoint = source of the JSCS SLV to be used for initial upland source control screening evaluations (DEQ/EPA, 2005):

*Human Health - Fish Consumption* = SLVs for chemicals in water taken up by fish for human consumption; these SLVs represent EPA's National Recommended Water Quality Criteria (NRWQC) values. If no NRWQC values are available, then DEQ's ambient water quality criteria (AWQC) values are listed for the constituent.

*Human Health - Ingestion* = SLVs for chemicals in water for human ingestion; these SLVs represent the most conservative value between EPA's Maximum Contaminant Levels (MCLs) and Region 9 Preliminary Remediation Goals (PRGs).

*Ecological* = SLVs for chemicals in water for ecological exposure; these SVLs represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent. If no AWQC values are available, then Oak Ridge National Laboratory Tier II SCV Technology Benchmark values are listed for the constituent.

<sup>(5)</sup> Range below typical concentrations in graphs developed by DEQ of concentrations of selected contaminants detected in stormwater from a larger number of industrial sites in Portland Harbor to assist with data evaluation [Appendix E to *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (DEQ, 2009, updated December 2015)].

<sup>(6)</sup> For purposes of calculating total PAH values and total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

<sup>(7)</sup> Refer to Table A4-10 for individual PCB congener results.

**bold** = Concentration exceeds the Portland Harbor screening criterion.

**Table A4-10**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 19, Site-Specific Monitoring Location (19\_SW2)**

		Outfall Basin 19, Location 19_SW2 <sup>(2)</sup>					
		Stormwater Grab Samples					
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1 W16C092-10 3/9/2016	Event 2 W16I149-05 9/17/2016	Event 3 W16J112-09 10/13/2016	Event 3 DUP W16J112-11 10/13/2016	Event 4 W16K053-01 11/5/2016
Polychlorinated Biphenyl Congeners (PCBs) (EPA 1668A)							
PCB 1	2-MoCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 2	3-MoCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 3	4-MoCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 4	2,2'-DiCB	µg/L	0.000265 U	0.000847	0.000246 U	0.000248 U	0.000258 U
PCB 5	2,3-DiCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 6	2,3'-DiCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 7	2,4-DiCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 8	2,4'-DiCB	µg/L	0.000265 U	0.000464	0.000246 U	0.000248 U	0.000258 U
PCB 9	2,5-DiCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 10	2,6-DiCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 11	3,3'-DiCB	µg/L	0.0026 U	0.00241 U	0.002420 U	0.002430 U	0.002530 U
PCB 12/13	3,4-DiCB + 3,4'-DiCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 14	3,5-DiCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 15	4,4'-DiCB	µg/L	0.00035 U	0.000543	0.000325 U	0.000327 U	0.000340 U
PCB 16	2,2',3'-TriCB	µg/L	0.000265 U	0.00107	0.000246 U	0.000248 U	0.000258 U
PCB 17	2,2',4'-TriCB	µg/L	0.000265 U	0.000896	0.000246 U	0.000248 U	0.000258 U
PCB 18/30	2,2',5'-TriCB + 2,4,6-TriCB	µg/L	0.00053 U	0.00216	0.000493 U	0.000495 U	0.000516 U
PCB 19	2,2',6'-TriCB	µg/L	0.000265 U	0.000387	0.000246 U	0.000248 U	0.000258 U
PCB 20/28	2,3,3'-TriCB + 2,4,4'-TriCB	µg/L	0.00137 U	0.00174	0.001270 U	0.001280 U	0.001330 U
PCB 21/33	2,3,4'-TriCB + 2,3,4-TriCB	µg/L	0.00143 U	0.00133 U	0.001330 U	0.001340 U	0.001390 U
PCB 22	2,3,4-TriCB	µg/L	0.00101 U	0.000934 U	0.000936 U	0.000941 U	0.000979 U
PCB 23	2,3,5-TriCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 24	2,3,6-TriCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 25	2,3,4-TriCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 26/29	2,3',5'-TriCB + 2,4,5-TriCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 27	2,3,6-TriCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 31	2,4,5-TriCB	µg/L	0.00138 U	0.00154	0.001280 U	0.001290 U	0.001340 U
PCB 32	2,4,6-TriCB	µg/L	0.000265 U	0.000634	0.000246 U	0.000248 U	0.000258 U
PCB 34	2,3,5-TriCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 35	3,3,4-TriCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 36	3,3,5-TriCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 37	3,4,4'-TriCB	µg/L	0.000726	0.000521 U	0.000522 U	0.000525 U	0.000546 U
PCB 38	3,4,5-TriCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 39	3,4,5-TriCB	µg/L	0.000265 U	0.000246 U	0.000246 U	0.000248 U	0.000258 U
PCB 40/41/71	2,2',3,3'-TeCB + 2,2',3,4'-TeCB + 2,3',4',6'-TeCB	µg/L	0.00159 U	0.00147 U	0.001480 U	0.001490 U	0.001550 U
PCB 42	2,2',3,4'-TeCB	µg/L	0.000539	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 43/73	2,2',3,5'-TeCB + 2,3',5',6'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 44/47/65	2,2',3,5'-TeCB + 2,2',4,4'-TeCB + 2,3,5,6'-TeCB	µg/L	0.00244	0.00147 U	0.001480 U	0.001490 U	0.001550 U
PCB 45/51	2,2',3,6'-TeCB + 2,2',4,6'-TeCB	µg/L	0.00106 U	0.000983 U	0.000986 U	0.000990 U	0.001030 U
PCB 46	2,2',3,6'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 48	2,2',4,5'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 49/69	2,2',4,5'-TeCB + 2,3',4,6'-TeCB	µg/L	0.00129	0.000983 U	0.000986 U	0.000990 U	0.001030 U
PCB 50/53	2,2',4,6'-TeCB + 2,2',5,6'-TeCB	µg/L	0.00106 U	0.000983 U	0.000986 U	0.000990 U	0.001030 U
PCB 52	2,2',5,5'-TeCB	µg/L	0.00398	0.00151 U	0.001520 U	0.001530 U	0.001590 U
PCB 54	2,2',6,6'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 55	2,3,3,4'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 56	2,3,3,4'-TeCB	µg/L	0.00117	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 57	2,3,3,5'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 58	2,3,3,5'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 59/62/75	2,3,3,6'-TeCB + 2,3,4,6'-TeCB + 2,4,4',6'-TeCB	µg/L	0.00159 U	0.00147 U	0.001480 U	0.001490 U	0.001550 U
PCB 60	2,3,4,4'-TeCB	µg/L	0.000629	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 61/70/74/76	2,3,4,5'-TeCB + 2,3',4',5'-TeCB + 2,4,4',5'-TeCB + 2',3,4,5'-TeCB	µg/L	0.0065	0.00197 U	0.001970 U	0.001980 U	0.002060 U
PCB 63	2,3,4,5'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 64	2,3,4,6'-TeCB	µg/L	0.00106	0.000499	0.000493 U	0.000495 U	0.000516 U
PCB 66	2,3',4,4'-TeCB	µg/L	0.00226	0.000825 U	0.000828 U	0.000832 U	0.000866 U
PCB 67	2,3',4,5'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 68	2,3',4,5'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 72	2,3',5,5'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 77	3,3',4,4'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 78	3,3',4,5'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 79	3,3',4,5'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 80	3,3',5,5'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 81	3,4,4,5'-TeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 82	2,2',3,3',4'-PeCB	µg/L	0.0012	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 83	2,2',3,3',5'-PeCB	µg/L	0.000530 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 84	2,2',3,3',6'-PeCB	µg/L	0.002440	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 85/116/117	2,2',3,4,4'-PeCB + 2,3,4,5,6'-PeCB + 2,3,4',5,6'-PeCB	µg/L	0.001590 U	0.00147 U	0.001480 U	0.001490 U	0.001550 U
PCB 86/87/97/108/119/125	2,2',3,4,5'-PeCB + 2,2',3,4,5'-PeCB + 2,2',3',4,5'-PeCB + 2,3,3',4,5'-PeCB + 2,3',4,4',6'-PeCB + 2,3,4,5,6'-PeCB	µg/L	0.00749	0.00295 U	0.00296 U	0.00297 U	0.003090 U
PCB 88/91	2,2',3,4,6'-PeCB + 2,2',3,4',6'-PeCB	µg/L	0.00106 U	0.000983 U	0.000986 U	0.000990 U	0.001030 U
PCB 89	2,2',3,4,6'-PeCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 90/101/113	2,2',3,4',5'-PeCB + 2,2',4,5,5'-PeCB + 2,3,3',5',6'-PeCB	µg/L	0.00937	0.00147 U	0.001810	0.001860	0.001550 U
PCB 92	2,2',3,5,5'-PeCB	µg/L	0.00156	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 93/98/100/102	2,2',3,5,6'-PeCB + 2,2',3',4,6'-PeCB + 2,2',4,4',6'-PeCB + 2,2',4,5,6'-PeCB	µg/L	0.00212 U	0.00197 U	0.001970 U	0.001980 U	0.002060 U

**Table A4-10**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 19, Site-Specific Monitoring Location (19\_SW2)**

Outfall Basin 19, Location 19_SW2 <sup>(2)</sup>							
Stormwater Grab Samples							
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3		
			W16C092-10 3/9/2016	W16I149-05 9/17/2016	W16J112-09 10/13/2016	Event 3 DUP W16J112-11 10/13/2016	Event 4 W16K053-01 11/5/2016
PCB 94	2,2',3,5,6'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 95	2,2',3,5',6'-PcCB	µg/L	0.00621	0.000934 U	0.001120	0.001130	0.000979 U
PCB 96	2,2',3,6,6'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 99	2,2',4,4',5'-PcCB	µg/L	0.00377	0.000491 U	0.000734	0.000806	0.000527
PCB 103	2,2',4,5',6'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 104	2,2',4,6,6'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 105	2,3,3',4,4'-PcCB	µg/L	0.00576	0.000491 U	0.001200	0.001220	0.000730
PCB 106	2,3,3',4,5'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 107/124	2,3,3',4',5'-PcCB + 2',3,4,5,5'-PcCB	µg/L	0.00106	0.000983 U	0.000986 U	0.000990 U	0.001030 U
PCB 109	2,3,3',4,6'-PcCB	µg/L	0.000636	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 110/115	2,3,3',4',6'-PcCB + 2,3,4,4',6'-PcCB	µg/L	0.0133	0.00123	0.002860	0.002910	0.002010
PCB 111	2,3,3',5,5'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 112	2,3,3',5,6'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 114	2,3,4,4',5'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 118	2,3,4,4',5'-PcCB	µg/L	0.0127	0.000886	0.002520	0.002580	0.001610
PCB 120	2,3,4,5,5'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 121	2,3,4,5',6'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 122	2,3,3',4,5'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 123	2,3,4,4',5'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 126	3,3',4,4',5'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 127	3,3',4,5,5'-PcCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 128/166	2,2',3,3',4,4'-HxCB + 2,3,4,4',5,6-HxCB	µg/L	0.00233	0.000983 U	0.000999 U	0.000999 U	0.001030 U
PCB 129/138/163	2,2',3,3',4,5'-HxCB + 2,2',3,4,4',5'-HxCB + 2,3,3',4',5,6-HxCB	µg/L	0.01280	0.00147 U	0.003160	0.00324	0.002350
PCB 130	2,2',3,3',4,5'-HxCB	µg/L	0.000752	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 131	2,2',3,3',4,6'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 132	2,2',3,3',4,6'-HxCB	µg/L	0.00412	0.000491 U	0.000943	0.000924	0.000728
PCB 133	2,2',3,3',5,5'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 134/143	2,2',3,3',5,6'-HxCB + 2,2',3,4,5,6'-HxCB	µg/L	0.00106	0.000983 U	0.000986 U	0.000990 U	0.001030 U
PCB 135/151	2,2',3,3',5,6'-HxCB + 2,2',3,3',5,6'-HxCB	µg/L	0.00213	0.000983 U	0.000986 U	0.000990 U	0.001030 U
PCB 136	2,2',3,3',6,6'-HxCB	µg/L	0.000881	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 137	2,2',3,4,4',5'-HxCB	µg/L	0.000854	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 139/140	2,2',3,4,4',6'-HxCB + 2,2',3,4,4',6'-HxCB	µg/L	0.00106	0.000983 U	0.000986 U	0.000990 U	0.001030 U
PCB 141	2,2',3,4,5,5'-HxCB	µg/L	0.00166	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 142	2,2',3,4,5,6'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 144	2,2',3,4,5',6'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 145	2,2',3,4,6,6'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 146	2,2',3,4',5,5'-HxCB	µg/L	0.00119	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 147/149	2,2',3,4',5,6'-HxCB + 2,2',3,4',5',6'-HxCB	µg/L	0.00692	0.000983 U	0.001450	0.00147	0.001110
PCB 148	2,2',3,4',5,6'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 150	2,2',3,4',6,6'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 152	2,2',3,5,6,6'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 153/168	2,2',4,4',5,5'-HxCB + 2,3',4,4',5',6'-HxCB	µg/L	0.00731	0.000983 U	0.001820	0.00182	0.001370
PCB 154	2,2',4,4',5,6'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 155	2,2',4,4',6,6'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 156/157	2,3,3',4,4',5'-HxCB + 2,3,3',4,4',5'-HxCB	µg/L	0.00231	0.000983 U	0.000986 U	0.000990 U	0.001030 U
PCB 158	2,3,3',4,4',6'-HxCB	µg/L	0.00126	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 159	2,3,3',4,5,5'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 160	2,3,3',4,5,6'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 161	2,3,3',4,5',6'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 162	2,3,3',4',5,5'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 164	2,3,3',4',5',6'-HxCB	µg/L	0.000676	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 165	2,3,3',5,5',6'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 167	2,3,4,4',5,5'-HxCB	µg/L	0.00065	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 169	3,3',4,4',5,5'-HxCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 170	2,2',3,3',4,4',5'-HpCB	µg/L	0.00136	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 171/173	2,2',3,3',4,4',5'-HpCB + 2,2',3,3',4,4',5,6'-HpCB	µg/L	0.00106	0.000983 U	0.000986 U	0.000990 U	0.001030 U
PCB 172	2,2',3,3',4,5,5'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 174	2,2',3,3',4,5,6'-HpCB	µg/L	0.0011	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 175	2,2',3,3',4,5',6'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 176	2,2',3,3',4,6,6'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 177	2,2',3,3',4',5,6'-HpCB	µg/L	0.000612	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 178	2,2',3,3',5,5',6'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 179	2,2',3,3',5,6,6'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 180/193	2,2',3,4,4',5,5'-HpCB + 2,3,3',4',5,5',6'-HpCB	µg/L	0.00248	0.000983 U	0.000986 U	0.000990 U	0.001030 U
PCB 181	2,2',3,4,4',5,6'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 182	2,2',3,4,4',5,6'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 183/185	2,2',3,4,4',5,6'-HpCB + 2,2',3,4,4',5,6'-HpCB	µg/L	0.00106	0.000983 U	0.000986 U	0.000990 U	0.001030 U
PCB 184	2,2',3,4,4',6,6'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 186	2,2',3,4,5,6,6'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 187	2,2',3,4',5,5',6'-HpCB	µg/L	0.00114	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 188	2,2',3,4',5,6,6'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 189	2,3,3',4,4',5,5'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 190	2,3,3',4,4',5,6'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 191	2,3,3',4,4',5,6'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 192	2,3,3',4,5,5',6'-HpCB	µg/L	0.00053 U	0.000491 U	0.000493 U	0.000495 U	0.000516 U
PCB 194	2,2',3,3',4,4',5,5'-OxCB	µg/L	0.000795 U	0.000737 U	0.000739 U	0.000743 U	0.000773 U
PCB 195	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000795 U	0.000737 U	0.000739 U	0.000743 U	0.000773 U

**Table A4-10**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 19, Site-Specific Monitoring Location (19\_SW2)**

		Outfall Basin 19, Location 19_SW2 <sup>(2)</sup>					
		Stormwater Grab Samples					
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3	Event 3 DUP	Event 4
			W16C092-10 3/9/2016	W16I149-05 9/17/2016	W16J112-09 10/13/2016	W16J112-11 10/13/2016	W16K053-01 11/5/2016
PCB 196	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000795 U	0.000737 U	0.000739 U	0.000743 U	0.000773 U
PCB 197/200	2,2',3,3',4,4',6,6'-OxCB + 2,2',3,3',4,5,6,6'-OxCB	µg/L	0.00159 U	0.00147 U	0.00148 U	0.00149 U	0.001550 U
PCB 198/199	2,2',3,3',4,5,5',6'-OxCB + 2,2',3,3',4,5,5',6'-OxCB	µg/L	0.001590 U	0.00147 U	0.001480 U	0.001490 U	0.001550 U
PCB 201	2,2',3,3',4,5',6,6'-OxCB	µg/L	0.000795 U	0.000737 U	0.000739 U	0.000743 U	0.000773 U
PCB 202	2,2',3,3',5,5',6,6'-OxCB	µg/L	0.000795 U	0.000737 U	0.000739 U	0.000743 U	0.000773 U
PCB 203	2,2',3,4,4',5,5',6'-OxCB	µg/L	0.000795 U	0.000737 U	0.000739 U	0.000743 U	0.000773 U
PCB 204	2,2',3,4,4',5,6,6'-OxCB	µg/L	0.000795 U	0.000737 U	0.000739 U	0.000743 U	0.000773 U
PCB 205	2,3,3',4,4',5,5',6'-OxCB	µg/L	0.000795 U	0.000737 U	0.000739 U	0.000743 U	0.000773 U
PCB 206	2,2',3,3',4,4',5,5',6'-NoCB	µg/L	0.000795 U	0.000737 U	0.000739 U	0.000743 U	0.000773 U
PCB 207	2,2',3,3',4,4',5,6,6'-NoCB	µg/L	0.000795 U	0.000737 U	0.000739 U	0.000743 U	0.000773 U
PCB 208	2,2',3,3',4,5,5',6,6'-NoCB	µg/L	0.000795 U	0.000737 U	0.000739 U	0.000743 U	0.000773 U
PCB 209	Decachlorobiphenyl	µg/L	0.000795 U	0.000737 U	0.000739 U	0.000743 U	0.000773 U
Total Monochlorobiphenyls		µg/L	ND	ND	ND	ND	ND
Total Dichlorobiphenyls		µg/L	ND	0.00185	ND	ND	ND
Total Trichlorobiphenyls		µg/L	0.000726	0.00843	ND	ND	ND
Total Tetrachlorobiphenyls		µg/L	0.0199	0.000499	ND	ND	ND
Total Pentachlorobiphenyls		µg/L	0.0644	0.00211	0.0102	0.0105	0.004880
Total Hexachlorobiphenyls		µg/L	0.0459	ND	0.00738	0.00746	0.005550
Total Heptachlorobiphenyls		µg/L	0.0067	ND	ND	ND	ND
Total Octachlorobiphenyls		µg/L	ND	ND	ND	ND	ND
Total Nonachlorobiphenyls		µg/L	ND	ND	ND	ND	ND
Total Decachlorobiphenyls		µg/L	ND	ND	ND	ND	ND
Total PCBs <sup>(3)</sup>		µg/L	0.138	0.0129	0.0176	0.0180	0.0104

## Notes:

MoCB = Monochlorobiphenyl

DiCB = Dichlorobiphenyl

TriCB = Trichlorobiphenyl

TeCB = Tetrachlorobiphenyl

PeCB = Pentachlorobiphenyl

HeCB = Hexachlorobiphenyl

HpCB = Heptachlorobiphenyl

OcCB = Octachlorobiphenyl

NoCB = Nonachlorobiphenyl

-- = No JSCS screening level available.

U = The analyte was not detected above the reported sample quantification limit.

µg/L = Micrograms per liter

ND = Not detected

DUP = Duplicate

<sup>(1)</sup> IUPAC = International Union of Pure and Applied Chemistry.<sup>(2)</sup> Sampling location is shown on Figure A-4 of main report. Samples were collected at the stormwater sampling manhole at 4927 NW Front Avenue and represent discharges only from the Calbag Metals-Front Avenue site (ECSI #2454).<sup>(3)</sup> For purposes of calculating total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

**Table A4-11**  
**2016/2017 Stormwater Sample Results**  
**Outfall Basin 44, Basin-Scale Monitoring Location (44\_SW20)**

		Outfall Basin 44, Location 44_SW20 <sup>(1)</sup> Stormwater Grab Samples					Portland Harbor Screening Criteria <sup>(3)</sup>			All Results in Range of Typical Results on DEQ Guidance Curve? <sup>(5)</sup>		
Class	Analyte	Units	Event 1	Event 2	Event 3	Event 4	Event 4 DUP	Geometric Mean Concentration <sup>(5)</sup>	ROD Cleanup Levels		JSCS SLVs	
			W16C092-02	W16E158-03	W16J112-01	W17B063-01	W17B063-04				SLV	Endpoint <sup>(4)</sup>
			3/9/2016	5/19/2016	10/13/2016	2/8/2017	2/8/2017					
<b>Field Measurements</b>												
	Conductivity	umhos/cm	27	47	39	29	NA	35	--	--	--	--
	pH	pH units	6.4	6.3	7.1	6.4	NA	6.5	--	--	--	--
	Temperature	Deg. C	10.6	17.5	14.2	4.9	NA	10.7	--	--	--	--
<b>Total Suspended Solids (SM 2540D)</b>												
	TSS	mg/L	75	34	14	29	31	32	--	--	--	Yes
<b>Total Metals (EPA 200.8)</b>												
	Arsenic	µg/L	<b>0.875</b>	<b>0.768</b>	<b>0.591</b>	<b>0.467</b>	<b>0.478</b>	<b>0.658</b>	0.018	0.045	Human Health - Ingestion	Yes
	Cadmium	µg/L	<b>0.216</b>	<b>0.424</b>	<b>0.151</b>	<b>0.154</b>	<b>0.164</b>	<b>0.217</b>	--	0.094	Ecological	Yes
	Chromium	µg/L	3.42	3.41	1.64	2.48	2.63	2.64	100	100	Human Health - Ingestion	Yes
	Copper	µg/L	<b>17.7</b>	<b>21.2</b>	<b>8.82</b>	<b>10.4</b>	<b>10.4</b>	<b>13.6</b>	2.74	2.7	Ecological	Yes
	Lead	µg/L	<b>13.7</b>	<b>5.9</b>	<b>3.33</b>	<b>7.46</b>	<b>7.69</b>	<b>6.72</b>	--	0.54	Ecological	Yes
	Mercury (WPCLSOP M-10)	µg/L	0.00835	0.0179	0.00661	0.0102	0.00882	0.00985	--	0.77	Ecological	Yes
	Nickel	µg/L	2.62	2.81	1.27	1.66	1.7	1.99	--	16	Ecological	Yes
	Silver	µg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	--	0.12	Ecological	Yes
	Zinc	µg/L	<b>89.2</b>	<b>120</b>	<b>52</b>	<b>70.8</b>	<b>72.5</b>	<b>79.5</b>	36.5	36	Ecological	Yes
<b>Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270-SIM)</b>												
	Acenaphthene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	--	0.2	Human Health - Ingestion	--
	Acenaphthylene	µg/L	0.10	0.020 U	0.064	0.026	0.029	0.043	--	0.2	Human Health - Ingestion	--
	Anthracene	µg/L	0.14	0.020	0.16	0.032	0.037	0.063	--	0.2	Human Health - Ingestion	--
	Benzo(a)anthracene	µg/L	<b>0.12</b>	<b>0.011</b>	<b>0.085</b>	<b>0.047</b>	<b>0.045</b>	<b>0.048</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(a)pyrene	µg/L	<b>0.098</b>	<b>0.017</b>	<b>0.093</b>	<b>0.043</b>	<b>0.042</b>	<b>0.051</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Benzo(b)fluoranthene	µg/L	<b>0.16</b>	<b>0.032</b>	<b>0.16</b>	<b>0.075</b>	<b>0.085</b>	<b>0.090</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(g,h,i)perylene	µg/L	0.10	0.065	0.11	0.068	0.070	0.084	--	0.2	Human Health - Ingestion	--
	Benzo(k)fluoranthene	µg/L	<b>0.042</b>	<b>0.011</b>	<b>0.054</b>	<b>0.026</b>	<b>0.019</b>	<b>0.027</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Chrysene	µg/L	<b>0.12</b>	<b>0.034</b>	<b>0.081</b>	<b>0.057</b>	<b>0.057</b>	<b>0.066</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Dibenzo(a,h)anthracene	µg/L	<b>0.013</b>	0.010 U	<b>0.017</b>	<b>0.010</b>	0.010 U	<b>0.012</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Fluoranthene	µg/L	<b>0.29</b>	0.062	0.13	0.14	0.15	0.14	--	0.2	Human Health - Ingestion	--
	Fluorene	µg/L	0.028	0.020 U	0.021	0.020 U	0.020 U	0.022	--	0.2	Human Health - Ingestion	--
	Indeno(1,2,3-cd)pyrene	µg/L	<b>0.058</b>	<b>0.022</b>	<b>0.070</b>	<b>0.028</b>	<b>0.03</b>	<b>0.040</b>	0.0012	0.018	Human Health - Fish Consumption	--
	1-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	--	--	--	--
	1-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	--	0.2	Human Health - Ingestion	--
	Naphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	12	0.2	Human Health - Ingestion	--
	Phenanthrene	µg/L	0.047	0.076	0.040	0.070	0.069	0.056	--	0.2	Human Health - Ingestion	--
	Pyrene	µg/L	<b>0.28</b>	0.069	0.15	0.17	0.18	0.15	--	0.2	Human Health - Ingestion	--
	Total PAHs <sup>(6)</sup>	µg/L	1.6	0.42	1.2	0.79	0.81	0.90	--	--	--	Yes
<b>Phthalates (EPA 8270-SIM)</b>												
	Bis(2-ethylhexyl)phthalate	µg/L	<b>2.4 J+</b>	<b>4.2</b>	<b>3.3</b>	<b>4.1</b>	<b>4.0</b>	<b>3.4</b>	0.2	2.2	Human Health - Fish Consumption	No
	Butylbenzylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Di-n-butylphthalate	µg/L	0.56	0.50 U	0.50 U	0.50 U	0.50 U	0.51	--	3	Ecological	--
	Di-n-octylphthalate	µg/L	0.50 U	2.2	0.50 U	0.50 U	0.50 U	0.72	--	3	Ecological	--
	Diethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Dimethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
<b>Polychlorinated Biphenyl (PCB) Congeners</b>												
	Total PCB Congeners <sup>(6)(7)</sup>	µg/L	<b>0.0210</b>	0.00305 ND	0.00315 ND	<b>0.0123</b>	<b>0.0114</b>	<b>0.00699</b>	0.0000064	0.000064	Human Health - Fish Consumption	Yes

**Table A4-11**  
**2016/2017 Stormwater Sample Results**  
**Outfall Basin 44, Basin-Scale Monitoring Location (44\_SW20)**

Class	Analyte	Units	Outfall Basin 44, Location 44_SW20 <sup>(1)</sup> Stormwater Grab Samples					Geometric Mean Concentration <sup>(5)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve? <sup>(5)</sup>
			Event 1 W16C092-02	Event 2 W16E158-03	Event 3 W16J112-01	Event 4 W17B063-01	Event 4 DUP W17B063-04			JSCS SLVs		
			3/9/2016	5/19/2016	10/13/2016	2/8/2017	2/8/2017			SLV	Endpoint <sup>(4)</sup>	
Organochlorine Pesticides (EPA 8081B)												
	4,4'-DDD	µg/L	0.00029 U	0.0028 U	0.00029 U	0.00029 U	0.00029 U	0.00051 U	0.000031	0.00031	Human Health - Fish Consumption	--
	4,4'-DDE	µg/L	0.00012 U	0.0011 U	0.00012 U	0.00012 U	0.00046 U	0.00026 U	0.000018	0.00022	Human Health - Fish Consumption	--
	4,4'-DDT	µg/L	0.0034 U	0.0030 U	0.0043 UJ	0.00031 U	0.00031 U	0.0019 U	0.000022	0.00022	Human Health - Fish Consumption	--
	Estimated Total DDX <sup>(6)</sup>	µg/L	0.0034 ND	0.0030 ND	0.0043 ND	0.00031 ND	0.00046 ND	0.0020 U	0.01	0.2	Human Health - Ingestion	--
	Aldrin	µg/L	0.00021 U	0.0072 UJ	0.00021 U	0.00021 U	0.00021 U	0.00051 U	0.0000077	0.00005	Human Health - Fish Consumption	--
	alpha-BHC (α-BHC)	µg/L	0.00055 U	0.0019 U	0.0011 UJ	0.00 U	0.00 U	0.00069 U	--	0.0049	Human Health - Fish Consumption	--
	beta-BHC (β-BHC)	µg/L	0.00048 U	0.0059 UJ	0.0013 UJ	0.0011 U	0.0019 U	0.0015 U	--	0.017	Human Health - Fish Consumption	--
	delta-BHC (δ-BHC)	µg/L	0.00021 U	0.0430 UJ	0.00054 UJ	0.00021 U	0.00021 U	0.0010 U	--	0.037	Human Health - Ingestion	--
	gamma-BHC (γ-BHC, Lindane)	µg/L	0.0013 U	0.0095 UJ	0.0011 UJ	0.00052 U	0.00035 U	0.0016 U	--	0.052	Human Health - Ingestion	--
	alpha-Chlordane	µg/L	0.0024 U	0.0017 U	0.00085 UJ	0.00022 U	0.00018 U	0.00091 U	0.000081	--	--	--
	beta-Chlordane	µg/L	0.00022 U	0.0021 U	0.00022 U	0.00022 U	0.00022 U	0.00039 U	0.000081	--	--	--
	Total Chlordane <sup>(6)</sup>	µg/L	0.0024 ND	0.0021 ND	0.00085 ND	0.00022 ND	0.00022 ND	0.00099 U	0.000081	0.00081	Human Health - Fish Consumption	--
	Dieldrin	µg/L	0.00024 U	0.0081 UJ	0.00024 U	0.0011 U	0.00085 U	0.00082 U	--	0.000054	Human Health - Fish Consumption	--
	Endosulfan I	µg/L	0.00016 U	0.0015 U	0.00036 UJ	0.00016 U	0.00016 U	0.00034 U	--	0.051	Ecological	--
	Endosulfan II	µg/L	0.00021 U	0.0020 U	0.00021 U	0.00021 U	0.00025 U	0.00038 U	--	0.051	Ecological	--
	Endosulfan Sulfate	µg/L	0.00086 U	0.0084 U	0.0011 UJ	0.00099 U	0.0013 U	0.0017 U	--	89	Human Health - Fish Consumption	--
	Endrin	µg/L	0.00059 U	0.0018 U	0.00019 U	0.00019 U	0.00019 U	0.00044 U	--	0.036	Ecological	--
	Endrin Aldehyde	µg/L	0.0038 U	0.0120 UJ	0.0039 UJ	0.0026 U	0.0025 U	0.0046 U	--	--	--	--
	Endrin Ketone	µg/L	0.00029 U	0.0028 U	0.00029 U	0.00029 U	0.00029 U	0.00051 U	--	0.3	Human Health - Fish Consumption	--
	Heptachlor	µg/L	0.00014 U	0.0013 U	0.00014 U	0.00014 U	0.00014 U	0.00024 U	--	0.000079	Human Health - Fish Consumption	--
	Heptachlor Epoxide	µg/L	0.00071 U	0.0069 U	0.00071 U	0.00071 U	0.00072 U	0.0013 U	--	0.000039	Human Health - Fish Consumption	--
	Methoxychlor	µg/L	0.00023 U	0.0022 U	0.00023 U	0.0023 U	0.00023 U	0.00062 U	--	0.03	Ecological	--
	Toxaphene	µg/L	0.020 U	0.19 U	0.020 U	0.11 U	0.020 U	0.047 U	--	0.0002	Ecological	--

## Notes:

DEQ = Oregon Department of Environmental Quality

DUP = field duplicate sample

NA = not analyzed

ND = not detected

J+ = Detection of analyte is considered a high estimate.

U = The analyte was not detected above the reported sample quantification limit.

UJ = The analyte was not detected and the detection limit is considered an estimate.

-- = not established

µg/L = micrograms per liter

mg/L = milligrams per liter

<sup>(1)</sup> Sampling location is shown on Figure A-5 of main report. Samples were collected at manhole ABC352 (outgoing 12-inch pipe) and represent all of the Basin 44 drainage area.<sup>(2)</sup> For the purposes of calculating the geometric mean concentrations, non-detect results are set to the value of the method reporting limit, with the exception of total PAHs and total PCB congeners. This assumption is conservative and may overestimate the true geometric mean concentration. For total PAHs and total PCB congeners, results including one or more detections of an individual constituent were calculated by assigning a value of zero to non-detected concentrations. For results in which no individual constituents were detected, the total concentration is reported as the highest MRL among the individual constituents. Duplicate sample results were averaged with the corresponding primary sample results, and the average concentration for that event was then included as a single value in the geometric mean calculations.<sup>(3)</sup> Portland Harbor screening criteria are the cleanup levels for surface water specified in Table 17 of the Portland Harbor Record of Decision (ROD; EPA, 2017), where established. Where no cleanup level for a constituent is established in the ROD, the screening level value (SLV) from the Portland Harbor Joint Source Control Strategy (DEQ/EPA, 2005) is used, if established.<sup>(4)</sup> Endpoint = source of the JSCS SLV to be used for initial upland source control screening evaluations (DEQ/EPA, 2005):*Human Health - Fish Consumption* = SLVs for chemicals in water taken up by fish for human consumption; these SLVs represent EPA's National Recommended Water Quality Criteria (NRWQC) values. If no NRWQC values are available, then DEQ's ambient water quality criteria (AWQC) values are listed for the constituent.*Human Health - Ingestion* = SLVs for chemicals in water for human ingestion; these SLVs represent the most conservative value between EPA's Maximum Contaminant Levels (MCLs) and Region 9 Preliminary Remediation Goals (PRGs).*Ecological* = SLVs for chemicals in water for ecological exposure; these SVLs represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent. If no AWQC values are available, then Oak Ridge National Laboratory Tier II SCV Technology Benchmark values are listed for the constituent.<sup>(5)</sup> Range below typical concentrations in graphs developed by DEQ of concentrations of selected contaminants detected in stormwater from a larger number of industrial sites in Portland Harbor to assist with data evaluation [Appendix E to *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (DEQ, 2009, updated December 2015)].<sup>(6)</sup> For purposes of calculating total PAHs, total PCB congeners, total DDX and total Chlordane values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.<sup>(7)</sup> Refer to Table A4-12 for individual PCB congener results.**bold** = Concentration exceeds the Portland Harbor screening criterion.

**Table A4-12**  
**2016/2017 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 44, Basin-Scale Monitoring Location (44\_SW20)**

Outfall Basin 44, Location 44_SW20 <sup>(2)</sup>							
Stormwater Grab Samples							
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3		
			W16C092-02 3/9/2016	W16E158-03 5/19/2016	W16I112-01 10/13/2016	Event 4 W17B063-01 2/8/2017	Event 4 DUP W17B063-04 2/8/2017
Polychlorinated Biphenyl Congeners (PCBs) (EPA 1668A)							
PCB 1	2-MoCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000081 U	0.000061 U
PCB 2	3-MoCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000093 U	0.000072 U
PCB 3	4-MoCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000082 U	0.000065 U
PCB 4	2,2-DiCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000078 U	0.000046 U
PCB 5	2,3-DiCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000019 U	0.000020 U
PCB 6	2,3-DiCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000019 U	0.000020 U
PCB 7	2,4-DiCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000019 U	0.000020 U
PCB 8	2,4-DiCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000026 J	0.000051 UJ
PCB 9	2,5-DiCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000019 U	0.000020 U
PCB 10	2,6-DiCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000049 U	0.000051 U
PCB 11	3,3'-DiCB	µg/L	0.00241 U	0.002490 U	0.002570 U	0.000411	0.000361
PCB 12/13	3,4-DiCB + 3,4'-DiCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 14	3,5-DiCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000019 U	0.000020 U
PCB 15	4,4'-DiCB	µg/L	0.000325 U	0.000335 U	0.000346 U	0.000050 J	0.000032 J
PCB 16	2,2',3'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000076 U	0.000070 U
PCB 17	2,2',4'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000067 U	0.000062 U
PCB 18/30	2,2',5'-TriCB + 2,4,6-TriCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000056 U	0.000052 U
PCB 19	2,2',6'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000078 U	0.000068 U
PCB 20/28	2,3,3'-TriCB + 2,4,4'-TriCB	µg/L	0.00127 U	0.001310 U	0.001350 U	0.000122	0.000125
PCB 21/33	2,3,4'-TriCB + 2,3,4-TriCB	µg/L	0.00133 U	0.001370 U	0.001420 U	0.000063 U	0.000063 U
PCB 22	2,3,4'-TriCB	µg/L	0.000936 U	0.000964 U	0.000996 U	0.000061 U	0.000060 U
PCB 23	2,3,5'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000060 U	0.000060 U
PCB 24	2,3,6'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000048 U	0.000045 U
PCB 25	2,3',4'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000059 U	0.000059 U
PCB 26/29	2,3',5'-TriCB + 2,4,5'-TriCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000063 U	0.000063 U
PCB 27	2,3',6'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000046 U	0.000043 U
PCB 31	2,4',5'-TriCB	µg/L	0.001280 U	0.001320 U	0.001360 U	0.000125	0.000087 J
PCB 32	2,4',6'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000044 U	0.000044 U
PCB 34	2',3,5'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000061 U	0.000061 U
PCB 35	3,3',4'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000062 U	0.000062 U
PCB 36	3,3',5'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000060 U	0.000060 U
PCB 37	3,4,4'-TriCB	µg/L	0.000735	0.000538 U	0.000556 U	0.000058 U	0.000078 J
PCB 38	3,4,5'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000062 U	0.000061 U
PCB 39	3,4',5'-TriCB	µg/L	0.000246 U	0.000254 U	0.000262 U	0.000056 U	0.000056 U
PCB 40/41/71	2,2',3,3'-TeCB + 2,2',3,4'-TeCB + 2,3',4',6'-TeCB	µg/L	0.001480 U	0.001520 U	0.001570 U	0.000097 U	0.000101 U
PCB 42	2,2',3,4'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000097 U	0.000101 U
PCB 43/73	2,2',3,5'-TeCB + 2,3',5',6'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 44/47/65	2,2',3,5'-TeCB + 2,2',4,4'-TeCB + 2,3,5,6'-TeCB	µg/L	0.00148 U	0.001520 U	0.001570 U	0.000157	0.000158
PCB 45/51	2,2',3,6'-TeCB + 2,2',4,6'-TeCB	µg/L	0.000985 U	0.001020 U	0.001050 U	0.000058 U	0.000051 U
PCB 46	2,2',3,6'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000066 U	0.000056 U
PCB 48	2,2',4,5'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000053 U	0.000051 U
PCB 49/69	2,2',4,5'-TeCB + 2,3',4,6'-TeCB	µg/L	0.000985 U	0.001020 U	0.001050 U	0.000078 J	0.000082 J
PCB 50/53	2,2',4,6'-TeCB + 2,2',5,6'-TeCB	µg/L	0.000985 U	0.001020 U	0.001050 U	0.000097 U	0.000101 U
PCB 52	2,2',5,5'-TeCB	µg/L	0.00152 U	0.001560 U	0.001610 U	0.000211	0.000203
PCB 54	2,2',6,6'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000045 U	0.000042 U
PCB 55	2,3,3',4'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 56	2,3,3',4'-TeCB	µg/L	0.000864	0.000508 U	0.000524 U	0.000114	0.000083 J
PCB 57	2,3,3',5'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 58	2,3,3',5'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 59/62/75	2,3,3',6'-TeCB + 2,3,4,6'-TeCB + 2,4,4',6'-TeCB	µg/L	0.00148 U	0.001520 U	0.001570 U	0.000097 U	0.000101 U
PCB 60	2,3,4,4'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000047 J
PCB 61/70/74/76	2,3,4,5'-TeCB + 2,3',4',5'-TeCB + 2,4,4',5'-TeCB + 2',3,4,5'-TeCB	µg/L	0.00212	0.002030 U	0.002100 U	0.000377	0.000323
PCB 63	2,3,4',5'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 64	2,3,4',6'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000070 J	0.000062 J
PCB 66	2,3,4,4'-TeCB	µg/L	0.00123	0.000853 U	0.000881 U	0.000190	0.000157
PCB 67	2,3,4,5'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 68	2,3,4,5'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 72	2,3,5,5'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 77	3,3',4,4'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000050	0.000037 U
PCB 78	3,3',4,5'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 79	3,3',4,5'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 80	3,3',5,5'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 81	3,4,4',5'-TeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000041 U	0.000037 U
PCB 82	2,2',3,3',4'-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000073 J	0.000051 UJ
PCB 83	2,2',3,3',5'-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	NA	NA
PCB 83/99	2,2',3,3',5'-PeCB + 2,2',4,4',5'-PeCB	µg/L	NA	NA	NA	0.000222	0.000194
PCB 84	2,2',3,3',6'-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000054 U	0.000048 U
PCB 85/116/117	2,2',3,4,4'-PeCB + 2,3,4,5,6'-PeCB + 2,3,4',5,6'-PeCB	µg/L	0.001480 U	0.001520 U	0.001570 U	0.000091 J	0.000064 J
PCB 86/87/97/108/119/125	2,2',3,4,5'-PeCB + 2,2',3,4,5'-PeCB + 2,2',3',4,5'-PeCB + 2,3,3',4,5'-PeCB + 2,3',4,4',6'-PeCB + 2,3,4,5,6'-PeCB	µg/L	0.00295 U	0.003050 U	0.00315 U	0.00036	0.000296
PCB 88/91	2,2',3,4,6'-PeCB + 2,2',3,4',6'-PeCB	µg/L	0.000985 U	0.001020 U	0.001050 U	0.000086 J	0.000087
PCB 89	2,2',3,4,6'-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000051 U	0.000051 U
PCB 90/101/113	2,2',3,4',5'-PeCB + 2,2',4,5,5'-PeCB + 2,3,3',5',6'-PeCB	µg/L	0.00148 U	0.001520 U	0.001570 U	0.000463	0.000381
PCB 92	2,2',3,5,5'-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000082 J	0.000057 J
PCB 93/98/100/102	2,2',3,5,6'-PeCB + 2,2',3',4,6'-PeCB + 2,2',4,4',6'-PeCB + 2,2',4,5,6'-PeCB	µg/L	0.00197 U	0.002030 U	0.002100 U	NA	NA

**Table A4-12**  
**2016/2017 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 44, Basin-Scale Monitoring Location (44\_SW20)**

		Outfall Basin 44, Location 44_SW20 <sup>(2)</sup>					
		Stormwater Grab Samples					
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3	Event 4	Event 4 DUP
			W16C092-02 3/9/2016	W16E158-03 5/19/2016	W16I112-01 10/13/2016	W17B063-01 2/8/2017	W17B063-04 2/8/2017
PCB 93/95/100	2,2',3,5,6-PeCB + 2,2',3,5',6-PeCB + 2,2',4,4',6-PeCB	µg/L	NA	NA	NA	0.000344	0.000322
PCB 94	2,2',3,5,6'-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	NA	NA
PCB 95	2,2',3,5',6-PeCB	µg/L	0.000936 U	0.000964 U	0.000996 U	NA	NA
PCB 96	2,2',3,6,6'-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 98/102	2,2',3',4,6-PeCB + 2,2',4,5,6'-PeCB	µg/L	NA	NA	NA	0.000194 U	0.000202 U
PCB 99	2,2',4,4',5-PeCB	µg/L	0.000523	0.000508 U	0.000524 U	NA	NA
PCB 103	2,2',4,5',6-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 104	2,2',4,6,6'-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000051 U	0.000038 U
PCB 105	2,3,3',4,4'-PeCB	µg/L	0.000832	0.000508 U	0.000524 U	0.000212	0.000200
PCB 106	2,3,3',4,5-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 107	2,3,3',4',5-PeCB	µg/L	NA	NA	NA	0.000049 U	0.000051 U
PCB 107/124	2,3,3',4',5-PeCB + 2',3,4,5,5'-PeCB	µg/L	0.000985 U	0.001020 U	0.001050 U	NA	NA
PCB 108/124	2,3,3',4,5'-PeCB + 2',3,4,5,5'-PeCB	µg/L	NA	NA	NA	0.000097 U	0.000101 U
PCB 109	2,3,3',4,6-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	NA	NA
PCB 110/115	2,3,3',4',6-PeCB + 2,3,4,4',6-PeCB	µg/L	0.00254	0.001020 U	0.001050 U	0.000714	0.000591
PCB 111	2,3,3',5,5'-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 112	2,3,3',5,6-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 114	2,3,4,4',5-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000036 U	0.000029 U
PCB 118	2,3',4,4',5-PeCB	µg/L	0.00163	0.000650 U	0.000671 U	0.000379	0.000410
PCB 120	2,3',4,5,5'-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 121	2,3',4,5',6-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 122	2',3,3',4,5-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 123	2',3,4,4',5-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000035 U	0.000029 U
PCB 126	3,3',4,4',5-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000038 U	0.000033 U
PCB 127	3,3',4,5,5'-PeCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 128/166	2,2',3,3',4',4'-HxCB + 2,3,4,4',5,6-HxCB	µg/L	0.00099 U	0.001020 U	0.00105 U	0.00015	0.000139
PCB 129/138/163	2,2',3,3',4,5-HxCB + 2,2',3,4,4',5'-HxCB + 2,3,3',4',5,6-HxCB	µg/L	0.00292	0.001520 U	0.001570 U	0.00133	0.001170
PCB 130	2,2',3,3',4,5'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000041 J	0.000040 J
PCB 131	2,2',3,3',4,6-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 132	2,2',3,3',4,6'-HxCB	µg/L	0.000937	0.000508 U	0.000524 U	0.000315	0.000302
PCB 133	2,2',3,3',5,5'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 134	2,2',3,3',5,6-HxCB	µg/L	NA	NA	NA	0.000097 U	0.000101 U
PCB 134/143	2,2',3,3',5,6-HxCB + 2,2',3,4,5,6'-HxCB	µg/L	0.000985 U	0.001020 U	0.001050 U	NA	NA
PCB 135/151	2,2',3,3',5,6'-HxCB + 2,2',3,3,5',6-HxCB	µg/L	0.000985 U	0.001020 U	0.001050 U	NA	NA
PCB 135/151/154	2,2',3,3',5,6'-HxCB + 2,2',3,3,5',6-HxCB + 2,2',4,4',5,6'-HxCB	µg/L	NA	NA	NA	0.000275	0.000272
PCB 136	2,2',3,3',6,6'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000116	0.000116 J
PCB 137	2,2',3,4,4',5-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000036 J	0.000048 J
PCB 139/140	2,2',3,4,4',6-HxCB + 2,2',3,4,4',6'-HxCB	µg/L	0.000985 U	0.001020 U	0.001050 U	0.000097 U	0.000101 U
PCB 141	2,2',3,4,5,5'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000191	0.000150 J
PCB 142	2,2',3,4,5,6-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 143	2,2',3,4,5,6'-HxCB	µg/L	NA	NA	NA	0.000097 U	0.000101 U
PCB 144	2,2',3,4,5',6-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000033 J	0.000044 J
PCB 145	2,2',3,4,6,6'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 146	2,2',3,4',5,5'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000123	0.000114 J
PCB 147/149	2,2',3,4',5,6-HxCB + 2,2',3,4',5',6-HxCB	µg/L	0.00182	0.001020 U	0.001050 U	0.00074	0.000674
PCB 148	2,2',3,4',5,6'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 150	2,2',3,4',6,6'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 152	2,2',3,5,6,6'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 153/168	2,2',4,4',5,5'-HxCB + 2,3',4,4',5',6-HxCB	µg/L	0.00184	0.001020 U	0.001050 U	0.00066	0.000641
PCB 154	2,2',4,4',5,6'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	NA	NA
PCB 155	2,2',4,4',6,6'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000021 U	0.000021 J
PCB 156/157	2,3,3',4,4',5-HxCB + 2,3,3',4,4',5'-HxCB	µg/L	0.000985 U	0.001020 U	0.001050 U	0.000102	0.000080 J
PCB 158	2,3,3',4,4',6-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000097 J	0.000070 J
PCB 159	2,3,3',4,5,5'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 160	2,3,3',4,5,6-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000194 U	0.000202 U
PCB 161	2,3,3',4,5',6-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 162	2,3,3',4',5,5'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 164	2,3,3',4',5',6-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000071	0.000068
PCB 165	2,3,3',5,5',6-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 167	2,3,4,4',5,5'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000023 UJ	0.000036 J
PCB 169	3,3',4,4',5,5'-HxCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000023 U	0.000028 U
PCB 170	2,2',3,3',4,4',5-HpCB	µg/L	0.000499	0.000508 U	0.000524 U	0.000232 J	0.000272
PCB 171/173	2,2',3,3',4,4',6-HpCB + 2,2',3,3',4,5,6-HpCB	µg/L	0.000985 U	0.001020 U	0.001050 U	0.000091 J	0.000096 J
PCB 172	2,2',3,3',4,5,5'-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 174	2,2',3,3',4,5,6-HpCB	µg/L	0.000596	0.000508 U	0.000524 U	0.000333	0.000378
PCB 175	2,2',3,3',4,5,6'-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 176	2,2',3,3',4,6,6'-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000038 J	0.000038 J
PCB 177	2,2',3,3',4',5,6-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000192	0.000187
PCB 178	2,2',3,3',5,5',6-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000063	0.000069
PCB 179	2,2',3,3',5,6,6'-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000149	0.000125 J
PCB 180/193	2,2',3,4,4',5,5'-HpCB + 2,3,3',4',5,5',6-HpCB	µg/L	0.00122	0.001020 U	0.001050 U	0.00063	0.000623
PCB 181	2,2',3,4,4',5,6-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 182	2,2',3,4,4',5,6'-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 183/185	2,2',3,4,4',5,6-HpCB + 2,2',3,4,5,5',6-HpCB	µg/L	0.000985 U	0.001020 U	0.001050 U	0.000193	0.000197 J
PCB 184	2,2',3,4,4',6,6'-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 186	2,2',3,4,5,6,6'-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 187	2,2',3,4',5,5',6-HpCB	µg/L	0.000729	0.000508 U	0.000524 U	0.000378	0.000419
PCB 188	2,2',3,4',5,6,6'-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000021 U	0.000024 U

**Table A4-12**  
**2016/2017 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 44, Basin-Scale Monitoring Location (44\_SW20)**

		Outfall Basin 44, Location 44_SW20 <sup>(2)</sup>					
		Stormwater Grab Samples					
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3	Event 4	Event 4 DUP
			W16C092-02 3/9/2016	W16E158-03 5/19/2016	W16I112-01 10/13/2016	W17B063-01 2/8/2017	W17B063-04 2/8/2017
PCB 189	2,3,3',4,4',5,5'-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000029 U	0.000032 U
PCB 190	2,3,3',4,4',5,6'-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000039 J	0.000037 J
PCB 191	2,3,3',4,4',5,6'-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 192	2,3,3',4,4',5,6'-HpCB	µg/L	0.000492 U	0.000508 U	0.000524 U	0.000049 U	0.000051 U
PCB 194	2,2',3,3',4,4',5,5'-OxCB	µg/L	0.000739 U	0.000761 U	0.000786 U	0.000148	0.000123 J
PCB 195	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000739 U	0.000761 U	0.000786 U	0.000063	0.000045 J
PCB 196	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000739 U	0.000761 U	0.000786 U	0.000075	0.000084
PCB 197/200	2,2',3,3',4,4',6,6'-OxCB + 2,2',3,3',4,5,6,6'-OxCB	µg/L	0.00148 U	0.001520 U	0.00157 U	0.00010 U	0.000101 U
PCB 198/199	2,2',3,3',4,5,5',6'-OxCB + 2,2',3,3',4,5,5',6'-OxCB	µg/L	0.00148 U	0.001520 U	0.001570 U	0.000191	0.000179
PCB 200	2,2',3,3',4,5,6,6'-OxCB	µg/L	NA	NA	NA	0.000097 U	0.000101 U
PCB 201	2,2',3,3',4,5,6,6'-OxCB	µg/L	0.000739 U	0.000761 U	0.000786 U	0.000020 J	0.000051 U
PCB 202	2,2',3,3',5,5',6,6'-OxCB	µg/L	0.000739 U	0.000761 U	0.000786 U	0.000049 J	0.000025 UJ
PCB 203	2,2',3,4,4',5,5',6'-OxCB	µg/L	0.000739 U	0.000761 U	0.000786 U	0.000109 J	0.000107
PCB 204	2,2',3,4,4',5,6,6'-OxCB	µg/L	0.000739 U	0.000761 U	0.000786 U	0.000049 U	0.000051 U
PCB 205	2,3,3',4,4',5,5',6'-OxCB	µg/L	0.000739 U	0.000761 U	0.000786 U	0.000019 U	0.000030 U
PCB 206	2,2',3,3',4,4',5,5',6'-NoCB	µg/L	0.000739 U	0.000761 U	0.000786 U	0.000086 J	0.000059 J
PCB 207	2,2',3,3',4,4',5,6,6'-NoCB	µg/L	0.000739 U	0.000761 U	0.000786 U	0.000049 U	0.000051 U
PCB 208	2,2',3,3',4,5,5',6,6'-NoCB	µg/L	0.000739 U	0.000761 U	0.000786 U	0.000022 U	0.000032 U
PCB 209	Decachlorobiphenyl	µg/L	0.000739 U	0.000761 U	0.000786 U	0.000019 U	0.000028 U
Total Monochlorobiphenyls		µg/L	ND	ND	ND	0.0000813 U	0.000068
Total Dichlorobiphenyls		µg/L	ND	ND	ND	0.000487	0.000392
Total Trichlorobiphenyls		µg/L	0.000735	ND	ND	0.000247	0.0000506
Total Tetrachlorobiphenyls		µg/L	0.00421	ND	ND	0.00125	0.00111
Total Pentachlorobiphenyls		µg/L	0.00553	ND	ND	0.00302	0.0026
Total Hexachlorobiphenyls		µg/L	0.00751	ND	ND	0.00427	0.00396
Total Heptachlorobiphenyls		µg/L	0.00304	ND	ND	0.00214	0.00225
Total Octachlorobiphenyls		µg/L	ND	ND	ND	0.000654	0.000539
Total Nonachlorobiphenyls		µg/L	ND	ND	ND	0.0000858	0.0000587
Total Decachlorobiphenyls		µg/L	ND	ND	ND	NA	NA
Total PCBs <sup>(3)</sup>		µg/L	0.0210	0.00305 ND	0.00315 ND	0.0123	0.000202

## Notes:

MoCB = Monochlorobiphenyl

DiCB = Dichlorobiphenyl

TriCB = Trichlorobiphenyl

TeCB = Tetrachlorobiphenyl

PeCB = Pentachlorobiphenyl

HeCB = Hexachlorobiphenyl

HpCB = Heptachlorobiphenyl

OxCB = Octachlorobiphenyl

NoCB = Nonachlorobiphenyl

-- = No JSCS screening level available.

U = The analyte was not detected above the reported sample quantification limit.

µg/L = Micrograms per liter

NA = Not analyzed

ND = Not detected

DUP = Duplicate

<sup>(1)</sup> IUPAC = International Union of Pure and Applied Chemistry.<sup>(2)</sup> Sampling location is shown on Figure A-5 of main report. Samples were collected at manhole ABC352 (outgoing 12-inch pipe) and represent all of the Basin 44 drainage area.<sup>(3)</sup> For purposes of calculating total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

Table A4-13  
2016/2017 Stormwater Sample Results  
Outfall Basin 45, Basin-Scale Monitoring Location (45\_SW1)

Class	Analyte	Units	Outfall Basin 45, Location 45_SW1 <sup>(1)</sup> Stormwater Grab Samples					Geometric Mean Concentration <sup>(2)</sup>	Portland Harbor Screening Criteria <sup>(3)</sup>			All Results in Range of Typical Results on DEQ Guidance Curve?(5)
			Event 1 W16C092-03	Event 2 W16E158-01	Event 2 DUP W16E158-04	Event 3 W16J112-02	Event 4 W17B063-02		ROD Cleanup Levels	JSCS SLVs		
			3/9/2016	5/19/2016	5/19/2016	10/13/2016	2/8/2017			SLV	Endpoint <sup>(4)</sup>	
Field Measurements												
	Conductivity	umhos/cm	30	29	NA	30	29	29.5	--	--	--	--
	pH	pH units	6.4	6.2	NA	7.1	6.6	6.57	--	--	--	--
	Temperature	Deg. C	10.2	16.3	NA	13.9	4.5	10.1	--	--	--	--
Total Suspended Solids (SM 2540D)												
	TSS	mg/L	83	46	45	42	47	52	--	--	--	Yes
Total Metals (EPA 200.8)												
	Arsenic	µg/L	<b>1.28</b>	<b>0.957</b>	<b>0.925</b>	<b>1.14</b>	<b>0.731</b>	<b>1.00</b>	0.018	0.045	Human Health - Ingestion	Yes
	Cadmium	µg/L	<b>0.205</b>	<b>0.375</b>	<b>0.358</b>	<b>0.170</b>	<b>0.249</b>	<b>0.237</b>	--	0.094	Ecological	Yes
	Chromium	µg/L	9.78	9.40	9.03	7.00	6.68	8.06	100	100	Human Health - Ingestion	Yes
	Copper	µg/L	<b>16.8</b>	<b>20.4</b>	<b>21.0</b>	<b>13.1</b>	<b>10.1</b>	<b>14.6</b>	2.74	2.7	Ecological	Yes
	Lead	µg/L	<b>10.5</b>	<b>6.21</b>	<b>6.09</b>	<b>10.9</b>	<b>11.6</b>	<b>9.51</b>	--	0.54	Ecological	Yes
	Mercury (WPCLSOP M-10)	µg/L	0.0145	0.0155	0.015	0.0115	0.00755	0.0118	--	0.77	Ecological	Yes
	Nickel	µg/L	8.40	7.13	6.93	5.49	4.92	6.32	--	16	Ecological	Yes
	Silver	µg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	--	0.12	Ecological	Yes
	Zinc	µg/L	<b>207</b>	<b>609</b>	<b>605</b>	<b>341</b>	<b>299</b>	<b>336</b>	36.5	36	Ecological	No
Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270-SIM)												
	Acenaphthene	µg/L	0.051	0.020 U	0.020 U	0.020 U	0.029	0.028	--	0.2	Human Health - Ingestion	--
	Acenaphthylene	µg/L	<b>0.59</b>	0.039	0.081	0.069	0.11	0.13	--	0.2	Human Health - Ingestion	--
	Anthracene	µg/L	<b>0.50</b>	0.046	0.063	0.051	0.069	0.099	--	0.2	Human Health - Ingestion	--
	Benzo(a)anthracene	µg/L	<b>0.34</b>	<b>0.034 J</b>	<b>0.061 J</b>	<b>0.034</b>	<b>0.079</b>	<b>0.081</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(a)pyrene	µg/L	<b>0.62</b>	<b>0.062 J</b>	<b>0.13 J</b>	<b>0.063</b>	<b>0.12</b>	<b>0.15</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Benzo(b)fluoranthene	µg/L	<b>0.86</b>	<b>0.12</b>	<b>0.20</b>	<b>0.12</b>	<b>0.21</b>	<b>0.24</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(g,h,i)perylene	µg/L	<b>0.73</b>	0.12	0.18	0.12	0.17	<b>0.22</b>	--	0.2	Human Health - Ingestion	--
	Benzo(k)fluoranthene	µg/L	<b>0.23</b>	<b>0.031</b>	<b>0.06</b>	<b>0.033</b>	<b>0.057</b>	<b>0.067</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Chrysene	µg/L	<b>0.49</b>	<b>0.072</b>	<b>0.12</b>	<b>0.066</b>	<b>0.13</b>	<b>0.14</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Dibenzo(a,h)anthracene	µg/L	<b>0.10</b>	<b>0.019</b>	<b>0.028</b>	<b>0.017</b>	<b>0.025</b>	<b>0.032</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Fluoranthene	µg/L	<b>0.86</b>	0.14	0.18	0.11	<b>0.26</b>	<b>0.25</b>	--	0.2	Human Health - Ingestion	--
	Fluorene	µg/L	0.060 U	0.02	0.026	0.020 U	0.033	0.031	--	0.2	Human Health - Ingestion	--
	Indeno(1,2,3-cd)pyrene	µg/L	<b>0.49</b>	<b>0.075</b>	<b>0.12</b>	<b>0.075</b>	<b>0.11</b>	<b>0.14</b>	0.0012	0.018	Human Health - Fish Consumption	--
	1-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	--	--	--	--
	1-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	--	0.2	Human Health - Ingestion	--
	Naphthalene	µg/L	0.043	0.040 U	0.040 U	0.040 U	0.040 U	0.041	12	0.2	Human Health - Ingestion	--
	Phenanthrene	µg/L	0.18	0.13	0.12	0.063	0.12	0.11	--	0.2	Human Health - Ingestion	--
	Pyrene	µg/L	<b>1.2</b>	0.13	0.18	0.13	<b>0.31</b>	<b>0.29</b>	--	0.2	Human Health - Ingestion	--
	Total PAHs <sup>(6)</sup>	µg/L	7.3	1.0	1.5	1.0	1.8	2.1	--	--	--	No

**Table A4-13**  
**2016/2017 Stormwater Sample Results**  
**Outfall Basin 45, Basin-Scale Monitoring Location (45\_SW1)**

Class	Analyte	Units	Outfall Basin 45, Location 45_SW1 <sup>(1)</sup>					Geometric Mean Concentration <sup>(2)</sup>	Portland Harbor Screening Criteria <sup>(3)</sup>			All Results in Range of Typical Results on DEQ Guidance Curve?(5)
			Stormwater Grab Samples						ROD Cleanup Levels	JSCS SLVs		
			Event 1 W16C092-03	Event 2 W16E158-01	Event 2 DUP W16E158-04	Event 3 W16J112-02	Event 4 W17B063-02			SLV	Endpoint <sup>(4)</sup>	
Phthalates (EPA 8270-SIM)												
	Bis(2-ethylhexyl)phthalate	µg/L	<b>6.8</b> J+	<b>2.4</b>	<b>2.8</b>	<b>1.2</b> J+	<b>2.5</b>	<b>2.7</b>	0.2	2.2	Human Health - Fish Consumption	No
	Butylbenzylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Di-n-butylphthalate	µg/L	0.50	0.60 J	0.58 J	0.50 U	0.50 U	0.52	--	3	Ecological	--
	Di-n-octylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Diethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Dimethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
Polychlorinated Biphenyl (PCB) Congeners												
	Total PCB Congeners <sup>(6)(7)</sup>	µg/L	0.00291 ND	0.00301 ND	0.00305 ND	0.00321 ND	<b>0.00835</b>	<b>0.00392</b>	0.0000064	0.000064	Human Health - Fish Consumption	Yes

## Notes:

DEQ = Oregon Department of Environmental Quality

DUP = field duplicate sample

NA = not analyzed

ND = not detected

U = The analyte was not detected above the reported sample quantification limit.

J+ = Detection of analyte is considered a high estimate.

-- = not established

µg/L = micrograms per liter

mg/L = milligrams per liter

<sup>(1)</sup> Sampling location is shown on Figure A-6 of main report. Samples were collected at manhole ABC319 (outgoing 27-inch pipe) and represent all of the Basin 45 drainage area.

<sup>(2)</sup> For the purposes of calculating the geometric mean concentrations, non-detect results are set to the value of the method reporting limit, with the exception of total PAHs and total PCB congeners. This assumption is conservative and may overestimate the true geometric mean concentration. For total PAHs and total PCB congeners, results including one or more detections of an individual constituent were calculated by assigning a value of zero to non-detected concentrations. For results in which no individual constituents were detected, the total concentration is reported as the highest MRL among the individual constituents. Duplicate sample results were averaged with the corresponding primary sample results, and the average concentration for that event was then included as a single value in the geometric mean calculations.

<sup>(3)</sup> Portland Harbor screening criteria are the cleanup levels for surface water specified in Table 17 the Portland Harbor Record of Decision (ROD; EPA, 2017), where established. Where no cleanup level for a constituent is established in the ROD, the screening level value (SLV) from the Portland Harbor Joint Source Control Strategy (DEQ/EPA, 2005) is used, if established.

<sup>(4)</sup> Endpoint = source of the JSCS SLV to be used for initial upland source control screening evaluations (DEQ/EPA, 2005):

*Human Health - Fish Consumption* = SLVs for chemicals in water taken up by fish for human consumption; these SLVs represent EPA's National Recommended Water Quality Criteria (NRWQC) values. If no NRWQC values are available, then DEQ's ambient water quality criteria (AWQC) values are listed for the constituent.

*Human Health - Ingestion* = SLVs for chemicals in water for human ingestion; these SLVs represent the most conservative value between EPA's Maximum Contaminant Levels (MCLs) and Region 9 Preliminary Remediation Goals (PRGs).

*Ecological* = SLVs for chemicals in water for ecological exposure; these SLVs represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent. If no AWQC values are available, then Oak Ridge National Laboratory Tier II SCV Technology Benchmark values are listed for the constituent.

<sup>(5)</sup> Range below typical concentrations in graphs developed by DEQ of concentrations of selected contaminants detected in stormwater from a larger number of industrial sites in Portland Harbor to assist with data evaluation [Appendix E to *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (DEQ, 2009, updated December 2015)].

<sup>(6)</sup> For purposes of calculating total PAH values and total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

<sup>(7)</sup> Refer to Table A4-14 for individual PCB congener results.

**bold** = Concentration exceeds the Portland Harbor screening criterion.

**Table A4-14**  
**2016/2017 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 45, Basin-Scale Monitoring Location (45\_SW1)**

Outfall Basin 45, Location 45_SW1 <sup>(2)</sup>							
Stormwater Grab Samples							
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1 W16C092-03 3/9/2016	Event 2 W16E158-01 5/19/2016	Event 2 DUP W16E158-04 5/19/2016	Event 3 W16J112-02 10/13/2016	Event 4 W17B063-02 2/8/2017
Polychlorinated Biphenyl Congeners (PCBs) (EPA 1668A)							
PCB 1	2-MoCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000072 U
PCB 2	3-MoCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000085 U
PCB 3	4-MoCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000077 U
PCB 4	2,2'-DiCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000064 U
PCB 5	2,3-DiCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000021 U
PCB 6	2,3'-DiCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000021 U
PCB 7	2,4-DiCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000021 U
PCB 8	2,4'-DiCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000051 U
PCB 9	2,5-DiCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000021 U
PCB 10	2,6-DiCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000051 U
PCB 11	3,3'-DiCB	µg/L	0.00238 U	0.002450 U	0.002490 U	0.002620 U	0.000525
PCB 12/13	3,4-DiCB + 3,4'-DiCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 14	3,5-DiCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000021 U
PCB 15	4,4'-DiCB	µg/L	0.000321 U	0.000331 U	0.000335 U	0.000353 U	0.000021 U
PCB 16	2,2',3'-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000069 U
PCB 17	2,2',4'-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000061 U
PCB 18/30	2,2',5'-TriCB + 2,4,6-TriCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 19	2,2',6'-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000070 U
PCB 20/28	2,3,3'-TriCB + 2,4,4'-TriCB	µg/L	0.00125 U	0.001290 U	0.001310 U	0.001380 U	0.000062 U
PCB 21/33	2,3,4-TriCB + 2',3,4-TriCB	µg/L	0.00131 U	0.001350 U	0.001370 U	0.001450 U	0.000065 U
PCB 22	2,3,4'-TriCB	µg/L	0.000923 U	0.000952 U	0.000964 U	0.001020 U	0.000062 U
PCB 23	2,3,5-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000062 U
PCB 24	2,3,6-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000044 U
PCB 25	2,3',4-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000061 U
PCB 26/29	2,3',5-TriCB + 2,4,5-TriCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000065 U
PCB 27	2,3',6-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000043 U
PCB 31	2,4',5-TriCB	µg/L	0.00126 U	0.001300 U	0.001320 U	0.001390 U	0.000061 U
PCB 32	2,4',6-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000041 U
PCB 34	2',3,5-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000063 U
PCB 35	3,3',4-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000064 U
PCB 36	3,3',5-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000062 U
PCB 37	3,4,4'-TriCB	µg/L	0.000515 U	0.000531 U	0.000538 U	0.000568 U	0.000061 U
PCB 38	3,4,5-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000064 U
PCB 39	3,4',5-TriCB	µg/L	0.000243 U	0.000250 U	0.000254 U	0.000268 U	0.000058 U
PCB 40/41/71	2,2',3,3'-TeCB + 2,2',3,4'-TeCB + 2,3',4',6'-TeCB	µg/L	0.00146 U	0.001500 U	0.001520 U	0.001610 U	0.000103 U
PCB 42	2,2',3,4'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000103 U
PCB 43/73	2,2',3,5'-TeCB + 2,3',5',6'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 44/47/65	2,2',3,5'-TeCB + 2,2',4,4'-TeCB + 2,3,5,6'-TeCB	µg/L	0.00146 U	0.001500 U	0.001520 U	0.001610 U	0.000101 U
PCB 45/51	2,2',3,6'-TeCB + 2,2',4,6'-TeCB	µg/L	0.000971 U	0.001000 U	0.001020 U	0.001070 U	0.000052 U
PCB 46	2,2',3,6'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000059 U
PCB 48	2,2',4,5'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 49/69	2,2',4,5'-TeCB + 2,3',4,6'-TeCB	µg/L	0.000971 U	0.001000 U	0.001020 U	0.001070 U	0.000103 U
PCB 50/53	2,2',4,6'-TeCB + 2,2',5,6'-TeCB	µg/L	0.000971 U	0.001000 U	0.001020 U	0.001070 U	0.000103 U
PCB 52	2,2',5,5'-TeCB	µg/L	0.00150 U	0.001540 U	0.001560 U	0.001650 U	0.000141
PCB 54	2,2',6,6'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 55	2,3,3',4'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 56	2,3,3',4'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000055
PCB 57	2,3,3',5'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 58	2,3,3',5'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 59/62/75	2,3,3',6'-TeCB + 2,3,4,6'-TeCB + 2,4,4',6'-TeCB	µg/L	0.00146 U	0.001500 U	0.001520 U	0.001610 U	0.000103 U
PCB 60	2,3,4,4'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 61/70/74/76	2,3,4,5'-TeCB + 2,3',4',5'-TeCB + 2,4,4',5'-TeCB + 2',3,4,5'-TeCB	µg/L	0.00194 U	0.002000 U	0.002030 U	0.002140 U	0.000168 U
PCB 63	2,3,4,5'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 64	2,3,4,6'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000046 U
PCB 66	2,3',4,4'-TeCB	µg/L	0.000816 U	0.000842 U	0.000853 U	0.000900 U	0.000053 U
PCB 67	2,3',4,5'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 68	2,3',4,5'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 72	2,3',5,5'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 77	3,3',4,4'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000034 U
PCB 78	3,3',4,5'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 79	3,3',4,5'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 80	3,3',5,5'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 81	3,4,4',5'-TeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000033 U
PCB 82	2,2',3,3',4'-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 83	2,2',3,3',5'-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	NA
PCB 83/99	2,2',3,3',5'-PeCB + 2,2',4,4',5'-PeCB	µg/L	NA	NA	NA	NA	0.000143
PCB 84	2,2',3,3',6'-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000061 U
PCB 85/116/117	2,2',3,4,4'-PeCB + 2,3,4,5,6'-PeCB + 2,3',4,5,6'-PeCB	µg/L	0.00146 U	0.001500 U	0.001520 U	0.001610 U	0.000049 U
PCB 86/87/97/108/119/125	2,2',3,4,5'-PeCB + 2,2',3,4,5',6'-PeCB + 2,2',3,4,5'-PeCB + 2,3,3',4,5',6'-PeCB + 2,3',4,4',6'-PeCB + 2,3,4,5,6'-PeCB	µg/L	0.00291 U	0.00301 U	0.00305 U	0.003210 U	0.000230
PCB 88/91	2,2',3,4,6'-PeCB + 2,2',3,4',6'-PeCB	µg/L	0.000971 U	0.001000 U	0.001020 U	0.001070 U	0.000054 U
PCB 89	2,2',3,4,6'-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000058 U
PCB 90/101/113	2,2',3,4',5'-PeCB + 2,2',4,5,5'-PeCB + 2,3,3',5',6'-PeCB	µg/L	0.00146 U	0.00150 U	0.001520 U	0.001610 U	0.000302
PCB 92	2,2',3,5,5'-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U

**Table A4-14**  
**2016/2017 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 45, Basin-Scale Monitoring Location (45\_SW1)**

Outfall Basin 45, Location 45_SW1 <sup>(2)</sup>							
Stormwater Grab Samples							
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1 W16C092-03 3/9/2016	Event 2 W16E158-01 5/19/2016	Event 2 DUP W16E158-04 5/19/2016	Event 3 W16J112-02 10/13/2016	Event 4 W17B063-02 2/8/2017
PCB 93/98/100/102	2,2',3,5,6-PeCB + 2,2',3',4,6-PeCB + 2,2',4,4',6-PeCB + 2,2',4,5,6-PeCB	µg/L	0.00194 U	0.002000 U	0.002030 U	0.002140 U	NA
PCB 93/95/100	2,2',3,5,6-PeCB + 2,2',3',5',6-PeCB + 2,2',4,4',6-PeCB		NA	NA	NA	NA	0.000252
PCB 94	2,2',3,5,6-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000060 U
PCB 95	2,2',3,5',6-PeCB	µg/L	0.000923 U	0.00095 U	0.000964 U	0.001020 U	NA
PCB 96	2,2',3,6,6'-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 98/102	2,2',3',4,6-PeCB + 2,2',4,5,6'-PeCB		NA	NA	NA	NA	0.000205 U
PCB 99	2,2',4,4',5-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	NA
PCB 103	2,2',4,5',6-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 104	2,2',4,6,6'-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000060 U
PCB 105	2,3,3',4,4'-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000119
PCB 106	2,3,3',4,5-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 107	2,3,3',4',5-PeCB		NA	NA	NA	NA	0.000051 U
PCB 107/124	2,3,3',4',5-PeCB + 2',3,4,5,5'-PeCB	µg/L	0.000971 U	0.001000 U	0.001020 U	0.001070 U	NA
PCB 108/124	2,3,3',4,5'-PeCB + 2',3,4,5,5'-PeCB		NA	NA	NA	NA	0.000103 U
PCB 109	2,3,3',4,6-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	NA
PCB 110/115	2,3,3',4',6-PeCB + 2,3,4,4',6-PeCB	µg/L	0.000971 U	0.00100 U	0.001020 U	0.001070 U	0.000486
PCB 111	2,3,3',5,5'-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 112	2,3,3',5,6-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 114	2,3,4,4',5-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000036 U
PCB 118	2,3',4,4',5-PeCB	µg/L	0.000622 U	0.000641 U	0.000650 U	0.000686 U	0.000269
PCB 120	2,3',4,5,5'-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 121	2,3',4,5',6-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 122	2',3,3',4,5-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 123	2',3,4,4',5-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000035 U
PCB 126	3,3',4,4',5-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000038 U
PCB 127	3,3',4,5,5'-PeCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 128/166	2,2',3,3',4,4'-HxCB + 2,3,4,4',5,6-HxCB	µg/L	0.00097 U	0.00100 U	0.00102 U	0.001070 U	0.000109
PCB 129/138/163	2,2',3,3',4,5-HxCB + 2,2',3,3',4,4',5'-HxCB + 2,3,3',4',5,6-HxCB	µg/L	0.00146 U	0.00150 U	0.001520 U	0.001610 U	0.000894
PCB 130	2,2',3,3',4,5'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 131	2,2',3,3',4,6-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 132	2,2',3,3',4,6'-HxCB	µg/L	0.000486 U	0.00050 U	0.000508 U	0.000536 U	0.000220
PCB 133	2,2',3,3',5,5'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 134	2,2',3,3',5,6-HxCB		NA	NA	NA	NA	0.000043 J
PCB 134/143	2,2',3,3',5,6-HxCB + 2,2',3,4,5,6'-HxCB	µg/L	0.000971 U	0.001000 U	0.001020 U	0.001070 U	NA
PCB 135/151	2,2',3,3',5,6'-HxCB + 2,2',3,3',5,5'-HxCB	µg/L	0.000971 U	0.00100 U	0.001020 U	0.001070 U	NA
PCB 135/151/154	2,2',3,3',5,6'-HxCB + 2,2',3,3',5,5'-HxCB + 2,2',4,4',5,6'-HxCB		NA	NA	NA	NA	0.000192
PCB 136	2,2',3,3',6,6'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000077
PCB 137	2,2',3,4,4',5-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 139/140	2,2',3,4,4',6-HxCB + 2,2',3,4,4',6'-HxCB	µg/L	0.000971 U	0.001000 U	0.001020 U	0.001070 U	0.000103 U
PCB 141	2,2',3,4,5,5'-HxCB	µg/L	0.000486 U	0.00050 U	0.000508 U	0.000536 U	0.000118
PCB 142	2,2',3,4,5,6-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 143	2,2',3,4,5,6'-HxCB		NA	NA	NA	NA	0.000103 U
PCB 144	2,2',3,4,5',6-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000030 J
PCB 145	2,2',3,4,6,6'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 146	2,2',3,4',5,5'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000078
PCB 147/149	2,2',3,4',5,6-HxCB + 2,2',3,4',5',6-HxCB	µg/L	0.000971 U	0.00100 U	0.001020 U	0.001070 U	0.000517
PCB 148	2,2',3,4',5,6'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 150	2,2',3,4',6,6'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 152	2,2',3,5,6,6'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 153/168	2,2',4,4',5,5'-HxCB + 2,3,4,4',5,6-HxCB	µg/L	0.000971 U	0.00100 U	0.001020 U	0.001070 U	0.000473
PCB 154	2,2',4,4',5,6'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	NA
PCB 155	2,2',4,4',6,6'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000021 U
PCB 156/157	2,3,3',4,4',5-HxCB + 2,3,3',4,4',5'-HxCB	µg/L	0.000971 U	0.001000 U	0.001020 U	0.001070 U	0.000070
PCB 158	2,3,3',4,4',6-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000068
PCB 159	2,3,3',4,5,5'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 160	2,3,3',4,5,6-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000205 U
PCB 161	2,3,3',4,5',6-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 162	2,3,3',4',5,5'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 164	2,3,3',4',5',6-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000049 J
PCB 165	2,3,3',5,5',6-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 167	2,3,4,4',5,5'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000028
PCB 169	3,3',4,4',5,5'-HxCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000025 U
PCB 170	2,2',3,3',4,4',5-HpCB	µg/L	0.000486 U	0.00050 U	0.000508 U	0.000536 U	0.000212
PCB 171/173	2,2',3,3',4,4',6-HpCB + 2,2',3,3',4,5,6-HpCB	µg/L	0.000971 U	0.001000 U	0.001020 U	0.001070 U	0.000103 U
PCB 172	2,2',3,3',4,5,5'-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 174	2,2',3,3',4,5,6'-HpCB	µg/L	0.000486 U	0.00050 U	0.000508 U	0.000536 U	0.000250
PCB 175	2,2',3,3',4,5',6-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 176	2,2',3,3',4,6,6'-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 177	2,2',3,3',4',5,6-HpCB	µg/L	0.000486 U	0.00050 U	0.000508 U	0.000536 U	0.000143
PCB 178	2,2',3,3',5,5',6-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000050 J
PCB 179	2,2',3,3',5,6,6'-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000112
PCB 180/193	2,2',3,4,4',5,5'-HpCB + 2,3,3',4',5,5',6-HpCB	µg/L	0.000971 U	0.00100 U	0.001020 U	0.001070 U	0.000528
PCB 181	2,2',3,4,4',5,6-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 182	2,2',3,4,4',5,6'-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 183/185	2,2',3,4,4',5',6-HpCB + 2,2',3,4,5,5',6-HpCB	µg/L	0.000971 U	0.00100 U	0.001020 U	0.001070 U	0.000136
PCB 184	2,2',3,4,4',6,6'-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U

**Table A4-14**  
**2016/2017 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 45, Basin-Scale Monitoring Location (45\_SW1)**

<b>Outfall Basin 45, Location 45_SW1<sup>(2)</sup></b>							
<b>Stormwater Grab Samples</b>							
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 2 DUP	Event 3	Event 4
			W16C092-03 3/9/2016	W16E158-01 5/19/2016	W16E158-04 5/19/2016	W16J112-02 10/13/2016	W17B063-02 2/8/2017
PCB 186	2,2',3,4,5,6,6'-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 187	2,2',3,4',5,5',6-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000318
PCB 188	2,2',3,4',5,6,6'-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000028 U
PCB 189	2,3,3',4,4',5,5'-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000030 U
PCB 190	2,3,3',4,4',5,6-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000032 J
PCB 191	2,3,3',4,4',5',6-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 192	2,3,3',4,5,5',6-HpCB	µg/L	0.000486 U	0.000501 U	0.000508 U	0.000536 U	0.000051 U
PCB 194	2,2',3,3',4,4',5,5'-OcCB	µg/L	0.000728 U	0.000751 U	0.000761 U	0.000803 U	0.000127
PCB 195	2,2',3,3',4,4',5,6-OcCB	µg/L	0.000728 U	0.000751 U	0.000761 U	0.000803 U	0.000064
PCB 196	2,2',3,3',4,4',5,6'-OcCB	µg/L	0.000728 U	0.000751 U	0.000761 U	0.000803 U	0.000084
PCB 197	2,2',3,3',4,4',6,6'-OcCB	µg/L	NA	NA	NA	NA	0.000103 U
PCB 197/200	2,2',3,3',4,4',6,6'-OcCB + 2,2',3,3',4,5,6,6'-OcCB	µg/L	0.00146 U	0.00150 U	0.00152 U	0.001610 U	NA
PCB 198/199	2,2',3,3',4,5,5',6-OcCB + 2,2',3,3',4,5,5',6'-OcCB	µg/L	0.00146 U	0.00150 U	0.001520 U	0.001610 U	0.000168
PCB 200	2,2',3,3',4,5,6,6'-OcCB	µg/L	NA	NA	NA	NA	0.000103 U
PCB 201	2,2',3,3',4,5',6,6'-OcCB	µg/L	0.000728 U	0.000751 U	0.000761 U	0.000803 U	0.000051 U
PCB 202	2,2',3,3',5,5',6,6'-OcCB	µg/L	0.000728 U	0.000751 U	0.000761 U	0.000803 U	0.000030 J
PCB 203	2,2',3,4,4',5,5',6-OcCB	µg/L	0.000728 U	0.000751 U	0.000761 U	0.000803 U	0.000092 J
PCB 204	2,2',3,4,4',5,6,6'-OcCB	µg/L	0.000728 U	0.000751 U	0.000761 U	0.000803 U	0.000051 U
PCB 205	2,3,3',4,4',5,6-OcCB	µg/L	0.000728 U	0.000751 U	0.000761 U	0.000803 U	0.000026 U
PCB 206	2,2',3,3',4,4',5,5',6-NoCB	µg/L	0.000728 U	0.000751 U	0.000761 U	0.000803 U	0.000063 J
PCB 207	2,2',3,3',4,4',5,6'-NoCB	µg/L	0.000728 U	0.000751 U	0.000761 U	0.000803 U	0.000051 U
PCB 208	2,2',3,3',4,5,5',6'-NoCB	µg/L	0.000728 U	0.000751 U	0.000761 U	0.000803 U	0.000033 J
PCB 209	Decachlorobiphenyl	µg/L	0.000728 U	0.000751 U	0.000761 U	0.000803 U	0.000026 U
	Total Monochlorobiphenyls	µg/L	ND	ND	ND	ND	0.0000722 U
	Total Dichlorobiphenyls	µg/L	ND	ND	ND	ND	0.000525
	Total Trichlorobiphenyls	µg/L	ND	ND	ND	ND	0.0000513 U
	Total Tetrachlorobiphenyls	µg/L	ND	ND	ND	ND	0.000564
	Total Pentachlorobiphenyls	µg/L	ND	ND	ND	ND	0.00185
	Total Hexachlorobiphenyls	µg/L	ND	ND	ND	ND	0.00297
	Total Heptachlorobiphenyls	µg/L	ND	ND	ND	ND	0.00164
	Total Octachlorobiphenyls	µg/L	ND	ND	ND	ND	0.000565
	Total Nonachlorobiphenyls	µg/L	ND	ND	ND	ND	0.0000962
	Total Decachlorobiphenyls	µg/L	ND	ND	ND	ND	NA
	Total PCBs <sup>(3)</sup>	µg/L	0.00291 ND	0.00301 ND	0.00305 ND	0.00321 ND	0.00835

**Notes:**

MoCB = Monochlorobiphenyl

DiCB = Dichlorobiphenyl

TriCB = Trichlorobiphenyl

TeCB = Tetrachlorobiphenyl

PeCB = Pentachlorobiphenyl

HeCB = Hexachlorobiphenyl

HpCB = Heptachlorobiphenyl

OcCB = Octachlorobiphenyl

NoCB = Nonachlorobiphenyl

-- = No JSCS screening level available.

J = estimated concentration

UJ = quantitated sample reporting limit is estimated

U = The analyte was not detected above the reported sample quantification limit.

µg/L = Micrograms per liter

NA = Not analyzed

ND = Not detected

DUP = Duplicate

<sup>(1)</sup> IUPAC = International Union of Pure and Applied Chemistry.<sup>(2)</sup> Sampling location is shown on Figure A-6 of main report. Samples were collected at manhole ABC319 (outgoing 27-inch pipe) and represent all of the Basin 45 drainage area.<sup>(3)</sup> For purposes of calculating total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

**Table A4-15**  
**2016 Stormwater Sample Results**  
**Outfall Basin 52D, Basin-Scale Monitoring Location (52D\_SW5)**

Class	Analyte	Units	Outfall Basin 52D, Location 52D_SW5 <sup>(1)</sup> Stormwater Grab Samples				Portland Harbor Screening Criteria <sup>(3)</sup>			All Results in Range of Typical Results on DEQ Guidance Curve?(5)
			Event 1 W16C092-04	Event 2 W16I149-01	Event 3 W16I112-05	Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	JSCS SLVs		
			3/9/2016	9/17/2016	10/13/2016			SLV	Endpoint <sup>(4)</sup>	
<b>Field Measurements</b>										
	Conductivity	umhos/cm	110	57	72	77	--	--	--	--
	pH	pH units	7.2	7.5	8.8	7.8	--	--	--	--
	Temperature	Deg. C	9.8	17	13.5	13.1	--	--	--	--
<b>Total Suspended Solids (SM 2540D)</b>										
	TSS	mg/L	795	41.0	610	271	--	--	--	No
<b>Total Metals (EPA 200.8)</b>										
	Arsenic	µg/L	<b>3.98</b>	<b>0.481</b>	<b>2.31</b>	<b>1.64</b>	0.018	0.045	Human Health - Ingestion	No
	Cadmium	µg/L	<b>0.881</b>	<b>0.159</b>	<b>0.722</b>	<b>0.466</b>	--	0.094	Ecological	No
	Chromium	µg/L	<b>165</b>	3.18	<b>106</b>	38.2	100	100	Human Health - Ingestion	No
	Copper	µg/L	<b>66.5</b>	<b>7.53</b>	<b>48.9</b>	<b>29.0</b>	2.74	2.7	Ecological	Yes
	Lead	µg/L	<b>86.7</b>	<b>1.91</b>	<b>61.0</b>	<b>21.6</b>	--	0.54	Ecological	No
	Mercury (WPCLSOP M-10)	µg/L	0.109	0.00377	0.0229	0.0211	--	0.77	Ecological	Yes
	Nickel	µg/L	15.0	2.70	9.34	7.23	--	16	Ecological	No
	Silver	µg/L	0.105	0.100 U	0.100 U	0.102	--	0.12	Ecological	Yes
	Zinc	µg/L	<b>501</b>	<b>92.7</b>	<b>444</b>	<b>274</b>	36.5	36	Ecological	Yes
<b>Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270-SIM)</b>										
	Acenaphthene	µg/L	0.040 U	0.020 U	0.040 U	0.032	--	0.2	Human Health - Ingestion	--
	Acenaphthylene	µg/L	0.14	0.020 U	0.071	0.058	--	0.2	Human Health - Ingestion	--
	Anthracene	µg/L	<b>0.27</b>	0.020 U	0.065	0.071	--	0.2	Human Health - Ingestion	--
	Benzo(a)anthracene	µg/L	<b>0.20</b>	0.010 U	<b>0.088 J-</b>	<b>0.056</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(a)pyrene	µg/L	<b>0.28</b>	0.010 U	<b>0.11 J-</b>	<b>0.068</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Benzo(b)fluoranthene	µg/L	<b>0.37</b>	0.010 U	<b>0.2 J-</b>	<b>0.090</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(g,h,i)perylene	µg/L	<b>0.37</b>	0.014	<b>0.25 J-</b>	0.11	--	0.2	Human Health - Ingestion	--
	Benzo(k)fluoranthene	µg/L	<b>0.094</b>	0.010 U	<b>0.077 J-</b>	<b>0.042</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Chrysene	µg/L	<b>0.27</b>	0.010 U	<b>0.14 J-</b>	<b>0.072</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Dibenzo(a,h)anthracene	µg/L	<b>0.049</b>	0.010 U	<b>0.035 J-</b>	<b>0.026</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Fluoranthene	µg/L	<b>0.51</b>	0.031	<b>0.24</b>	0.16	--	0.2	Human Health - Ingestion	--
	Fluorene	µg/L	0.040 U	0.020 U	0.040 U	0.032	--	0.2	Human Health - Ingestion	--
	Indeno(1,2,3-cd)pyrene	µg/L	<b>0.21</b>	0.010 U	<b>0.14 J-</b>	<b>0.066</b>	0.0012	0.018	Human Health - Fish Consumption	--
	1-Methylnaphthalene	µg/L	0.080 U	0.040 U	0.080 U	0.063	--	--	--	--
	1-Methylnaphthalene	µg/L	0.080 U	0.040 U	0.080 U	0.063	--	0.2	Human Health - Ingestion	--
	Naphthalene	µg/L	0.080 U	0.040 U	0.080 U	0.063	12	0.2	Human Health - Ingestion	--
	Phenanthrene	µg/L	0.16	0.058	0.074	0.088	--	0.2	Human Health - Ingestion	--
	Pyrene	µg/L	<b>0.71</b>	0.039	<b>0.36</b>	<b>0.22</b>	--	0.2	Human Health - Ingestion	--
	Total PAHs <sup>(6)</sup>	µg/L	3.6	0.14	2.0 J-	1.0	--	--	--	No

**Table A4-15**  
**2016 Stormwater Sample Results**  
**Outfall Basin 52D, Basin-Scale Monitoring Location (52D\_SW5)**

Class	Analyte	Units	Outfall Basin 52D, Location 52D_SW5 <sup>(1)</sup> Stormwater Grab Samples			Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve?(5)
			Event 1 W16C092-04	Event 2 W16I149-01	Event 3 W16I112-05			JSCS SLVs		
			3/9/2016	9/17/2016	10/13/2016			SLV	Endpoint <sup>(4)</sup>	
<b>Phthalates (EPA 8270-SIM)</b>										
	Bis(2-ethylhexyl)phthalate	µg/L	<b>2.7</b> J+	<b>1.3</b>	<b>2.1</b> J+	<b>1.9</b>	0.2	2.2	Human Health - Fish Consumption	Yes
	Butylbenzylphthalate	µg/L	1.0 U	0.50 U	1.0 U	0.8 U	--	3	Ecological	--
	Di-n-butylphthalate	µg/L	1.0 U	0.50 U	1.0 U	0.8 U	--	3	Ecological	--
	Di-n-octylphthalate	µg/L	1.0 U	0.50 U	1.0 U	0.8 U	--	3	Ecological	--
	Diethylphthalate	µg/L	1.0 U	0.50 U	1.0 U	0.8 U	--	3	Ecological	--
	Dimethylphthalate	µg/L	2.2	0.50 U	1.0 U	1.0	--	3	Ecological	--
<b>Polychlorinated Biphenyl (PCB) Congeners</b>										
	Total PCB Congeners <sup>(6)(7)</sup>	µg/L	<b>0.219</b>	0.00294 ND	<b>0.227</b>	<b>0.0527</b>	0.0000064	0.000064	Human Health - Fish Consumption	Yes

## Notes:

DEQ = Oregon Department of Environmental Quality

J+ = Detection of analyte is considered a high estimate.

J- = Result may be a low estimate.

U = The analyte was not detected above the reported sample quantification limit.

ND = not detected

-- = not established

µg/L = micrograms per liter

mg/L = milligrams per liter

<sup>(1)</sup> Sampling location is shown on Figure A-7 of main report. Samples were collected at manhole APT249 and represent all of the Basin 52D drainage area.

<sup>(2)</sup> For the purposes of calculating the geometric mean concentrations, non-detect results are set to the value of the method reporting limit, with the exception of total PAHs and total PCB congeners. This assumption is conservative and may overestimate the true geometric mean concentration. For total PAHs and total PCB congeners, results including one or more detections of an individual constituent were calculated by assigning a value of zero to non-detected concentrations. For results in which no individual constituents were detected, the total concentration is reported as the highest MRL among the individual constituents. Duplicate sample results were averaged with the corresponding primary sample results, and the average concentration for that event was then included as a single value in the geometric mean calculations.

<sup>(3)</sup> Portland Harbor screening criteria are the cleanup levels for surface water specified in Table 17 the Portland Harbor Record of Decision (ROD; EPA, 2017), where established. Where no cleanup level for a constituent is established in the ROD, the screening level value (SLV) from the Portland Harbor Joint Source Control Strategy (DEQ/EPA, 2005) is used, if established.

<sup>(4)</sup> Endpoint = source of the JSCS SLV to be used for initial upland source control screening evaluations (DEQ/EPA, 2005):

*Human Health - Fish Consumption* = SLVs for chemicals in water taken up by fish for human consumption; these SLVs represent EPA's National Recommended Water Quality Criteria (NRWQC) values. If no NRWQC values are available, then DEQ's ambient water quality criteria (AWQC) values are listed for the constituent.

*Human Health - Ingestion* = SLVs for chemicals in water for human ingestion; these SLVs represent the most conservative value between EPA's Maximum Contaminant Levels (MCLs) and Region 9 Preliminary Remediation Goals (PRGs).

*Ecological* = SLVs for chemicals in water for ecological exposure; these SVLs represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent. If no AWQC values are available, then Oak Ridge National Laboratory Tier II SCV Technology Benchmark values are listed for the constituent.

<sup>(5)</sup> Range below typical concentrations in graphs developed by DEQ of concentrations of selected contaminants detected in stormwater from a larger number of industrial sites in Portland Harbor to assist with data evaluation [Appendix E to *Guidance for Evaluating Stormwater Pathway at Upland Sites* (DEQ, 2009, updated December 2015)].

<sup>(6)</sup> For purposes of calculating total PAH values and total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

<sup>(7)</sup> Refer to Table A4-16 for individual PCB congener results.

**bold** = Concentration exceeds the Portland Harbor screening criterion.

**Table A4-16**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 52D, Basin-Scale Monitoring Location (52D\_SW5)**

IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Outfall Basin 52D, Location 52D_SW5 <sup>(2)</sup>		
			Stormwater Grab Samples		
			Event 1 W16C092-04 3/9/2016	Event 2 W16I149-01 9/17/2016	Event 3 W16J112-05 10/13/2016
Polychlorinated Biphenyl Congeners (PCBs) (EPA 1668A)					
PCB 1	2-MoCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 2	3-MoCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 3	4-MoCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 4	2,2'-DiCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 5	2,3'-DiCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 6	2,3'-DiCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 7	2,4'-DiCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 8	2,4'-DiCB	µg/L	0.000251 U	0.000245 U	0.000259
PCB 9	2,5'-DiCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 10	2,6'-DiCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 11	3,3'-DiCB	µg/L	0.002460 U	0.00240 U	0.002460 U
PCB 12/13	3,4'-DiCB + 3,4'-DiCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 14	3,5'-DiCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 15	4,4'-DiCB	µg/L	0.000647	0.000324 U	0.000518
PCB 16	2,2',3'-TriCB	µg/L	0.000369	0.000245 U	0.000310
PCB 17	2,2',4'-TriCB	µg/L	0.000408	0.000245 U	0.000268
PCB 18/30	2,2',5'-TriCB + 2,4,6'-TriCB	µg/L	0.000927	0.00049 U	0.000550
PCB 19	2,2',6'-TriCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 20/28	2,3,3'-TriCB + 2,4,4'-TriCB	µg/L	0.00206	0.00126 U	0.001670
PCB 21/33	2,3,4'-TriCB + 2',3,4'-TriCB	µg/L	0.00135 U	0.00132 U	0.001350 U
PCB 22	2,3,4'-TriCB	µg/L	0.000952 U	0.000931 U	0.000952 U
PCB 23	2,3,5'-TriCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 24	2,3,6'-TriCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 25	2,3',4'-TriCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 26/29	2,3',5'-TriCB + 2,4,5'-TriCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 27	2,3',6'-TriCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 31	2,4',5'-TriCB	µg/L	0.00130 U	0.00127 U	0.001300 U
PCB 32	2,4',6'-TriCB	µg/L	0.000532	0.000245 U	0.000346
PCB 34	2',3,5'-TriCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 35	3,3',4'-TriCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 36	3,3',5'-TriCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 37	3,4,4'-TriCB	µg/L	0.000793	0.00052 U	0.000849
PCB 38	3,4,5'-TriCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 39	3,4',5'-TriCB	µg/L	0.000251 U	0.000245 U	0.000251 U
PCB 40/41/71	2,2',3,3'-TeCB + 2,2',3,4'-TeCB + 2,3',4',6'-TeCB	µg/L	0.00160	0.00147 U	0.001620
PCB 42	2,2',3,4'-TeCB	µg/L	0.00088	0.00049 U	0.000817
PCB 43/73	2,2',3,5'-TeCB + 2,3',5',6'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 44/47/65	2,2',3,5'-TeCB + 2,2',4,4'-TeCB + 2,3,5,6'-TeCB	µg/L	0.00357	0.00147 U	0.003140
PCB 45/51	2,2',3,6'-TeCB + 2,2',4,6'-TeCB	µg/L	0.00100 U	0.00098 U	0.001000 U
PCB 46	2,2',3,6'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 48	2,2',4,5'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 49/69	2,2',4,5'-TeCB + 2,3',4,6'-TeCB	µg/L	0.00203	0.00098 U	0.001610
PCB 50/53	2,2',4,6'-TeCB + 2,2',5,6'-TeCB	µg/L	0.00100 U	0.00098 U	0.001000 U
PCB 52	2,2',5,5'-TeCB	µg/L	0.00544	0.00151 U	0.004330
PCB 54	2,2',6,6'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 55	2,3,3',4'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 56	2,3,3',4'-TeCB	µg/L	0.00106	0.00049 U	0.001180
PCB 57	2,3,3',5'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 58	2,3,3',5'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 59/62/75	2,3,3',6'-TeCB + 2,3,4,6'-TeCB + 2,4,4',6'-TeCB	µg/L	0.001500 U	0.00147 U	0.001500 U
PCB 60	2,3,4,4'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 61/70/74/76	2,3,4,5'-TeCB + 2,3',4',5'-TeCB + 2,4,4',5'-TeCB + 2',3,4,5'-TeCB	µg/L	0.00450	0.00196 U	0.004270
PCB 63	2,3,4',5'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 64	2,3,4',6'-TeCB	µg/L	0.00154	0.00049 U	0.001490
PCB 66	2,3',4,4'-TeCB	µg/L	0.00249	0.000824 U	0.002590
PCB 67	2,3',4,5'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 68	2,3',4,5'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 72	2,3',5,5'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 77	3,3',4,4'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 78	3,3',4,5'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 79	3,3',4,5'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 80	3,3',5,5'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 81	3,4,4',5'-TeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 82	2,2',3,3',4'-PeCB	µg/L	0.00111	0.00049 U	0.001340
PCB 83	2,2',3,3',5'-PeCB	µg/L	0.000501 U	0.00049 U	0.000603
PCB 84	2,2',3,3',6'-PeCB	µg/L	0.00251	0.00049 U	0.002620
PCB 85/116/117	2,2',3,4,4'-PeCB + 2,3,4,5,6'-PeCB + 2,3,4',5,6'-PeCB	µg/L	0.00160	0.00147 U	0.001830
PCB 86/87/97/108/119/125	2,2',3,4,5'-PeCB + 2,2',3,4,5'-PeCB + 2,2',3',4,5'-PeCB + 2,3,3',4,5'-PeCB + 2,3',4,4',6'-PeCB + 2',3,4,5,6'-PeCB	µg/L	0.00725	0.00294 U	0.00702
PCB 88/91	2,2',3,4,6'-PeCB + 2,2',3,4',6'-PeCB	µg/L	0.00133	0.00098 U	0.001290
PCB 89	2,2',3,4,6'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 90/101/113	2,2',3,4',5'-PeCB + 2,2',4,5,5'-PeCB + 2,3,3',5',6'-PeCB	µg/L	0.01020	0.00147 U	0.010300
PCB 92	2,2',3,5,5'-PeCB	µg/L	0.00204	0.00049 U	0.002100
PCB 93/98/100/102	2,2',3,5,6'-PeCB + 2,2',3',4,6'-PeCB + 2,2',4,4',6'-PeCB + 2,2',4,5,6'-PeCB	µg/L	0.00201 U	0.00196 U	0.002000 U
PCB 94	2,2',3,5,6'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U

**Table A4-16**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 52D, Basin-Scale Monitoring Location (52D\_SW5)**

		Outfall Basin 52D, Location 52D_SW5 <sup>(2)</sup>			
		Stormwater Grab Samples			
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3
			W16C092-04 3/9/2016	W16I149-01 9/17/2016	W16J112-05 10/13/2016
PCB 95	2,2',3,5'-PeCB	µg/L	0.007920	0.000931 U	0.008040
PCB 96	2,2',3,6'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 99	2,2',4,4',5'-PeCB	µg/L	0.00491	0.00049 U	0.004360
PCB 103	2,2',4,5',6'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 104	2,2',4,6,6'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 105	2,3,3',4,4'-PeCB	µg/L	0.00394	0.00049 U	0.003910
PCB 106	2,3,3',4,5'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 107/124	2,3,3',4,5'-PeCB + 2,3,4,5,5'-PeCB	µg/L	0.001000 U	0.00098 U	0.001000 U
PCB 109	2,3,3',4,6'-PeCB	µg/L	0.000619	0.00049 U	0.000675
PCB 110/115	2,3,3',4,6'-PeCB + 2,3,4,4',6'-PeCB	µg/L	0.01650	0.00098 U	0.017400
PCB 111	2,3,3',5,5'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 112	2,3,3',5,6'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 114	2,3,4,4',5'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 118	2,3',4,4',5'-PeCB	µg/L	0.01060	0.000628 U	0.010100
PCB 120	2,3,4,5,5'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 121	2,3,4,5,6'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 122	2,3,3',4,5'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 123	2,3,4,4',5'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 126	3,3',4,4',5'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 127	3,3',4,5,5'-PeCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 128/166	2,2',3,3',4,4'-HxCB + 2,3,4,4',5,6'-HxCB	µg/L	0.00282	0.00098 U	0.00327
PCB 129/138/163	2,2',3,3',4,5'-HxCB + 2,2',3,4,4',5'-HxCB + 2,3,3',4',5,6'-HxCB	µg/L	0.01830	0.00147 U	0.021000
PCB 130	2,2',3,3',4,5'-HxCB	µg/L	0.000953	0.00049 U	0.001180
PCB 131	2,2',3,3',4,6'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 132	2,2',3,3',4,6'-HxCB	µg/L	0.00610	0.00049 U	0.006600
PCB 133	2,2',3,3',5,5'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 134/143	2,2',3,3',5,6'-HxCB + 2,2',3,4,5,6'-HxCB	µg/L	0.00100 U	0.00098 U	0.001000 U
PCB 135/151	2,2',3,3',5,6'-HxCB + 2,2',3,5,5',6'-HxCB	µg/L	0.00478	0.00098 U	0.005160
PCB 136	2,2',3,3',6,6'-HxCB	µg/L	0.00180	0.00049 U	0.001860
PCB 137	2,2',3,4,4',5'-HxCB	µg/L	0.000627	0.00049 U	0.000823
PCB 139/140	2,2',3,4,4',6'-HxCB + 2,2',3,4,4',6'-HxCB	µg/L	0.00100 U	0.00098 U	0.001000 U
PCB 141	2,2',3,4,5,5'-HxCB	µg/L	0.00257	0.00049 U	0.003310
PCB 142	2,2',3,4,5,6'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 144	2,2',3,4,5,6'-HxCB	µg/L	0.000625	0.00049 U	0.000698
PCB 145	2,2',3,4,6,6'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 146	2,2',3,4,5,5'-HxCB	µg/L	0.00221	0.00049 U	0.002350
PCB 147/149	2,2',3,4,5,6'-HxCB + 2,2',3,4',5',6'-HxCB	µg/L	0.01190	0.00098 U	0.013500
PCB 148	2,2',3,4,5,6'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 150	2,2',3,4,6,6'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 152	2,2',3,5,6,6'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 153/168	2,2',4,4',5,5'-HxCB + 2,3',4,4',5',6'-HxCB	µg/L	0.01350	0.00098 U	0.013900
PCB 154	2,2',4,4',5,6'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 155	2,2',4,4',6,6'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 156/157	2,3,3',4,4',5'-HxCB + 2,3,3',4,4',5'-HxCB	µg/L	0.00194	0.00098 U	0.002010
PCB 158	2,3,3',4,4',6'-HxCB	µg/L	0.00156	0.00049 U	0.001880
PCB 159	2,3,3',4,5,5'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 160	2,3,3',4,5,6'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 161	2,3,3',4,5,6'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 162	2,3,3',4,5,5'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 164	2,3,3',4,5',6'-HxCB	µg/L	0.00115	0.00049 U	0.001250
PCB 165	2,3,3',5,5',6'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 167	2,3,4,4',5,5'-HxCB	µg/L	0.000775	0.00049 U	0.000799
PCB 169	3,3',4,4',5,5'-HxCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 170	2,2',3,3',4,4',5'-HpCB	µg/L	0.00392	0.00049 U	0.004510
PCB 171/173	2,2',3,3',4,4',6'-HpCB + 2,2',3,3',4,5,6'-HpCB	µg/L	0.00121	0.00098 U	0.001470
PCB 172	2,2',3,3',4,5,5'-HpCB	µg/L	0.00066	0.00049 U	0.000785
PCB 174	2,2',3,3',4,5,6'-HpCB	µg/L	0.00399	0.00049 U	0.004780
PCB 175	2,2',3,3',4,5',6'-HpCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 176	2,2',3,3',4,6,6'-HpCB	µg/L	0.000518	0.00049 U	0.000565
PCB 177	2,2',3,3',4,5,6'-HpCB	µg/L	0.00240	0.00049 U	0.002590
PCB 178	2,2',3,3',5,5',6'-HpCB	µg/L	0.000818	0.00049 U	0.000922
PCB 179	2,2',3,3',5,6,6'-HpCB	µg/L	0.00172	0.00049 U	0.001850
PCB 180/193	2,2',3,4,4',5,5'-HpCB + 2,3,3',4',5',5',6'-HpCB	µg/L	0.00974	0.00098 U	0.010500
PCB 181	2,2',3,4,4',5,6'-HpCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 182	2,2',3,4,4',5,6'-HpCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 183/185	2,2',3,4,4',5,6'-HpCB + 2,2',3,4,5,5',6'-HpCB	µg/L	0.00313	0.00098 U	0.003250
PCB 184	2,2',3,4,4',6,6'-HpCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 186	2,2',3,4,5,6,6'-HpCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 187	2,2',3,4',5,5',6'-HpCB	µg/L	0.00560	0.00049 U	0.005720
PCB 188	2,2',3,4',5,6,6'-HpCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 189	2,3,3',4,4',5,5'-HpCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 190	2,3,3',4,4',5,6'-HpCB	µg/L	0.000895	0.00049 U	0.000752
PCB 191	2,3,3',4,4',5',6'-HpCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 192	2,3,3',4,5,5',6'-HpCB	µg/L	0.000501 U	0.00049 U	0.000501 U
PCB 194	2,2',3,3',4,4',5,5'-OxCB	µg/L	0.00281	0.000735 U	0.002720
PCB 195	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000945	0.000735 U	0.000889
PCB 196	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.00145	0.000735 U	0.001350
PCB 197/200	2,2',3,3',4,4',6,6'-OxCB + 2,2',3,3',4,5,6,6'-OxCB	µg/L	0.00150 U	0.00147 U	0.00150 U

**Table A4-16**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 52D, Basin-Scale Monitoring Location (52D\_SW5)**

IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Outfall Basin 52D, Location 52D_SW5 <sup>(2)</sup>		
			Stormwater Grab Samples		
			Event 1 W16C092-04 3/9/2016	Event 2 W16I149-01 9/17/2016	Event 3 W16J112-05 10/13/2016
PCB 198/199	2,2',3,3',4,5,5',6'-OxCB + 2,2',3,3',4,5,5',6'-OxCB	µg/L	0.00360	0.00147 U	0.003220
PCB 201	2,2',3,3',4,5',6,6'-OxCB	µg/L	0.000752 U	0.000735 U	0.000752 U
PCB 202	2,2',3,3',5,5',6,6'-OxCB	µg/L	0.000752 U	0.000735 U	0.000752 U
PCB 203	2,2',3,4,4',5,5',6'-OxCB	µg/L	0.00212	0.000735 U	0.001980
PCB 204	2,2',3,4,4',5,6,6'-OxCB	µg/L	0.000752 U	0.000735 U	0.000752 U
PCB 205	2,3,3',4,4',5,5',6'-OxCB	µg/L	0.000752 U	0.000735 U	0.000752 U
PCB 206	2,2',3,3',4,4',5,5',6'-NoCB	µg/L	0.00204	0.000735 U	0.001670
PCB 207	2,2',3,3',4,4',5,6,6'-NoCB	µg/L	0.000752 U	0.000735 U	0.000752 U
PCB 208	2,2',3,3',4,5,5',6,6'-NoCB	µg/L	0.000752 U	0.000735 U	0.000752 U
PCB 209	Decachlorobiphenyl	µg/L	0.000752 U	0.000735 U	0.000752 U
	Total Monochlorobiphenyls	µg/L	ND	ND	ND
	Total Dichlorobiphenyls	µg/L	0.000647	ND	0.000776
	Total Trichlorobiphenyls	µg/L	0.00508	ND	0.00399
	Total Tetrachlorobiphenyls	µg/L	0.0231	ND	0.021
	Total Pentachlorobiphenyls	µg/L	0.0706	ND	0.0716
	Total Hexachlorobiphenyls	µg/L	0.0716	ND	0.0796
	Total Heptachlorobiphenyls	µg/L	0.0346	ND	0.0377
	Total Octachlorobiphenyls	µg/L	0.0109	ND	0.0102
	Total Nonachlorobiphenyls	µg/L	0.00204	ND	0.00167
	Total Decachlorobiphenyls	µg/L	ND	ND	ND
	Total PCBs <sup>(3)</sup>	µg/L	0.219	0.00294 ND	0.227

## Notes:

MoCB = Monochlorobiphenyl

DiCB = Dichlorobiphenyl

TriCB = Trichlorobiphenyl

TeCB = Tetrachlorobiphenyl

PeCB = Pentachlorobiphenyl

HeCB = Hexachlorobiphenyl

HpCB = Heptachlorobiphenyl

OcCB = Octachlorobiphenyl

NoCB = Nonachlorobiphenyl

-- = No JSCS screening level available.

U = The analyte was not detected above the reported sample quantification limit.

µg/L = Micrograms per liter

ND = Not detected

<sup>(1)</sup> IUPAC = International Union of Pure and Applied Chemistry.<sup>(2)</sup> Sampling location is shown on Figure A-7 of main report. Samples were collected at manhole APT249 and represent all of the Basin 52D drainage area.<sup>(3)</sup> For purposes of calculating total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

**Table A4-17**  
**2016 Stormwater Sample Results**  
**Outfall Basin 52D, Site-Specific Monitoring Location (52D\_SW6)**

Class	Analyte	Units	Outfall Basin 52D, Location 52D_SW6 <sup>(1)</sup> Stormwater Grab Samples				Portland Harbor Screening Criteria <sup>(4)</sup>			All Results in Range of Typical Results on DEQ Guidance Curve?(6)
			Event 1 W16C092-05	Event 2 <sup>(2)</sup> --	Event 3 W16J112-04	Geometric Mean Concentration <sup>(3)</sup>	ROD Cleanup Levels	JSCS SLVs		
			3/9/2016	9/17/2016	10/13/2016			SLV	Endpoint <sup>(5)</sup>	
Field Measurements										
	Conductivity	umhos/cm	142	NS	115	128	--	--	--	--
	pH	pH units	9.3	NS	8.4	8.8	--	--	--	--
	Temperature	Deg. C	10.8	NS	12.6	11.7	--	--	--	--
Total Suspended Solids (SM 2540D)										
	TSS	mg/L	3260	NS	1500	2211	--	--	--	No
Total Metals (EPA 200.8)										
	Arsenic	µg/L	<b>11.2</b>	NS	<b>2.86</b>	<b>5.66</b>	0.018	0.045	Human Health - Ingestion	No
	Cadmium	µg/L	<b>2.55</b>	NS	<b>1.13</b>	<b>1.70</b>	--	0.094	Ecological	No
	Chromium	µg/L	<b>599</b>	NS	<b>165</b>	<b>314</b>	100	100	Human Health - Ingestion	No
	Copper	µg/L	<b>285</b>	NS	<b>69.7</b>	<b>141</b>	2.74	2.7	Ecological	No
	Lead	µg/L	<b>293</b>	NS	<b>106</b>	<b>176</b>	--	0.54	Ecological	No
	Mercury (WPCL SOP M-10)	µg/L	0.422	NS	0.0793	0.183	--	0.77	Ecological	No
	Nickel	µg/L	<b>56.4</b>	NS	12.8	<b>26.9</b>	--	16	Ecological	No
	Silver	µg/L	<b>0.318</b>	NS	<b>0.152</b>	<b>0.220</b>	--	0.12	Ecological	No
	Zinc	µg/L	<b>1480</b>	NS	<b>703</b>	<b>1020</b>	36.5	36	Ecological	No
Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270-SIM)										
	Acenaphthene	µg/L	0.040 UJ	NS	0.040 U	0.040	--	0.2	Human Health - Ingestion	--
	Acenaphthylene	µg/L	0.15 J-	NS	0.15	0.15	--	0.2	Human Health - Ingestion	--
	Anthracene	µg/L	<b>0.39</b> J-	NS	0.14	<b>0.23</b>	--	0.2	Human Health - Ingestion	--
	Benzo(a)anthracene	µg/L	<b>0.23</b> J-	NS	<b>0.19</b>	<b>0.21</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(a)pyrene	µg/L	<b>0.32</b> J-	NS	<b>0.27</b>	<b>0.29</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Benzo(b)fluoranthene	µg/L	<b>0.41</b> J-	NS	<b>0.44</b>	<b>0.42</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(g,h,i)perylene	µg/L	<b>0.39</b> J-	NS	<b>0.48</b>	<b>0.43</b>	--	0.2	Human Health - Ingestion	--
	Benzo(k)fluoranthene	µg/L	<b>0.11</b> J-	NS	<b>0.19</b>	<b>0.14</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Chrysene	µg/L	<b>0.28</b> J-	NS	<b>0.3</b>	<b>0.29</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Dibenzo(a,h)anthracene	µg/L	<b>0.056</b> J-	NS	<b>0.061</b>	<b>0.06</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Fluoranthene	µg/L	<b>0.54</b> J-	NS	<b>0.51</b>	<b>0.52</b>	--	0.2	Human Health - Ingestion	--
	Fluorene	µg/L	0.040 UJ	NS	0.040 U	0.040	--	0.2	Human Health - Ingestion	--
	Indeno(1,2,3-cd)pyrene	µg/L	<b>0.24</b> J-	NS	<b>0.27</b>	<b>0.25</b>	0.0012	0.018	Human Health - Fish Consumption	--
	1-Methylnaphthalene	µg/L	0.080 UJ	NS	0.080 U	0.08	--	--	--	--
	2-Methylnaphthalene	µg/L	0.080 UJ	NS	0.080 U	0.080	--	0.2	Human Health - Ingestion	--
	Naphthalene	µg/L	0.080 UJ	NS	0.080 U	0.080	12	0.2	Human Health - Ingestion	--
	Phenanthrene	µg/L	0.17 J-	NS	0.15	0.16	--	0.2	Human Health - Ingestion	--
	Pyrene	µg/L	<b>0.73</b> J-	NS	<b>0.76</b>	<b>0.74</b>	--	0.2	Human Health - Ingestion	--
	Total PAHs <sup>(6)</sup>	µg/L	4.02 J-	NS	3.91	4.0	--	--	--	No

**Table A4-17**  
**2016 Stormwater Sample Results**  
**Outfall Basin 52D, Site-Specific Monitoring Location (52D\_SW6)**

Class	Analyte	Units	Outfall Basin 52D, Location 52D_SW6 <sup>(1)</sup> Stormwater Grab Samples			Geometric Mean Concentration <sup>(3)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(4)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve? <sup>(6)</sup>
			Event 1 W16C092-05	Event 2 <sup>(2)</sup> --	Event 3 W16J112-04			JSCS SLVs		
			3/9/2016	9/17/2016	10/13/2016			SLV	Endpoint <sup>(5)</sup>	
Phthalates (EPA 8270-SIM)										
	Bis(2-ethylhexyl)phthalate	µg/L	<b>1.9</b> J-	NS	<b>3.3</b> J+	<b>2.5</b>	0.2	2.2	Human Health - Fish Consumption	No
	Butylbenzylphthalate	µg/L	1.0 UJ	NS	1.0 U	1.0 U	--	3	Ecological	--
	Di-n-butylphthalate	µg/L	1.0 UJ	NS	1.0 U	1.0 U	--	3	Ecological	--
	Di-n-octylphthalate	µg/L	1.0 UJ	NS	1.0 U	1.0 U	--	3	Ecological	--
	Diethylphthalate	µg/L	1.0 UJ	NS	1.0 U	1.0 U	--	3	Ecological	--
	Dimethylphthalate	µg/L	1.0 UJ	NS	1.0 U	1.0 U	--	3	Ecological	--
Polychlorinated Biphenyl (PCB) Congeners										
	Total PCB Congeners <sup>(6/7)</sup>	µg/L	<b>0.677</b>	NS	<b>0.574</b>	<b>0.623</b>	0.0000064	0.000064	Human Health - Fish Consumption	No

**Notes:**

DEQ = Oregon Department of Environmental Quality

NS = Not sampled. Sample not collected during this event because no discharge was occurring at this location; the paired downgradient basin-scale location (52D\_SW5) was sampled on this date.

J- = Detection of analyte is considered a low estimate.

J+ = Detection of analyte is considered a high estimate.

U = The analyte was not detected above the reported sample quantification limit.

UJ = The analyte was not detected, and the detection limit is considered an estimate.

-- = not established

µg/L = micrograms per liter

mg/L = milligrams per liter

<sup>(1)</sup> Sampling location is shown on Figure A-7 of main report. Samples were collected at manhole APT 252 (incoming line from 9449 N. Burgard Way) and represent discharges only from the Portland Container Repair site (ECSI #2375).

<sup>(2)</sup> A sample was not collected from this location during Event 2 because no discharge was occurring at this location; the paired downgradient basin-scale location (52D\_SW5) was sampled on this date.

<sup>(3)</sup> For the purposes of calculating the geometric mean concentrations, non-detect results are set to the value of the method reporting limit, with the exception of total PAHs and total PCB congeners. This assumption is conservative and may overestimate the true geometric mean concentration. For total PAHs and total PCB congeners, results including one or more detections of an individual constituent were calculated by assigning a value of zero to non-detected concentrations. For results in which no individual constituents were detected, the total concentration is reported as the highest MRL among the individual constituents. Duplicate sample results were averaged with the corresponding primary sample results, and the average concentration for that event was then included as a single value in the geometric mean calculations.

<sup>(4)</sup> Portland Harbor screening criteria are the cleanup levels for surface water specified in Table 17 the Portland Harbor Record of Decision (ROD; EPA, 2017), where established. Where no cleanup level for a constituent is established in the ROD, the screening level value (SLV) from the Portland Harbor Joint Source Control Strategy (DEQ/EPA, 2005) is used, if established.

<sup>(5)</sup> Endpoint = source of the JSCS SLV to be used for initial upland source control screening evaluations (DEQ/EPA, 2005):

*Human Health - Fish Consumption* = SLVs for chemicals in water taken up by fish for human consumption; these SLVs represent EPA's National Recommended Water Quality Criteria (NRWQC) values. If no NRWQC values are available, then DEQ's ambient water quality criteria (AWQC) values are listed for the constituent.

*Human Health - Ingestion* = SLVs for chemicals in water for human ingestion; these SLVs represent the most conservative value between EPA's Maximum Contaminant Levels (MCLs) and Region 9 Preliminary Remediation Goals (PRGs).

*Ecological* = SLVs for chemicals in water for ecological exposure; these SVLs represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent. If no AWQC values are available, then Oak Ridge National Laboratory Tier II SCV Technology Benchmark values are listed for the constituent.

<sup>(5)</sup> Range below typical concentrations in graphs developed by DEQ of concentrations of selected contaminants detected in stormwater from a larger number of industrial sites in Portland Harbor to assist with data evaluation [Appendix E to *Guidance for Evaluating Stormwater Pathway at Upland Sites* (DEQ, 2009, updated December 2015)].

<sup>(6)</sup> For purposes of calculating total PAH values and total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

<sup>(7)</sup> Refer to Table A4-18 for individual PCB congener results.

**bold** = Concentration exceeds the Portland Harbor screening criterion.

**Table A4-18**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 52D, Site-Specific Monitoring Location (52D\_SW6)**

			Outfall Basin 52D, Location 52D_SW6 <sup>(2)</sup>		
			Stormwater Grab Samples		
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2 <sup>(3)</sup>	Event 3
			W16C092-05 3/9/2016	-- 9/17/2016	W16J112-04 10/13/2016
<b>Polychlorinated Biphenyl Congeners (PCBs) (EPA 1668A)</b>					
PCB 1	2-MoCB	µg/L	0.000243 U	NS	0.000251 U
PCB 2	3-MoCB	µg/L	0.000243 U	NS	0.000251 U
PCB 3	4-MoCB	µg/L	0.000243 U	NS	0.000251 U
PCB 4	2,2-DiCB	µg/L	0.000598	NS	0.000341
PCB 5	2,3-DiCB	µg/L	0.000243 U	NS	0.000251 U
PCB 6	2,3-DiCB	µg/L	0.000243 U	NS	0.000251 U
PCB 7	2,4-DiCB	µg/L	0.000243 U	NS	0.000251 U
PCB 8	2,4-DiCB	µg/L	0.000852	NS	0.000587
PCB 9	2,5-DiCB	µg/L	0.000243 U	NS	0.000251 U
PCB 10	2,6-DiCB	µg/L	0.000243 U	NS	0.000251 U
PCB 11	3,3'-DiCB	µg/L	0.002380 U	NS	0.002460 U
PCB 12/13	3,4-DiCB + 3,4'-DiCB	µg/L	0.000486 U	NS	0.000502 U
PCB 14	3,5-DiCB	µg/L	0.000243 U	NS	0.000251 U
PCB 15	4,4'-DiCB	µg/L	0.00208	NS	0.001260
PCB 16	2,2,3-TriCB	µg/L	0.00112	NS	0.000675
PCB 17	2,2,4-TriCB	µg/L	0.00130	NS	0.000669
PCB 18/30	2,2,5-TriCB + 2,4,6-TriCB	µg/L	0.00294	NS	0.001380
PCB 19	2,2,6-TriCB	µg/L	0.000727	NS	0.000333
PCB 20/28	2,3,3'-TriCB + 2,4,4'-TriCB	µg/L	0.00646	NS	0.004040
PCB 21/33	2,3,4-TriCB + 2',3,4-TriCB	µg/L	0.00156	NS	0.001420
PCB 22	2,3,4-TriCB	µg/L	0.00165	NS	0.001340
PCB 23	2,3,5-TriCB	µg/L	0.000243 U	NS	0.000251 U
PCB 24	2,3,6-TriCB	µg/L	0.000243 U	NS	0.000251 U
PCB 25	2,3,4-TriCB	µg/L	0.000383	NS	0.000251 U
PCB 26/29	2,3,5-TriCB + 2,4,5-TriCB	µg/L	0.00083	NS	0.000502 U
PCB 27	2,3,6-TriCB	µg/L	0.000401	NS	0.000251 U
PCB 31	2,4,5-TriCB	µg/L	0.00369	NS	0.002520
PCB 32	2,4,6-TriCB	µg/L	0.00170	NS	0.000872
PCB 34	2,3,5-TriCB	µg/L	0.000243 U	NS	0.000251 U
PCB 35	3,3',4-TriCB	µg/L	0.000243 U	NS	0.000251 U
PCB 36	3,3',5-TriCB	µg/L	0.000243 U	NS	0.000251 U
PCB 37	3,4,4'-TriCB	µg/L	0.00239	NS	0.001910
PCB 38	3,4,5-TriCB	µg/L	0.000243 U	NS	0.000251 U
PCB 39	3,4',5-TriCB	µg/L	0.000243 U	NS	0.000251 U
PCB 40/41/71	2,2',3,3'-TeCB + 2,2',3,4'-TeCB + 2,3',4',6'-TeCB	µg/L	0.00489	NS	0.003750
PCB 42	2,2',3,4'-TeCB	µg/L	0.00267	NS	0.000502 U
PCB 43/73	2,2',3,5'-TeCB + 2,3',5',6'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 44/47/65	2,2',3,5'-TeCB + 2,2',4,4'-TeCB + 2,3,5,6'-TeCB	µg/L	0.01090	NS	0.007440
PCB 45/51	2,2',3,6'-TeCB + 2,2',4,6'-TeCB	µg/L	0.00186	NS	0.001180
PCB 46	2,2',3,6'-TeCB	µg/L	0.000585	NS	0.000502 U
PCB 48	2,2',4,5'-TeCB	µg/L	0.00122	NS	0.000831
PCB 49/69	2,2',4,5'-TeCB + 2,3',4,6'-TeCB	µg/L	0.00629	NS	0.004060
PCB 50/53	2,2',4,6'-TeCB + 2,2',5,6'-TeCB	µg/L	0.00142	NS	0.001000 U
PCB 52	2,2',5,5'-TeCB	µg/L	0.01660	NS	0.011100
PCB 54	2,2',6,6'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 55	2,3,3',4'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 56	2,3,3',4'-TeCB	µg/L	0.00337	NS	0.002990
PCB 57	2,3,3',5'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 58	2,3,3',5'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 59/62/75	2,3,3',6'-TeCB + 2,3,4,6'-TeCB + 2,4,4',6'-TeCB	µg/L	0.00146 U	NS	0.001510 U
PCB 60	2,3,4,4'-TeCB	µg/L	0.00102	NS	0.001110
PCB 61/70/74/76	2,3,4,5'-TeCB + 2,3',4',5'-TeCB + 2,4,4',5'-TeCB + 2',3,4,5'-TeCB	µg/L	0.01370	NS	0.010800
PCB 63	2,3,4',5'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 64	2,3,4',6'-TeCB	µg/L	0.00466	NS	0.003490
PCB 66	2,3,4,4'-TeCB	µg/L	0.00790	NS	0.006120
PCB 67	2,3,4,5'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 68	2,3,4,5'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 72	2,3',5,5'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 77	3,3',4,4'-TeCB	µg/L	0.00108	NS	0.001040
PCB 78	3,3',4,5'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 79	3,3',4,5'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 80	3,3',5,5'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 81	3,4,4',5'-TeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 82	2,2',3,3',4'-PeCB	µg/L	0.00331	NS	0.003170
PCB 83	2,2',3,3',5'-PeCB	µg/L	0.00171	NS	0.001740
PCB 84	2,2',3,3',6'-PeCB	µg/L	0.00758	NS	0.006450
PCB 85/116/117	2,2',3,4,4'-PeCB + 2,3,4,5,6'-PeCB + 2,3,4',5,6'-PeCB	µg/L	0.00491	NS	0.004630
PCB 86/87/97/108/119/125	2,2',3,4,5'-PeCB + 2,2',3,4,5'-PeCB + 2,2',3',4,5'-PeCB + 2,3,3',4,5'-PeCB + 2,3',4,4',6'-PeCB + 2,3,4,5,6'-PeCB	µg/L	0.02080	NS	0.017200
PCB 88/91	2,2',3,4,6'-PeCB + 2,2',3,4',6'-PeCB	µg/L	0.00401	NS	0.003170
PCB 89	2,2',3,4,6'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 90/101/113	2,2',3,4',5'-PeCB + 2,2',4,5,5'-PeCB + 2,3,3',5',6'-PeCB	µg/L	0.03010	NS	0.025800
PCB 92	2,2',3,5,5'-PeCB	µg/L	0.00591	NS	0.005230
PCB 93/98/100/102	2,2',3,5,6'-PeCB + 2,2',3',4,6'-PeCB + 2,2',4,4',6'-PeCB + 2,2',4,5,6'-PeCB	µg/L	0.00195 U	NS	0.002010 U

**Table A4-18**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 52D, Site-Specific Monitoring Location (52D\_SW6)**

			Outfall Basin 52D, Location 52D_SW6 <sup>(2)</sup>		
			Stormwater Grab Samples		
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2 <sup>(3)</sup>	Event 3
			W16C092-05 3/9/2016	-- 9/17/2016	W16J112-04 10/13/2016
PCB 94	2,2',3,5,6'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 95	2,2',3,5',6'-PeCB	µg/L	0.02350	NS	0.020100
PCB 96	2,2',3,6,6'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 99	2,2',4,4',5'-PeCB	µg/L	0.01420	NS	0.010500
PCB 103	2,2',4,5',6'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 104	2,2',4,6,6'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 105	2,3,3',4,4'-PeCB	µg/L	0.01160	NS	0.009710
PCB 106	2,3,3',4,5'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 107/124	2,3,3',4',5'-PeCB + 2',3,4,5,5'-PeCB	µg/L	0.00111	NS	0.001030
PCB 109	2,3,3',4,6'-PeCB	µg/L	0.00181	NS	0.001710
PCB 110/115	2,3,3',4',6'-PeCB + 2,3,4,4',6'-PeCB	µg/L	0.04670	NS	0.041200
PCB 111	2,3,3',5,5'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 112	2,3,3',5,6'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 114	2,3,4,4',5'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 118	2,3,4,4',5'-PeCB	µg/L	0.03100	NS	0.024900
PCB 120	2,3,4,5,5'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 121	2,3,4,5,6'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 122	2,3,3',4,5'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 123	2,3,4,4',5'-PeCB	µg/L	0.000587	NS	0.000546
PCB 126	3,3,4,4',5'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 127	3,3,4,5,5'-PeCB	µg/L	0.000486 U	NS	0.000502 U
PCB 128/166	2,2',3,3',4,4'-HxCB + 2,3,4,4',5,6'-HxCB	µg/L	0.00813	NS	0.008020
PCB 129/138/163	2,2',3,3',4,5'-HxCB + 2,2',3,4,4',5'-HxCB + 2,3,3',4',5,6'-HxCB	µg/L	0.05380	NS	0.052100
PCB 130	2,2',3,3',4,5'-HxCB	µg/L	0.00284	NS	0.002770
PCB 131	2,2',3,3',4,6'-HxCB	µg/L	0.000677	NS	0.000601
PCB 132	2,2',3,3',4,6'-HxCB	µg/L	0.01800	NS	0.016700
PCB 133	2,2',3,3',5,5'-HxCB	µg/L	0.00060	NS	0.000508
PCB 134/143	2,2',3,3',5,6'-HxCB + 2,2',3,4,5,6'-HxCB	µg/L	0.00244	NS	0.002450
PCB 135/151	2,2',3,3',5,6'-HxCB + 2,2',3,5,5',6'-HxCB	µg/L	0.01420	NS	0.013000
PCB 136	2,2',3,3',6,6'-HxCB	µg/L	0.00517	NS	0.004790
PCB 137	2,2',3,4,4',5'-HxCB	µg/L	0.00249	NS	0.000502 U
PCB 139/140	2,2',3,4,4',6'-HxCB + 2,2',3,4,4',6'-HxCB	µg/L	0.000973 U	NS	0.001000 U
PCB 141	2,2',3,4,5,5'-HxCB	µg/L	0.00768	NS	0.008550
PCB 142	2,2',3,4,5,6'-HxCB	µg/L	0.000486 U	NS	0.000502 U
PCB 144	2,2',3,4,5,6'-HxCB	µg/L	0.00182	NS	0.001770
PCB 145	2,2',3,4,6,6'-HxCB	µg/L	0.000486 U	NS	0.000502 U
PCB 146	2,2',3,4',5,5'-HxCB	µg/L	0.00662	NS	0.005920
PCB 147/149	2,2',3,4',5,6'-HxCB + 2,2',3,4',5,6'-HxCB	µg/L	0.03660	NS	0.034500
PCB 148	2,2',3,4',5,6'-HxCB	µg/L	0.000486 U	NS	0.000502 U
PCB 150	2,2',3,4',6,6'-HxCB	µg/L	0.000486 U	NS	0.000502 U
PCB 152	2,2',3,5,6,6'-HxCB	µg/L	0.000486 U	NS	0.000502 U
PCB 153/168	2,2',4,4',5,5'-HxCB + 2,3',4,4',5',6'-HxCB	µg/L	0.03950	NS	0.035500
PCB 154	2,2',4,4',5,6'-HxCB	µg/L	0.000486 U	NS	0.000502 U
PCB 155	2,2',4,4',6,6'-HxCB	µg/L	0.000486 U	NS	0.000502 U
PCB 156/157	2,3,3',4,4',5'-HxCB + 2,3,3',4,4',5'-HxCB	µg/L	0.00572	NS	0.004840
PCB 158	2,3,3',4,4',6'-HxCB	µg/L	0.00468	NS	0.004890
PCB 159	2,3,3',4,5,5'-HxCB	µg/L	0.000486 U	NS	0.004840 U
PCB 160	2,3,3',4,5,6'-HxCB	µg/L	0.000486 U	NS	0.004890 U
PCB 161	2,3,3',4,5,6'-HxCB	µg/L	0.000486 U	NS	0.004840 U
PCB 162	2,3,3',4,5,5'-HxCB	µg/L	0.000486 U	NS	0.004890 U
PCB 164	2,3,3',4,5',6'-HxCB	µg/L	0.00304	NS	0.003090
PCB 165	2,3,3',5,5',6'-HxCB	µg/L	0.000486 U	NS	0.000502 U
PCB 167	2,3',4,4',5,5'-HxCB	µg/L	0.00225	NS	0.001860
PCB 169	3,3',4,4',5,5'-HxCB	µg/L	0.000486 U	NS	0.000502 U
PCB 170	2,2',3,3',4,4',5'-HpCB	µg/L	0.01120	NS	0.011000
PCB 171/173	2,2',3,3',4,4',6'-HpCB + 2,2',3,3',4,5,6'-HpCB	µg/L	0.00354	NS	0.003470
PCB 172	2,2',3,3',4,5,5'-HpCB	µg/L	0.00193	NS	0.000502 U
PCB 174	2,2',3,3',4,5,6'-HpCB	µg/L	0.01160	NS	0.011700
PCB 175	2,2',3,3',4,5',6'-HpCB	µg/L	0.000486 U	NS	0.000513
PCB 176	2,2',3,3',4,6,6'-HpCB	µg/L	0.00157	NS	0.001400
PCB 177	2,2',3,3',4',5,6'-HpCB	µg/L	0.00705	NS	0.006610
PCB 178	2,2',3,3',5,5',6'-HpCB	µg/L	0.00244	NS	0.002260
PCB 179	2,2',3,3',5,6,6'-HpCB	µg/L	0.00517	NS	0.004440
PCB 180/193	2,2',3,4,4',5,5'-HpCB + 2,3,3',4',5,5',6'-HpCB	µg/L	0.02810	NS	0.025600
PCB 181	2,2',3,4,4',5,6'-HpCB	µg/L	0.000486 U	NS	0.000502 U
PCB 182	2,2',3,4,4',5,6'-HpCB	µg/L	0.000486 U	NS	0.000502 U
PCB 183/185	2,2',3,4,4',5,6'-HpCB + 2,2',3,4,5,5',6'-HpCB	µg/L	0.00967	NS	0.008170
PCB 184	2,2',3,4,4',6,6'-HpCB	µg/L	0.000486 U	NS	0.000502 U
PCB 186	2,2',3,4,5,6,6'-HpCB	µg/L	0.000486 U	NS	0.000502 U
PCB 187	2,2',3,4',5,5',6'-HpCB	µg/L	0.01650	NS	0.013800
PCB 188	2,2',3,4',5,6,6'-HpCB	µg/L	0.000486 U	NS	0.000502 U
PCB 189	2,3,3',4,4',5,5'-HpCB	µg/L	0.000528	NS	0.000502 U
PCB 190	2,3,3',4,4',5,6'-HpCB	µg/L	0.00253	NS	0.001840
PCB 191	2,3,3',4,4',5',6'-HpCB	µg/L	0.000486 U	NS	0.000502 U
PCB 192	2,3,3',4,5,5',6'-HpCB	µg/L	0.000486 U	NS	0.000502 U
PCB 194	2,2',3,3',4,4',5,5'-OxCB	µg/L	0.00807	NS	0.006720
PCB 195	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.00259	NS	0.002380

**Table A4-18**  
**2016 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 52D, Site-Specific Monitoring Location (52D\_SW6)**

		Outfall Basin 52D, Location 52D_SW6 <sup>(2)</sup>			
		Stormwater Grab Samples			
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2 <sup>(3)</sup>	Event 3
			W16C092-05 3/9/2016	-- 9/17/2016	W16J112-04 10/13/2016
PCB 196	2,2',3,3',4,4',5,6'-O <sub>2</sub> CB	µg/L	0.00423	NS	0.003540
PCB 197/200	2,2',3,3',4,4',6,6'-O <sub>2</sub> CB + 2,2',3,3',4,5,6,6'-O <sub>2</sub> CB	µg/L	0.00146 U	NS	0.00151 U
PCB 198/199	2,2',3,3',4,5,5',6'-O <sub>2</sub> CB + 2,2',3,3',4,5,5',6'-O <sub>2</sub> CB	µg/L	0.01040	NS	0.008290
PCB 201	2,2',3,3',4,5',6,6'-O <sub>2</sub> CB	µg/L	0.00124	NS	0.001020
PCB 202	2,2',3,3',5,5',6,6'-O <sub>2</sub> CB	µg/L	0.00215	NS	0.001680
PCB 203	2,2',3,4,4',5,5',6'-O <sub>2</sub> CB	µg/L	0.00622	NS	0.005050
PCB 204	2,2',3,4,4',5,6,6'-O <sub>2</sub> CB	µg/L	0.000729 U	NS	0.000754 U
PCB 205	2,3,3',4,4',5,5',6'-O <sub>2</sub> CB	µg/L	0.000729 U	NS	0.000754 U
PCB 206	2,2',3,3',4,4',5,5',6'-NoCB	µg/L	0.00626	NS	0.003900
PCB 207	2,2',3,3',4,4',5,6,6'-NoCB	µg/L	0.000729 U	NS	0.000754 U
PCB 208	2,2',3,3',4,5,5',6,6'-NoCB	µg/L	0.00142	NS	0.000916
PCB 209	Decachlorobiphenyl	µg/L	0.000842	NS	0.000754 U
	Total Monochlorobiphenyls	µg/L	ND	NS	ND
	Total Dichlorobiphenyls	µg/L	0.00353	NS	0.00219
	Total Trichlorobiphenyls	µg/L	0.0252	NS	0.0152
	Total Tetrachlorobiphenyls	µg/L	0.0782	NS	0.0539
	Total Pentachlorobiphenyls	µg/L	0.209	NS	0.177
	Total Hexachlorobiphenyls	µg/L	0.216	NS	0.202
	Total Heptachlorobiphenyls	µg/L	0.102	NS	0.0908
	Total Octachlorobiphenyls	µg/L	0.0349	NS	0.0287
	Total Nonachlorobiphenyls	µg/L	0.00768	NS	0.00482
	Total Decachlorobiphenyls	µg/L	0.000842	NS	ND
	Total PCBs <sup>(4)</sup>	µg/L	0.677	NS	0.574

## Notes:

MoCB = Monochlorobiphenyl

DiCB = Dichlorobiphenyl

TriCB = Trichlorobiphenyl

TeCB = Tetrachlorobiphenyl

PeCB = Pentachlorobiphenyl

HeCB = Hexachlorobiphenyl

HpCB = Heptachlorobiphenyl

OcCB = Octachlorobiphenyl

NoCB = Nonachlorobiphenyl

-- = No JSCS screening level available.

U = The analyte was not detected above the reported sample quantification limit.

µg/L = Micrograms per liter

ND = Not detected

NS = Not sampled. Sample not collected during this event because no discharge was occurring at this location; the paired downgradient basin-scale location (52D\_SW5) was sampled on this date.

DUO = Duplicate

<sup>(1)</sup> IUPAC = International Union of Pure and Applied Chemistry.<sup>(2)</sup> Sampling location is shown on Figure A-7 of main report. Samples were collected at manhole APT 252 (incoming line from 9449 N. Burgard Way) and represent discharges only from the Portland Container Repair site (ECSI #2375).<sup>(3)</sup> A sample was not collected from this location during Event 2 because no discharge was occurring at this location; the paired downgradient basin-scale location (52D\_SW5) was sampled on this date.<sup>(4)</sup> For purposes of calculating total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

**Table A4-19**  
**2016/2017 Stormwater Sample Results**  
**Outfall Basin 53A, Basin-Scale Monitoring Location (53A\_SW1)**

Class	Analyte	Units	Outfall Basin 53A, Location 53A_SW1 <sup>(1)</sup> Stormwater Grab Samples					Geometric Mean Concentration <sup>(2)</sup>	Portland Harbor Screening Criteria <sup>(3)</sup>			All Results in Range of Typical Results on DEQ Guidance Curve? <sup>(5)</sup>
			Event 1 W16C092-06	Event 1 DUP W16C092-12	Event 2 W16J112-06	Event 3 W16K144-01	Event 4 W17B060-01		ROD Cleanup Levels	JSCS SLVs		
			3/9/2016	3/9/2016	10/13/2016	11/15/2016	2/8/2017			SLV	Endpoint <sup>(4)</sup>	
Field Measurements												
	Conductivity	umhos/cm	65	NA	37	30	48	43	--	--	--	--
	pH	pH units	7.7	NA	8.2	7.7	6.1	7.4	--	--	--	--
	Temperature	Deg. C	10.4	NA	14.3	13.5	6.0	10.5	--	--	--	--
Total Suspended Solids (SM 2540D)												
	TSS	mg/L	43	43	47	191	74	73	--	--	--	Yes
Total Metals (EPA 200.8)												
	Arsenic	µg/L	<b>1.05</b>	<b>1.15</b>	<b>1.03</b>	<b>1.37</b>	<b>0.879</b>	<b>1.08</b>	0.018	0.045	Human Health - Ingestion	Yes
	Cadmium	µg/L	<b>0.234</b>	<b>0.245</b>	<b>0.348</b>	<b>0.280</b>	<b>0.149</b>	<b>0.243</b>	--	0.094	Ecological	Yes
	Chromium	µg/L	14.3	14.7	14.4	31.9	19.3	18.9	100	100	Human Health - Ingestion	No
	Copper	µg/L	<b>9.61</b>	<b>10.0</b>	<b>12.2</b>	<b>21.8</b>	<b>11.7</b>	<b>13.2</b>	2.74	2.7	Ecological	Yes
	Lead	µg/L	<b>9.71</b>	<b>9.81</b>	<b>12.8</b>	<b>14.0</b>	<b>9.62</b>	<b>11.4</b>	--	0.54	Ecological	Yes
	Mercury (WPCLSOP M-10)	µg/L	0.0100	0.0101	0.00902	0.00856	0.00921	0.00919	--	0.77	Ecological	Yes
	Nickel	µg/L	2.66	2.78	2.61	5.79	3.44	3.45	--	16	Ecological	Yes
	Silver	µg/L	0.104	0.100 U	0.100 U	<b>0.193</b>	0.100 U	0.118	--	0.12	Ecological	Yes
	Zinc	µg/L	<b>477 J</b>	<b>313 J</b>	<b>466</b>	<b>258</b>	<b>184</b>	<b>306</b>	36.5	36	Ecological	Yes
Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270-SIM)												
	Acenaphthene	µg/L	0.020 U	0.020 U	0.020 U	0.028	0.060 U	0.029	--	0.2	Human Health - Ingestion	--
	Acenaphthylene	µg/L	0.020 U	0.020 U	0.020 U	0.11	0.060 U	0.040	--	0.2	Human Health - Ingestion	--
	Anthracene	µg/L	0.026	0.020 U	0.020 U	0.098	0.060 U	0.041	--	0.2	Human Health - Ingestion	--
	Benzo(a)anthracene	µg/L	<b>0.012</b>	<b>0.010</b>	<b>0.018</b>	<b>0.24</b>	<b>0.079</b>	<b>0.044</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(a)pyrene	µg/L	<b>0.015</b>	<b>0.014</b>	<b>0.024</b>	<b>0.41</b>	<b>0.12</b>	<b>0.064</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Benzo(b)fluoranthene	µg/L	<b>0.034</b>	<b>0.030</b>	<b>0.064</b>	<b>1.0</b>	<b>0.26</b>	<b>0.15</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(g,h,i)perylene	µg/L	0.031	0.026	0.058	<b>0.75</b>	<b>0.20</b>	0.13	--	0.2	Human Health - Ingestion	--
	Benzo(k)fluoranthene	µg/L	0.010 U	0.010 U	<b>0.026</b>	<b>0.29</b>	<b>0.099</b>	<b>0.052</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Chrysene	µg/L	<b>0.027</b>	<b>0.022</b>	<b>0.047</b>	<b>0.64</b>	<b>0.14</b>	<b>0.10</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Dibenzo(a,h)anthracene	µg/L	0.010 U	0.010 U	0.010 U	<b>0.12</b>	<b>0.043</b>	<b>0.027</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Fluoranthene	µg/L	0.054	0.049	0.12	<b>0.96</b>	<b>0.36</b>	<b>0.21</b>	--	0.2	Human Health - Ingestion	--
	Fluorene	µg/L	0.020 U	0.020 U	0.020 U	0.036	0.060 U	0.030	--	0.2	Human Health - Ingestion	--
	Indeno(1,2,3-cd)pyrene	µg/L	<b>0.011</b>	0.010 U	<b>0.030</b>	<b>0.51</b>	<b>0.12</b>	<b>0.066</b>	0.0012	0.018	Human Health - Fish Consumption	--
	1-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.12 U	0.053 U	--	--	--	--
	1-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.12 U	0.053 U	--	0.2	Human Health - Ingestion	--
	Naphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.047	0.12 U	0.055	12	0.2	Human Health - Ingestion	--
	Phenanthrene	µg/L	0.030	0.029	0.051	<b>0.24</b>	<b>0.24</b>	0.096	--	0.2	Human Health - Ingestion	--
	Pyrene	µg/L	0.083	0.073	0.11	<b>0.86</b>	<b>0.32</b>	<b>0.22</b>	--	0.2	Human Health - Ingestion	--
	Total PAHs <sup>(6)</sup>	µg/L	0.32	0.25	0.53	6.3	2.0	1.2	--	--	--	No

**Table A4-19**  
**2016/2017 Stormwater Sample Results**  
**Outfall Basin 53A, Basin-Scale Monitoring Location (53A\_SW1)**

Class	Analyte	Units	Outfall Basin 53A, Location 53A_SW1 <sup>(1)</sup> Stormwater Grab Samples					Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve? <sup>(5)</sup>
			Event 1 W16C092-06	Event 1 DUP W16C092-12	Event 2 W16J112-06	Event 3 W16K144-01	Event 4 W17B060-01			JSCS SLVs		
			3/9/2016	3/9/2016	10/13/2016	11/15/2016	2/8/2017			SLV	Endpoint <sup>(4)</sup>	
Phthalates (EPA 8270-SIM)												
	Bis(2-ethylhexyl)phthalate	µg/L	<b>0.85</b>	<b>0.89</b>	<b>1.0</b> J+	<b>2.6</b> J+	1.5 U	<b>1.4</b>	0.2	2.2	Human Health - Fish Consumption	Yes
	Butylbenzylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	1.5 U	0.66 U	--	3	Ecological	--
	Di-n-butylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	1.5 U	0.66 U	--	3	Ecological	--
	Di-n-octylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	1.5 U	0.66 U	--	3	Ecological	--
	Diethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	1.5 U	0.66 U	--	3	Ecological	--
	Dimethylphthalate	µg/L	2.6	2.6	0.50 U	0.50 U	1.5 U	0.99	--	3	Ecological	--
Polychlorinated Biphenyl (PCB) Congeners												
	Total PCB Congeners <sup>(6)(7)</sup>	µg/L	0.00318 ND	<b>0.00101</b>	<b>0.00340</b>	<b>0.00253</b>	<b>0.0184</b>	<b>0.00240</b>	0.0000064	0.000064	Human Health - Fish Consumption	Yes

## Notes:

DEQ = Oregon Department of Environmental Quality

DUP = field duplicate sample

NA = not analyzed

ND = not detected

J = Detection of analyte is considered an estimate with unknown bias because the RPD between the results in the sample and sample duplicate slightly exceed control criteria.

J+ = Detection of analyte is considered a high estimate.

U = The analyte was not detected above the reported sample quantification limit.

-- = not established

µg/L = micrograms per liter

mg/L = milligrams per liter

<sup>(1)</sup> Sampling location is shown on Figure A-8 of main report. Samples were collected at manhole AAA170 and represent all of the Basin 53A drainage area.

<sup>(2)</sup> For the purposes of calculating the geometric mean concentrations, non-detect results are set to the value of the method reporting limit, with the exception of total PAHs and total PCB congeners. This assumption is conservative and may overestimate the true geometric mean concentration. For total PAHs and total PCB congeners, results including one or more detections of an individual constituent were calculated by assigning a value of zero to non-detected concentrations. For results in which no individual constituents were detected, the total concentration is reported as the highest MRL among the individual constituents. Duplicate sample results were averaged with the corresponding primary sample results, and the average concentration for that event was then included as a single value in the geometric mean calculations.

<sup>(3)</sup> Portland Harbor screening criteria are the cleanup levels for surface water specified in Table 17 the Portland Harbor Record of Decision (ROD; EPA, 2017), where established. Where no cleanup level for a constituent is established in the ROD, the screening level value (SLV) from the Portland Harbor Joint Source Control Strategy (DEQ/EPA, 2005) is used, if established.

<sup>(4)</sup> Endpoint = source of the JSCS SLV to be used for initial upland source control screening evaluations (DEQ/EPA, 2005):

*Human Health - Fish Consumption* = SLVs for chemicals in water taken up by fish for human consumption; these SLVs represent EPA's National Recommended Water Quality Criteria (NRWQC) values. If no NRWQC values are available, then DEQ's ambient water quality criteria (AWQC) values are listed for the constituent.

*Human Health - Ingestion* = SLVs for chemicals in water for human ingestion; these SLVs represent the most conservative value between EPA's Maximum Contaminant Levels (MCLs) and Region 9 Preliminary Remediation Goals (PRGs).

*Ecological* = SLVs for chemicals in water for ecological exposure; these SVLs represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent. If no AWQC values are available, then Oak Ridge National Laboratory Tier II SCV Technology Benchmark values are listed for the constituent.

<sup>(5)</sup> Range below typical concentrations in graphs developed by DEQ of concentrations of selected contaminants detected in stormwater from a larger number of industrial sites in Portland Harbor to assist with data evaluation [Appendix E to *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (DEQ, 2009, updated December 2015)].

<sup>(6)</sup> For purposes of calculating total PAH values and total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

<sup>(7)</sup> Refer to Table A4-20 for individual PCB congener results.

**bold** = Concentration exceeds the Portland Harbor screening criterion.

**Table A4-20**  
**2016/2017 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 53A, Basin-Scale Monitoring Location (53A\_SW1)**

		Outfall Basin 53A, Location 53A_SW1 <sup>(2)</sup>					
		Stormwater Grab Samples					
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 1 DUP	Event 2	Event 3	Event 4
			W16C092-06 3/9/2016	W16C092-12 3/9/2016	W16J112-06 10/13/2016	W16K144-01 11/15/2016	W17B060-01 2/8/2017
Polychlorinated Biphenyl Congeners (PCBs) (EPA 1668A)							
PCB 1	2-MoCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000054 U
PCB 2	3-MoCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000063 U
PCB 3	4-MoCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000056 U
PCB 4	2,2-DiCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000138 U
PCB 5	2,3-DiCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000020 U
PCB 6	2,3'-DiCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000066 U
PCB 7	2,4-DiCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000020 U
PCB 8	2,4'-DiCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000253 U	0.000204 U
PCB 9	2,5-DiCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000020 U
PCB 10	2,6-DiCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000049 U
PCB 11	3,3'-DiCB	µg/L	0.0026 U	0.00243 U	0.002530 U	0.00239 U	0.000389 U
PCB 12/13	3,4-DiCB + 3,4'-DiCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 14	3,5-DiCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000020 U
PCB 15	4,4'-DiCB	µg/L	0.00035 U	0.000328 U	0.000341 U	0.000321 U	0.000134 U
PCB 16	2,2',3'-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000101 U
PCB 17	2,2',4'-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000164 U
PCB 18/30	2,2',5'-TriCB + 2,4,6-TriCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000355 U
PCB 19	2,2',6'-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000097 U
PCB 20/28	2,3,3'-TriCB + 2,4,4'-TriCB	µg/L	0.00137 U	0.00128 U	0.001330 U	0.00126 U	0.000554 J
PCB 21/33	2,3,4-TriCB + 2,3,4'-TriCB	µg/L	0.00143 U	0.00134 U	0.001390 U	0.00131 U	0.000348 U
PCB 22	2,3,4'-TriCB	µg/L	0.00101 U	0.000943 U	0.000982 U	0.000925 U	0.000239 U
PCB 23	2,3,5-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000049 U
PCB 24	2,3,6-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000064 U
PCB 25	2,3',4-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000048 U
PCB 26/29	2,3',5-TriCB + 2,4,5-TriCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000109 J
PCB 27	2,3',6-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000062 U
PCB 31	2,4',5-TriCB	µg/L	0.00138 U	0.00129 U	0.001340 U	0.001270 U	0.000486 U
PCB 32	2,4',6-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000130 U
PCB 34	2,3',5-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000050 U
PCB 35	3,3',4-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000051 U
PCB 36	3,3',5-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000049 U
PCB 37	3,4,4'-TriCB	µg/L	0.000562 U	0.000526 U	0.000548 U	0.000516 U	0.000165 U
PCB 38	3,4,5-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000051 U
PCB 39	3,4',5-TriCB	µg/L	0.000265 U	0.000248 U	0.000258 U	0.000243 U	0.000046 U
PCB 40/41/71	2,2',3,3'-TeCB + 2,2',3,4'-TeCB + 2,3',4',6'-TeCB	µg/L	0.00159 U	0.00149 U	0.001550 U	0.00146 U	0.000248 J
PCB 42	2,2',3,4'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000123 J
PCB 43/73	2,2',3,5'-TeCB + 2,3',5',6'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 44/47/65	2,2',3,5'-TeCB + 2,2',4,4'-TeCB + 2,3,5,6'-TeCB	µg/L	0.00159 U	0.00149 U	0.001550 U	0.001460 U	0.000507 U
PCB 45/51	2,2',3,6'-TeCB + 2,2',4,6'-TeCB	µg/L	0.00106 U	0.000992 U	0.001030 U	0.000974 U	0.000119 U
PCB 46	2,2',3,6'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000067 U
PCB 48	2,2',4,5'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000054 U
PCB 49/69	2,2',4,5'-TeCB + 2,3',4,6'-TeCB	µg/L	0.00106 U	0.000992 U	0.001030 U	0.000974 U	0.000319 U
PCB 50/53	2,2',4,6'-TeCB + 2,2',5,6'-TeCB	µg/L	0.00106 U	0.000992 U	0.001030 U	0.000974 U	0.000080 J
PCB 52	2,2',5,5'-TeCB	µg/L	0.00163 U	0.00153 U	0.001590 U	0.00150 U	0.000553 U
PCB 54	2,2',6,6'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000041 U
PCB 55	2,3,3',4'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 56	2,3,3',4'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000142 U
PCB 57	2,3,3',5'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 58	2,3,3',5'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 59/62/75	2,3,3',6'-TeCB + 2,3,4,6'-TeCB + 2,4,4',6'-TeCB	µg/L	0.00159 U	0.00149 U	0.001550 U	0.00146 U	0.000098 U
PCB 60	2,3,4,4'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000088 U
PCB 61/70/74/76	2,3,4,5'-TeCB + 2,3',4',5'-TeCB + 2,4,4',5'-TeCB + 2,3,4,5'-TeCB	µg/L	0.00212 U	0.00198 U	0.002070 U	0.00195 U	0.000519 U
PCB 63	2,3,4',5'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 64	2,3,4',6'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000256 U
PCB 66	2,3',4,4'-TeCB	µg/L	0.000891 U	0.000834 U	0.000868 U	0.000818 U	0.000288 U
PCB 67	2,3',4,5'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 68	2,3',4,5'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 72	2,3',5,5'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 77	3,3',4,4'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000046 U
PCB 78	3,3',4,5'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 79	3,3',4,5'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 80	3,3',5,5'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 81	3,4,4',5'-TeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000039 U
PCB 82	2,2',3,3',4'-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 83	2,2',3,3',5'-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	NA
PCB 83/99	2,2',3,3',5'-PeCB + 2,2',4,4',5'-PeCB	µg/L	NA	NA	NA	NA	0.000255 U
PCB 84	2,2',3,3',6'-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000038 U
PCB 85/116/117	2,2',3,4,4'-PeCB + 2,3,4,4,5,6'-PeCB + 2,3,4',5,6'-PeCB	µg/L	0.00159 U	0.0015 U	0.001550 U	0.00146 U	0.000087 J
PCB 86/87/97/108/119/125	2,2',3,4,5'-PeCB + 2,2',3,4,5'-PeCB + 2,2',3',4,5'-PeCB + 2,3,3',4,5'-PeCB + 2,3',4,4',6'-PeCB + 2',3,4,5,6'-PeCB	µg/L	0.00318 U	0.00298 U	0.00310 U	0.00292 U	0.000402 U
PCB 88/91	2,2',3,4,6'-PeCB + 2,2',3,4,6'-PeCB	µg/L	0.00106 U	0.000992 U	0.001030 U	0.000974 U	0.000242 U
PCB 89	2,2',3,4,6'-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 90/101/113	2,2',3,4',5'-PeCB + 2,2',4,5,5'-PeCB + 2,3,3',5',6'-PeCB	µg/L	0.00159 U	0.00149 U	0.001550 U	0.00146 U	0.000519 U
PCB 92	2,2',3,5,5'-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000102 J
PCB 93/95/100	2,2',3,5,6'-PeCB + 2,2',3,5',6'-PeCB + 2,2',4,4',6'-PeCB	µg/L	NA	NA	NA	NA	0.000683 U

**Table A4-20**  
**2016/2017 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 53A, Basin-Scale Monitoring Location (53A\_SW1)**

Outfall Basin 53A, Location 53A_SW1 <sup>(2)</sup>							
Stormwater Grab Samples							
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 1 DUP	Event 2	Event 3	Event 4
			W16C092-06 3/9/2016	W16C092-12 3/9/2016	W16J112-06 10/13/2016	W16K144-01 11/15/2016	W17B060-01 2/8/2017
PCB 93/98/100/102	2,2',3,5,6-PeCB + 2,2',3',4,6-PeCB + 2,2',4,4',6-PeCB + 2,2',4,5,6'-PeCB	µg/L	0.00212 U	0.0020 U	0.002070 U	0.00195 U	NA
PCB 94	2,2',3,5,6'-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 95	2,2',3,5,6-PeCB	µg/L	0.00101 U	0.00094 U	0.000982 U	0.000925 U	0.000049 U
PCB 96	2,2',3,6,6'-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 98/102	2,2',3',4,6-PeCB + 2,2',4,5,6'-PeCB	µg/L	NA	NA	NA	NA	0.000196 U
PCB 99	2,2',4,4',5-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	NA
PCB 103	2,2',4,5,6-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 104	2,2',4,6,6'-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000031 U
PCB 105	2,3,3',4,4'-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000210
PCB 106	2,3,3',4,5-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000059 U
PCB 107	2,3,3',4',5-PeCB	µg/L	NA	NA	NA	NA	0.000057 U
PCB 107/124	2,3,3',4',5-PeCB + 2',3,4,5,5'-PeCB	µg/L	0.00106 U	0.00092 U	0.001030 U	0.000974 U	NA
PCB 108/124	2,3,3',4,5'-PeCB + 2',3,4,5,5'-PeCB	µg/L	NA	NA	NA	NA	0.000098 U
PCB 109	2,3,3',4,6-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	NA
PCB 110/115	2,3,3',4',6-PeCB + 2,3,4,4',6-PeCB	µg/L	0.00106 U	0.00101 U	0.001130 U	0.000974 U	0.000869
PCB 111	2,3,3',5,5'-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 112	2,3,3',5,6-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 114	2,3,4,4',5-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000053 U
PCB 118	2,3',4,4',5-PeCB	µg/L	0.000679 U	0.000635 U	0.000661 U	0.000623 U	0.000398
PCB 120	2,3',4,5,5'-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 121	2,3',4,5,6-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 122	2,3,3',4,5-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000064 U
PCB 123	2,3,4,4',5-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000052 U
PCB 126	3,3',4,4',5-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000056 U
PCB 127	3,3',4,5,5'-PeCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000058 U
PCB 128/166	2,2',3,3',4,4'-HxCB + 2,3,4,4',5,6-HxCB	µg/L	0.00106 U	0.00099 U	0.00103 U	0.000974 U	0.000198 J
PCB 129/138/163	2,2',3,3',4,4',5-HxCB + 2,2',3,4,4',5'-HxCB + 2,3,3',4',5,6-HxCB	µg/L	0.00159 U	0.00149 U	0.001680 U	0.001460 U	0.001570
PCB 130	2,2',3,3',4,5'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000079 J
PCB 131	2,2',3,3',4,6-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000050 U
PCB 132	2,2',3,3',4,6'-HxCB	µg/L	0.000531 U	0.0005 U	0.000596 U	0.000487 U	0.000414
PCB 133	2,2',3,3',5,5'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 134	2,2',3,3',5,6-HxCB	µg/L	NA	NA	NA	NA	0.000098 U
PCB 134/143	2,2',3,3',5,6-HxCB + 2,2',3,4,5,6'-HxCB	µg/L	0.00106 U	0.00092 U	0.001030 U	0.000974 U	NA
PCB 135/151	2,2',3,3',5,6'-HxCB + 2,2',3,5,5',6-HxCB	µg/L	0.00106 U	0.00099 U	0.001030 U	0.000974 U	NA
PCB 135/151/154	2,2',3,3',5,6'-HxCB + 2,2',3,5,5',6-HxCB + 2,2',4,4',5,6'-HxCB	µg/L	NA	NA	NA	NA	0.000319
PCB 136	2,2',3,3',6,6'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000117
PCB 137	2,2',3,4,4',5-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000057 J
PCB 139/140	2,2',3,4,4',6-HxCB + 2,2',3,4,4',6'-HxCB	µg/L	0.00106 U	0.00092 U	0.001030 U	0.000974 U	0.000098 U
PCB 141	2,2',3,4,5,5'-HxCB	µg/L	0.000531 U	0.0005 U	0.000517 U	0.000487 U	0.000156 J
PCB 142	2,2',3,4,5,6-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 143	2,2',3,4,5,6'-HxCB	µg/L	NA	NA	NA	NA	0.000098 U
PCB 144	2,2',3,4,5,6-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000045 J
PCB 145	2,2',3,4,6,6'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 146	2,2',3,4',5,5'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000138
PCB 147/149	2,2',3,4',5,6-HxCB + 2,2',3,4',5,6'-HxCB	µg/L	0.00106 U	0.00099 U	0.001030 U	0.000974 U	0.000765
PCB 148	2,2',3,4',5,6'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 150	2,2',3,4',6,6'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 152	2,2',3,5,6,6'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 153/168	2,2',4,4',5,5'-HxCB + 2,3',4,4',5,6-HxCB	µg/L	0.00106 U	0.00099 U	0.001030 U	0.000974 U	0.000651
PCB 154	2,2',4,4',5,6-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	NA
PCB 155	2,2',4,4',6,6'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000020 U
PCB 156/157	2,3,3',4,4',5-HxCB + 2,3,3',4,4',5'-HxCB	µg/L	0.00106 U	0.00092 U	0.001030 U	0.000974 U	0.000129
PCB 158	2,3,3',4,4',6-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000114
PCB 159	2,3,3',4,5,5'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 160	2,3,3',4,5,6-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000196 U
PCB 161	2,3,3',4,5',6-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 162	2,3,3',4,5,5'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 164	2,3,3',4,5',6-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000091
PCB 165	2,3,3',5,5',6-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 167	2,3',4,4',5,5'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049
PCB 169	3,3',4,4',5,5'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000032 U
PCB 170	2,2',3,3',4,4',5-HpCB	µg/L	0.000531 U	0.0005 U	0.000517 U	0.000487 U	0.000035
PCB 171/173	2,2',3,3',4,4',6-HpCB + 2,2',3,3',4,5,6-HpCB	µg/L	0.00106 U	0.00092 U	0.001030 U	0.000974 U	0.000129
PCB 172	2,2',3,3',4,5,5'-HpCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000058 U
PCB 174	2,2',3,3',4,5,6'-HpCB	µg/L	0.000531 U	0.0005 U	0.000517 U	0.000487 U	0.000360
PCB 175	2,2',3,3',4,5',6-HpCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 176	2,2',3,3',4,6,6'-HpCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 177	2,2',3,3',4',5,6-HpCB	µg/L	0.000531 U	0.0005 U	0.000517 U	0.000487 U	0.000142 J
PCB 178	2,2',3,3',5,5',6-HpCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 179	2,2',3,3',5,6,6'-HpCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000103
PCB 180/193	2,2',3,4,4',5,5'-HpCB + 2,3,3',4',5,5',6-HpCB	µg/L	0.00106 U	0.00099 U	0.001030 U	0.000974 U	0.000673
PCB 181	2,2',3,4,4',5,6-HpCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000056 U
PCB 182	2,2',3,4,4',5,6'-HpCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 183/185	2,2',3,4,4',5,6-HpCB + 2,2',3,4,5,5',6-HpCB	µg/L	0.00106 U	0.00099 U	0.001030 U	0.000974 U	0.000182
PCB 184	2,2',3,4,4',6,6'-HpCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 186	2,2',3,4,5,6,6'-HpCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 187	2,2',3,4',5,5',6-HpCB	µg/L	0.000531 U	0.0005 U	0.000517 U	0.000487 U	0.000328

**Table A4-20**  
**2016/2017 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin 53A, Basin-Scale Monitoring Location (53A\_SW1)**

		Outfall Basin 53A, Location 53A_SW1 <sup>(2)</sup>					
		Stormwater Grab Samples					
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 1 DUP	Event 2	Event 3	Event 4
			W16C092-06 3/9/2016	W16C092-12 3/9/2016	W16J112-06 10/13/2016	W16K144-01 11/15/2016	W17B060-01 2/8/2017
PCB 188	2,2',3,4',5,6,6'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000031 U
PCB 189	2,3,3',4,4',5,5'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000045 U
PCB 190	2,3,3',4,4',5,6'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000050 J
PCB 191	2,3,3',4,4',5'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 192	2,3,3',4,5,5',6'-HxCB	µg/L	0.000531 U	0.000496 U	0.000517 U	0.000487 U	0.000049 U
PCB 194	2,2',3,3',4,4',5,5'-OxCB	µg/L	0.000796 U	0.00074 U	0.000775 U	0.000730 U	0.000116 J
PCB 195	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000796 U	0.000744 U	0.000775 U	0.000730 U	0.000068
PCB 196	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000796 U	0.000744 U	0.000775 U	0.000730 U	0.000063 J
PCB 197	2,2',3,3',4,4',6,6'-OxCB	µg/L	NA	NA	NA	NA	0.000098 U
PCB 197/200	2,2',3,3',4,4',6,6'-OxCB + 2,2',3,3',4,5,6,6'-OxCB	µg/L	0.00159 U	0.00149 U	0.00155 U	0.00146 U	NA
PCB 198/199	2,2',3,3',4,5,5',6'-OxCB + 2,2',3,3',4,5,5',6'-OxCB	µg/L	0.00159 U	0.00149 U	0.001550 U	0.00146 U	0.000159
PCB 200	2,2',3,3',4,5,6,6'-OxCB	µg/L	NA	NA	NA	NA	0.000098 U
PCB 201	2,2',3,3',4,5',6,6'-OxCB	µg/L	0.000796 U	0.000744 U	0.000775 U	0.000730 U	0.000049 U
PCB 202	2,2',3,3',5,5',6,6'-OxCB	µg/L	0.000796 U	0.000744 U	0.000775 U	0.000730 U	0.000021 U
PCB 203	2,2',3,4,4',5,5',6'-OxCB	µg/L	0.000796 U	0.000744 U	0.000775 U	0.000730 U	0.000095 J
PCB 204	2,2',3,4,4',5,6,6'-OxCB	µg/L	0.000796 U	0.000744 U	0.000775 U	0.000730 U	0.000049 U
PCB 205	2,3,3',4,4',5,5',6'-OxCB	µg/L	0.000796 U	0.000744 U	0.000775 U	0.000730 U	0.000025 U
PCB 206	2,2',3,3',4,4',5,5',6'-NoCB	µg/L	0.000796 U	0.000744 U	0.000775 U	0.000730 U	0.000083 J
PCB 207	2,2',3,3',4,4',5,6,6'-NoCB	µg/L	0.000796 U	0.000744 U	0.000775 U	0.000730 U	0.000049 U
PCB 208	2,2',3,3',4,5,5',6,6'-NoCB	µg/L	0.000796 U	0.000744 U	0.000775 U	0.000730 U	0.000031 U
PCB 209	Decachlorobiphenyl	µg/L	0.000796 U	0.000744 U	0.000775 U	0.000730 U	0.000050
	Total Monochlorobiphenyls	µg/L	ND	ND	ND	ND	0.0000543 U
	Total Dichlorobiphenyls	µg/L	ND	ND	ND	0.000253	0.000931
	Total Trichlorobiphenyls	µg/L	ND	ND	ND	ND	0.00255
	Total Tetrachlorobiphenyls	µg/L	ND	ND	ND	ND	0.00329
	Total Pentachlorobiphenyls	µg/L	ND	0.00101	0.00113	ND	0.00377
	Total Hexachlorobiphenyls	µg/L	ND	ND	0.00227	ND	0.00489
	Total Heptachlorobiphenyls	µg/L	ND	ND	ND	ND	0.00212
	Total Octachlorobiphenyls	µg/L	ND	ND	ND	ND	0.0005
	Total Nonachlorobiphenyls	µg/L	ND	ND	ND	ND	0.0000834
	Total Decachlorobiphenyls	µg/L	ND	ND	ND	ND	NA
	Total PCBs <sup>(3)</sup>	µg/L	0.00318 ND	0.00101	0.00340	0.000253	0.018400

## Notes:

MoCB = Monochlorobiphenyl

DiCB = Dichlorobiphenyl

TriCB = Trichlorobiphenyl

TeCB = Tetrachlorobiphenyl

PeCB = Pentachlorobiphenyl

HeCB = Hexachlorobiphenyl

HpCB = Heptachlorobiphenyl

OxCB = Octachlorobiphenyl

NoCB = Nonachlorobiphenyl

-- = No JSCS screening level available

J = estimated concentration

U = The analyte was not detected above the reported sample quantification limit.

µg/L = Micrograms per liter

NA = Not analyzed

ND = Not detected

DUP = Duplicate

<sup>(1)</sup> IUPAC = International Union of Pure and Applied Chemistry.<sup>(2)</sup> Sampling location is shown on Figure A-8 of main report. Samples were collected at manhole AAA170 and represent all of the Basin 53A drainage area.<sup>(3)</sup> For purposes of calculating total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

Table A4-21  
2016/2017 Stormwater Sample Results  
Outfall Basin M-2, Basin-Scale Monitoring Location (M2\_SW1)

Class	Analyte	Units	Outfall Basin M-2, Location M2_SW1 <sup>(1)</sup> Stormwater Grab Samples				Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve?(5)
			Event 1 W16C092-01	Event 2 W16I149-01	Event 3 W16I112-03	Event 4 W17B063-03			JSCS SLVs		
			3/9/2016	9/17/2016	10/13/2016	2/8/2017			SLV	Endpoint <sup>(4)</sup>	
Field Measurements											
	Conductivity	umhos/cm	43	74	24	45	43	--	--	--	--
	pH	pH units	6.1	7	7	6.6	6.7	--	--	--	--
	Temperature	Deg. C	10.4	16.2	14.1	6.1	11.0	--	--	--	--
Total Suspended Solids (SM 2540D)											
	TSS	mg/L	44	3	24	45	19	--	--	--	Yes
Total Metals (EPA 200.8)											
	Arsenic	µg/L	<b>0.656</b>	<b>0.857</b>	<b>0.478</b>	<b>0.680</b>	<b>0.654</b>	0.018	0.045	Human Health - Ingestion	Yes
	Cadmium	µg/L	<b>0.114</b>	0.100 U	0.100 U	<b>0.104</b>	<b>0.104</b>	--	0.094	Ecological	Yes
	Chromium	µg/L	2.21	0.63	1.55	2.13	1.46	100	100	Human Health - Ingestion	Yes
	Copper	µg/L	<b>9.22</b>	<b>5.01</b>	<b>6.39</b>	<b>6.81</b>	<b>6.70</b>	2.74	2.7	Ecological	Yes
	Lead	µg/L	<b>4.37</b>	<b>0.706</b>	<b>2.06</b>	<b>3.50</b>	<b>2.17</b>	--	0.54	Ecological	Yes
	Mercury (WPCLSOP M-10)	µg/L	0.00434	0.00476	0.00473	0.00457	0.00460	--	0.77	Ecological	Yes
	Nickel	µg/L	1.60	0.740	1.05	1.55	1.18	--	16	Ecological	Yes
	Silver	µg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	--	0.12	Ecological	Yes
	Zinc	µg/L	<b>87.9</b>	<b>45.5</b>	<b>61.2</b>	<b>63.7</b>	<b>62.8</b>	36.5	36	Ecological	Yes
Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270-SIM)											
	Acenaphthene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	--	0.2	Human Health - Ingestion	--
	Acenaphthylene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	--	0.2	Human Health - Ingestion	--
	Anthracene	µg/L	0.022	0.020 U	0.020	0.020 U	0.020	--	0.2	Human Health - Ingestion	--
	Benzo(a)anthracene	µg/L	<b>0.024</b>	0.010 UJ	0.010 U	<b>0.023</b>	<b>0.015</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(a)pyrene	µg/L	<b>0.030</b>	0.010 UJ	0.010 U	<b>0.034</b>	<b>0.018</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Benzo(b)fluoranthene	µg/L	<b>0.054</b>	0.010 UJ	<b>0.016</b>	<b>0.071</b>	<b>0.028</b>	0.0012	0.018	Human Health - Fish Consumption	--
	Benzo(g,h,i)perylene	µg/L	0.081	0.010 UJ	0.033	0.083	0.039	--	0.2	Human Health - Ingestion	--
	Benzo(k)fluoranthene	µg/L	<b>0.013</b>	0.010 UJ	0.010 U	0.018	<b>0.012</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Chrysene	µg/L	<b>0.043</b>	0.010 UJ	<b>0.015</b>	<b>0.048</b>	<b>0.024</b>	0.0013	0.018	Human Health - Fish Consumption	--
	Dibenzo(a,h)anthracene	µg/L	0.010 U	0.010 UJ	0.010 U	0.011	<b>0.010</b>	0.00012	0.018	Human Health - Fish Consumption	--
	Fluoranthene	µg/L	0.11	0.010 U	0.039	0.087	0.044	--	0.2	Human Health - Ingestion	--
	Fluorene	µg/L	0.02	0.020 U	0.020 U	0.020 U	0.020	--	0.2	Human Health - Ingestion	--
	Indeno(1,2,3-cd)pyrene	µg/L	<b>0.025</b>	0.010 UJ	0.010 U	<b>0.034</b>	<b>0.017</b>	0.0012	0.018	Human Health - Fish Consumption	--
	1-Methylnaphthalene	µg/L	0.040 U	0.040 UJ	0.051	0.040 U	0.043	--	--	--	--
	1-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.05	0.040 U	0.043	--	0.2	Human Health - Ingestion	--
	Naphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.041	0.040	12	0.2	Human Health - Ingestion	--
	Phenanthrene	µg/L	0.069	0.024 U	0.069	0.090	0.057	--	0.2	Human Health - Ingestion	--
	Pyrene	µg/L	0.20	0.013 U	0.070	0.16	0.073	--	0.2	Human Health - Ingestion	--
	Total PAHs <sup>(6)</sup>	µg/L	0.69	0.040 U	0.37	0.70	0.29	--	--	--	Yes

**Table A4-21**  
**2016/2017 Stormwater Sample Results**  
**Outfall Basin M-2, Basin-Scale Monitoring Location (M2\_SW1)**

Class	Analyte	Units	Outfall Basin M-2, Location M2_SW1 <sup>(1)</sup> Stormwater Grab Samples				Geometric Mean Concentration <sup>(2)</sup>	ROD Cleanup Levels	Portland Harbor Screening Criteria <sup>(3)</sup>		All Results in Range of Typical Results on DEQ Guidance Curve?(5)
			Event 1 W16C092-01	Event 2 W16I149-01	Event 3 W16J112-03	Event 4 W17B063-03			JSCS SLVs		
			3/9/2016	9/17/2016	10/13/2016	2/8/2017			SLV	Endpoint <sup>(4)</sup>	
<b>Phthalates (EPA 8270-SIM)</b>											
	Bis(2-ethylhexyl)phthalate	µg/L	<b>2.0</b> J+	<b>0.58</b> J+	<b>1.4</b> J+	<b>2.3</b>	<b>1.4</b>	0.2	2.2	Human Health - Fish Consumption	Yes
	Butylbenzylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Di-n-butylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Di-n-octylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Diethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
	Dimethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	--	3	Ecological	--
<b>Polychlorinated Biphenyl (PCB) Congeners</b>											
	Total PCB Congeners <sup>(6)(7)</sup>	µg/L	0.00297 ND	0.00353 ND	0.00311 ND	<b>0.00231</b>	<b>0.00295</b>	0.0000064	0.000064	Human Health - Fish Consumption	Yes

**Notes:**

DEQ = Oregon Department of Environmental Quality

NA = not analyzed

ND = not detected

J+ = Detection of analyte is considered a high estimate.

U = The analyte was not detected above the reported sample quantification limit.

UJ = The analyte was not detected, and the detection limit is considered an estimate.

-- = not established

µg/L = micrograms per liter

mg/L = milligrams per liter

<sup>(1)</sup> Sampling location is shown on Figure A-9 of main report. Samples were collected at manhole AAM169 (outgoing 60-inch pipe) and represent all of the Basin M-2 drainage area.<sup>(2)</sup> For the purposes of calculating the geometric mean concentrations, non-detect results are set to the value of the method reporting limit, with the exception of total PAHs and total PCB congeners. This assumption is conservative and may overestimate the true geometric mean concentration. For total PAHs and total PCB congeners, results including one or more detections of an individual constituent were calculated by assigning a value of zero to non-detected concentrations. For results in which no individual constituents were detected, the total concentration is reported as the highest MRL among the individual constituents. Duplicate sample results were averaged with the corresponding primary sample results, and the average concentration for that event was then included as a single value in the geometric mean calculations.<sup>(3)</sup> Portland Harbor screening criteria are the cleanup levels for surface water specified in Table 17 the Portland Harbor Record of Decision (ROD; EPA, 2017), where established. Where no cleanup level for a constituent is established in the ROD, the screening level value (SLV) from the Portland Harbor Joint Source Control Strategy (DEQ/EPA, 2005) is used, if established.<sup>(4)</sup> Endpoint = source of the JSCS SLV to be used for initial upland source control screening evaluations (DEQ/EPA, 2005):*Human Health - Fish Consumption* = SLVs for chemicals in water taken up by fish for human consumption; these SLVs represent EPA's National Recommended Water Quality Criteria (NRWQC) values. If no NRWQC values are available, then DEQ's ambient water quality criteria (AWQC) values are listed for the constituent.*Human Health - Ingestion* = SLVs for chemicals in water for human ingestion; these SLVs represent the most conservative value between EPA's Maximum Contaminant Levels (MCLs) and Region 9 Preliminary Remediation Goals (PRGs).*Ecological* = SLVs for chemicals in water for ecological exposure; these SVLs represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent. If no AWQC values are available, then Oak Ridge National Laboratory Tier II SCV Technology Benchmark values are listed for the constituent.<sup>(5)</sup> Range below typical concentrations in graphs developed by DEQ of concentrations of selected contaminants detected in stormwater from a larger number of industrial sites in Portland Harbor to assist with data evaluation [Appendix E to *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (DEQ, 2009, updated December 2015)].<sup>(6)</sup> For purposes of calculating total PAH values and total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.<sup>(6)</sup> Refer to Table A4-22 for individual PCB congener results.**bold** = Concentration exceeds the Portland Harbor screening criterion.

**Table A4-22**  
**2016/2017 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin M-2, Basin-Scale Monitoring Location (M2\_SW1)**

		Outfall Basin M-2, Location M-2_SW1 <sup>(2)</sup>				
		Stormwater Grab Samples				
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3	Event 4
			W16C092-01 3/9/2016	W16I149-01 9/17/16	W16I112-03 10/13/2016	W17B063-03 2/8/2017
Polychlorinated Biphenyl Congeners (PCBs) (EPA 1668A)						
PCB 1	2-MoCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000061 U
PCB 2	3-MoCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000070 U
PCB 3	4-MoCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000062 U
PCB 4	2,2-DiCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000049 U
PCB 5	2,3-DiCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000020 U
PCB 6	2,3'-DiCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000020 U
PCB 7	2,4-DiCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000020 U
PCB 8	2,4'-DiCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000049 U
PCB 9	2,5-DiCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000020 U
PCB 10	2,6-DiCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000049 U
PCB 11	3,3'-DiCB	µg/L	0.00243 U	0.002400 U	0.002540 U	0.000413 U
PCB 12/13	3,4-DiCB + 3,4'-DiCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 14	3,5-DiCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000020 U
PCB 15	4,4'-DiCB	µg/L	0.000327 U	0.000324 U	0.000342 U	0.000020 U
PCB 16	2,2',3-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000093 U
PCB 17	2,2',4-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000082 U
PCB 18/30	2,2',5-TrCB + 2,4,6-TrCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000069 U
PCB 19	2,2',6-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000102 U
PCB 20/28	2,3,3'-TrCB + 2,4,4'-TrCB	µg/L	0.00128 U	0.001260 U	0.001340 U	0.000069 U
PCB 21/33	2,3,4-TrCB + 2,3,4'-TrCB	µg/L	0.00134 U	0.001320 U	0.001400 U	0.000072 U
PCB 22	2,3,4'-TrCB	µg/L	0.000942 U	0.000931 U	0.000985 U	0.000070 U
PCB 23	2,3,5-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000070 U
PCB 24	2,3,6-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000059 U
PCB 25	2,3',4-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000068 U
PCB 26/29	2,3',5-TrCB + 2,4,5-TrCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000072 U
PCB 27	2,3',6-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000057 U
PCB 31	2,4',5-TrCB	µg/L	0.00129 U	0.001270 U	0.001350 U	0.000068 U
PCB 32	2,4',6-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000054 U
PCB 34	2,3',5-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000071 U
PCB 35	3,3',4-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000072 U
PCB 36	3,3',5-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000069 U
PCB 37	3,4,4'-TrCB	µg/L	0.000525 U	0.000520 U	0.000550 U	0.000064 U
PCB 38	3,4,5-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000071 U
PCB 39	3,4,5'-TrCB	µg/L	0.000248 U	0.000245 U	0.000259 U	0.000065 U
PCB 40/41/71	2,2',3,3'-TeCB + 2,2',3,4'-TeCB + 2,3',4',6'-TeCB	µg/L	0.00149 U	0.001470 U	0.001560 U	0.000097 U
PCB 42	2,2',3,4'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000097 U
PCB 43/73	2,2',3,5'-TeCB + 2,3',5',6'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 44/47/65	2,2',3,5'-TeCB + 2,2',4,4'-TeCB + 2,3,5,6'-TeCB	µg/L	0.00149 U	0.001470 U	0.001560 U	0.000042 J
PCB 45/51	2,2',3,6'-TeCB + 2,2',4,6'-TeCB	µg/L	0.000991 U	0.000980 U	0.001040 U	0.000049 U
PCB 46	2,2',3,6'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000046 U
PCB 48	2,2',4,5'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 49/69	2,2',4,5'-TeCB + 2,3',4,6'-TeCB	µg/L	0.000991 U	0.000980 U	0.001040 U	0.000097 U
PCB 50/53	2,2',4,6'-TeCB + 2,2',5,6'-TeCB	µg/L	0.000991 U	0.000980 U	0.001040 U	0.000097 U
PCB 52	2,2',5,5'-TeCB	µg/L	0.00153 U	0.001510 U	0.001600 U	0.000049 U
PCB 54	2,2',6,6'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000046 U
PCB 55	2,3,3',4'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 56	2,3,3',4'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 57	2,3,3',5'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 58	2,3,3',5'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 59/62/75	2,3,3',6'-TeCB + 2,3,4,6'-TeCB + 2,4,4',6'-TeCB	µg/L	0.00149 U	0.001470 U	0.001560 U	0.000097 U
PCB 60	2,3,4,4'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 61/70/74/76	2,3,4,5'-TeCB + 2,3',4',5'-TeCB + 2,4,4',5'-TeCB + 2,3,4,5'-TeCB	µg/L	0.00198 U	0.001960 U	0.002070 U	0.000061 J
PCB 63	2,3,4',5'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 64	2,3,4',6'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 66	2,3',4,4'-TeCB	µg/L	0.000833 U	0.000824 U	0.000871 U	0.000030 J
PCB 67	2,3',4,5'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 68	2,3',4,5'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 72	2,3',5,5'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 77	3,3',4,4'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000036 U
PCB 78	3,3',4,5'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 79	3,3',4,5'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 80	3,3',5,5'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 81	3,4,4',5'-TeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000034 U
PCB 82	2,2',3,3',4'-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 83	2,2',3,3',5'-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	NA
PCB 83/99	2,2',3,3',5'-PeCB + 2,2',4,4',5'-PeCB	µg/L	NA	NA	NA	0.000043 J
PCB 84	2,2',3,3',6'-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000040 U
PCB 85/116/117	2,2',3,4,4'-PeCB + 2,3,4,4,5,6'-PeCB + 2,3,4',5,6'-PeCB	µg/L	0.00149 U	0.001470 U	0.001560 U	0.000097 U
PCB 86/87/97/108/119/125	2,2',3,4,5'-PeCB + 2,2',3,4,5'-PeCB + 2,2',3',4,5'-PeCB + 2,3,3',4,5'-PeCB + 2,3',4,4',6'-PeCB + 2',3,4,5,6'-PeCB	µg/L	0.00297 U	0.002940 U	0.003110 U	0.000195 U
PCB 88/91	2,2',3,4,6'-PeCB + 2,2',3,4',6'-PeCB	µg/L	0.000991 U	0.000980 U	0.001040 U	0.000049 U
PCB 89	2,2',3,4,6'-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 90/101/113	2,2',3,4',5'-PeCB + 2,2',4,5,5'-PeCB + 2,3,3',5',6'-PeCB	µg/L	0.00149 U	0.001470 U	0.001560 U	0.000085 J
PCB 92	2,2',3,5,5'-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 93/95/100	2,2',3,5,6'-PeCB + 2,2',3,5',6'-PeCB + 2,2',4,4',6'-PeCB	µg/L	NA	NA	NA	0.000072 J

**Table A4-22**  
**2016/2017 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin M-2, Basin-Scale Monitoring Location (M2\_SW1)**

IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Outfall Basin M-2, Location M-2_SW1 <sup>(2)</sup>			
			Stormwater Grab Samples			
			Event 1 W16C092-01 3/9/2016	Event 2 W16I149-01 9/17/16	Event 3 W16I112-03 10/13/2016	Event 4 W17B063-03 2/8/2017
PCB 93/98/100/102	2,2',3,5,6-PeCB + 2,2',3',4,6-PeCB + 2,2',4,4',6-PeCB + 2,2',4,5,6'-PeCB	µg/L	0.00198 U	0.001960 U	0.002070 U	
PCB 94	2,2',3,5,6'-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 95	2,2',3,5,6-PeCB	µg/L	0.000942 U	0.000931 U	0.000985 U	
PCB 96	2,2',3,6,6'-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 98/102	2,2',3',4,6-PeCB + 2,2',4,5,6'-PeCB	µg/L	NA	NA	NA	0.000195 U
PCB 99	2,2',4,4',5-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	NA
PCB 103	2,2',4,5',6-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 104	2,2',4,6,6'-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000032 U
PCB 105	2,3,3',4,4'-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000060 J
PCB 106	2,3,3',4,5-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 107	2,3,3',4',5-PeCB	µg/L	NA	NA	NA	0.000049 U
PCB 107/124	2,3,3',4',5-PeCB + 2',3,4,5,5'-PeCB	µg/L	0.000991 U	0.000980 U	0.001040 U	NA
PCB 108/124	2,3,3',4,5'-PeCB + 2',3,4,5,5'-PeCB	µg/L	NA	NA	NA	0.000097 U
PCB 109	2,3,3',4,6-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	NA
PCB 110/115	2,3,3',4',6-PeCB + 2,3,4,4',6-PeCB	µg/L	0.000991 U	0.000980 U	0.001040 U	0.000156
PCB 111	2,3,3',5,5'-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 112	2,3,3',5,6-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 114	2,3,4,4',5-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000036 U
PCB 118	2,3',4,4',5-PeCB	µg/L	0.000634 U	0.000628 U	0.000664 U	0.000108
PCB 120	2,3',4,5,5'-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 121	2,3',4,5',6-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 122	2,3,3',4,5-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 123	2,3,4,4',5-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000036 U
PCB 126	3,3',4,4',5-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000039 U
PCB 127	3,3',4,5,5'-PeCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 128/166	2,2',3,3',4,4'-HxCB + 2,3,4,4',5,6-HxCB	µg/L	0.00099 U	0.000980 U	0.001040 U	0.000097 U
PCB 129/138/163	2,2',3,3',4,4',5-HxCB + 2,2',3,4,4',5'-HxCB + 2,3,3',4',5,6-HxCB	µg/L	0.00149 U	0.001470 U	0.001560 U	0.000318
PCB 130	2,2',3,3',4,5'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 131	2,2',3,3',4,6-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 132	2,2',3,3',4,6'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 J
PCB 133	2,2',3,3',5,5'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 134	2,2',3,3',5,6-HxCB	µg/L	NA	NA	NA	0.000097 U
PCB 134/143	2,2',3,3',5,6-HxCB + 2,2',3,4,5,6'-HxCB	µg/L	0.000991 U	0.000980 U	0.001040 U	NA
PCB 135/151	2,2',3,3',5,6'-HxCB + 2,2',3,5,5',6-HxCB	µg/L	0.000991 U	0.000980 U	0.001040 U	NA
PCB 135/151/154	2,2',3,3',5,6'-HxCB + 2,2',3,5,5',6-HxCB + 2,2',4,4',5,6'-HxCB	µg/L	NA	NA	NA	0.000041 J
PCB 136	2,2',3,3',6,6'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000025 J
PCB 137	2,2',3,4,4',5-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 139/140	2,2',3,4,4',6-HxCB + 2,2',3,4,4',6'-HxCB	µg/L	0.000991 U	0.000980 U	0.001040 U	0.000097 U
PCB 141	2,2',3,4,5,5'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000037 J
PCB 142	2,2',3,4,5,6-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 143	2,2',3,4,5,6'-HxCB	µg/L	NA	NA	NA	0.000097 U
PCB 144	2,2',3,4,5',6-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 145	2,2',3,4,6,6'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 146	2,2',3,4,5,5'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000026 J
PCB 147/149	2,2',3,4',5,6-HxCB + 2,2',3,4',5',6-HxCB	µg/L	0.000991 U	0.000980 U	0.001040 U	0.000164
PCB 148	2,2',3,4',5,6'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 150	2,2',3,4',6,6'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 152	2,2',3,5,6,6'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 153/168	2,2',4,4',5,5'-HxCB + 2,3',4,4',5',6-HxCB	µg/L	0.000991 U	0.000980 U	0.001040 U	0.000154
PCB 154	2,2',4,4',5,6'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	NA
PCB 155	2,2',4,4',6,6'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000022 U
PCB 156/157	2,3,3',4,4',5-HxCB + 2,3,3',4,4',5'-HxCB	µg/L	0.000991 U	0.000980 U	0.001040 U	0.000039 U
PCB 158	2,3,3',4,4',6-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 159	2,3,3',4,5,5'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 160	2,3,3',4,5,6-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000195 U
PCB 161	2,3,3',4,5',6-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 162	2,3,3',4',5,5'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 164	2,3,3',4',5,6-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 165	2,3,3',5,5',6-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 167	2,3',4,4',5,5'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000020 U
PCB 169	3,3',4,4',5,5'-HxCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000024 U
PCB 170	2,2',3,3',4,4',5-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000062
PCB 171/173	2,2',3,3',4,4',6-HpCB + 2,2',3,3',4,5,6-HpCB	µg/L	0.000991 U	0.000980 U	0.001040 U	0.000097 U
PCB 172	2,2',3,3',4,5,5'-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 174	2,2',3,3',4,5,6'-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000074
PCB 175	2,2',3,3',4,5,6-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 176	2,2',3,3',4,6,6'-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 177	2,2',3,3',4',5,6-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 178	2,2',3,3',5,5',6-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 179	2,2',3,3',5,6,6'-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000032 J
PCB 180/193	2,2',3,4,4',5,5'-HpCB + 2,3,3',4',5,5',6-HpCB	µg/L	0.000991 U	0.000980 U	0.001040 U	0.000151
PCB 181	2,2',3,4,4',5,6-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 182	2,2',3,4,4',5,6'-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 183/185	2,2',3,4,4',5,6-HpCB + 2,2',3,4,5,5',6-HpCB	µg/L	0.000991 U	0.000980 U	0.001040 U	0.000097 U
PCB 184	2,2',3,4,4',6,6'-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 186	2,2',3,4,5,6,6'-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U

**Table A4-22**  
**2016/2017 Stormwater Sample Results - Polychlorinated Biphenyl Congeners**  
**Outfall Basin M-2, Basin-Scale Monitoring Location (M2\_SW1)**

		Outfall Basin M-2, Location M-2_SW1 <sup>(2)</sup>				
		Stormwater Grab Samples				
IUPAC Number <sup>(1)</sup>	Chemical Name	Units	Event 1	Event 2	Event 3	Event 4
			W16C092-01 3/9/2016	W16I149-01 9/17/16	W16I112-03 10/13/2016	W17B063-03 2/8/2017
PCB 187	2,2',3,4',5,5',6-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000075 J
PCB 188	2,2',3,4',5,6,6'-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000028 U
PCB 189	2,3,3',4,4',5,5'-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000028 U
PCB 190	2,3,3',4,4',5,6'-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 191	2,3,3',4,4',5,6'-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 192	2,3,3',4,5,5',6'-HpCB	µg/L	0.000496 U	0.000490 U	0.000519 U	0.000049 U
PCB 194	2,2',3,3',4,4',5,5'-OcCB	µg/L	0.000743 U	0.000735 U	0.000778 U	0.000029 J
PCB 195	2,2',3,3',4,4',5,6'-OcCB	µg/L	0.000743 U	0.000735 U	0.000778 U	0.000049 U
PCB 196	2,2',3,3',4,4',5,6'-OcCB	µg/L	0.000743 U	0.000735 U	0.000778 U	0.000049 U
PCB 197	2,2',3,3',4,4',6,6'-OcCB	µg/L	NA	NA	NA	0.000097 U
PCB 197/200	2,2',3,3',4,4',6,6'-OcCB + 2,2',3,3',4,5,6,6'-OcCB	µg/L	0.00149 U	0.001470 U	0.00156 U	NA
PCB 198/199	2,2',3,3',4,5,5',6'-OcCB + 2,2',3,3',4,5,5',6'-OcCB	µg/L	0.00149 U	0.001470 U	0.001560 U	0.000097 U
PCB 200	2,2',3,3',4,5,6,6'-OcCB	µg/L	NA	NA	NA	0.000097 U
PCB 201	2,2',3,3',4,5,6'-OcCB	µg/L	0.000743 U	0.000735 U	0.000778 U	0.000049 U
PCB 202	2,2',3,3',5,5',6,6'-OcCB	µg/L	0.000743 U	0.000735 U	0.000778 U	0.000024 U
PCB 203	2,2',3,4,4',5,5',6'-OcCB	µg/L	0.000743 U	0.000735 U	0.000778 U	0.000049 U
PCB 204	2,2',3,4,4',5,6,6'-OcCB	µg/L	0.000743 U	0.000735 U	0.000778 U	0.000049 U
PCB 205	2,3,3',4,4',5,5',6'-OcCB	µg/L	0.000743 U	0.000735 U	0.000778 U	0.000027 U
PCB 206	2,2',3,3',4,4',5,5',6-NoCB	µg/L	0.000743 U	0.000735 U	0.000778 U	0.000051 U
PCB 207	2,2',3,3',4,4',5,6,6'-NoCB	µg/L	0.000743 U	0.000735 U	0.000778 U	0.000049 U
PCB 208	2,2',3,3',4,5,5',6,6'-NoCB	µg/L	0.000743 U	0.000735 U	0.000778 U	0.000028 U
PCB 209	Decachlorobiphenyl	µg/L	0.000743 U	0.000735 U	0.000778 U	0.000029 U
	Total Monochlorobiphenyls	µg/L	ND	ND	ND	0.0000607 U
	Total Dichlorobiphenyls	µg/L	ND	ND	ND	0.000413
	Total Trichlorobiphenyls	µg/L	ND	ND	ND	0.0000544 U
	Total Tetrachlorobiphenyls	µg/L	ND	ND	ND	0.000133 J
	Total Pentachlorobiphenyls	µg/L	ND	ND	ND	0.000526
	Total Hexachlorobiphenyls	µg/L	ND	ND	ND	0.000813
	Total Heptachlorobiphenyls	µg/L	ND	ND	ND	0.000393
	Total Octachlorobiphenyls	µg/L	ND	ND	ND	0.0000286
	Total Nonachlorobiphenyls	µg/L	ND	ND	ND	0.0000279 U
	Total Decachlorobiphenyls	µg/L	ND	ND	ND	NA
	Total PCBs <sup>(3)</sup>	µg/L	0.00297 ND	0.00353 ND	0.00311 ND	0.00231

## Notes:

MoCB = Monochlorobiphenyl

DiCB = Dichlorobiphenyl

TriCB = Trichlorobiphenyl

TeCB = Tetrachlorobiphenyl

PeCB = Pentachlorobiphenyl

HeCB = Hexachlorobiphenyl

HpCB = Heptachlorobiphenyl

OcCB = Octachlorobiphenyl

NoCB = Nonachlorobiphenyl

-- = No JSCS screening level available.

J = estimated concentration

U = The analyte was not detected above the reported sample quantification limit.

µg/L = Micrograms per liter

NA = Not analyzed

ND = Not detected

DUP = Duplicate

<sup>(1)</sup> IUPAC = International Union of Pure and Applied Chemistry.<sup>(2)</sup> Sampling location is shown on Figure A-9 of main report. Samples were collected at manhole AAMI169 (outgoing 60-inch pipe) and represent all of the Basin M-2 drainage area.<sup>(3)</sup> For purposes of calculating total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

**Table A4-23**  
**2015-2017 Stormwater Quality Control Sample Results - Field Decontamination Blank Samples**

		Field Decontamination Blanks <sup>(1)</sup>					
Class	Analyte	Units	Sampling Round 1	Sampling Round 1	Sampling Round 2	Sampling Round 3	Sampling Round 4
			(Composite sampling) W16C070-01	(Grab Sampling) W16C092-11	(Grab Sampling) W16I149-02	(Grab Sampling) W16I112-10	(Grab Sampling) W17B060-02
			3/9/2016	3/9/2016	5/19/2016	10/13/2016	2/8/2017
<b>Field Measurements</b>							
	Conductivity	umhos/cm	NA	NA	NA	NA	NA
	pH	pH units	NA	NA	NA	NA	NA
	Temperature	Deg. C	NA	NA	NA	NA	NA
<b>Total Suspended Solids (SM 2540D)</b>							
	TSS	mg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
<b>Total Metals (EPA 200.8)</b>							
	Arsenic	µg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
	Cadmium	µg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
	Chromium	µg/L	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
	Copper	µg/L	0.200 U	0.347	0.345	0.200 U	1.17
	Lead	µg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
	Mercury (WPCLSOP M-10)	µg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
	Nickel	µg/L	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
	Silver	µg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
	Zinc	µg/L	0.500 U	1.30	0.500 U	0.611	0.500 U
<b>Polycyclic Aromatic Hydrocarbons (PAHs) (EPA 8270-SIM)</b>							
	Acenaphthene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
	Acenaphthylene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
	Anthracene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
	Benzo(a)anthracene	µg/L	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
	Benzo(a)pyrene	µg/L	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
	Benzo(b)fluoranthene	µg/L	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
	Benzo(g,h,i)perylene	µg/L	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
	Benzo(k)fluoranthene	µg/L	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
	Chrysene	µg/L	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
	Dibenzo(a,h)anthracene	µg/L	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
	Fluoranthene	µg/L	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
	Fluorene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
	Indeno(1,2,3-cd)pyrene	µg/L	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
	1-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
	2-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
	Naphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
	Phenanthrene	µg/L	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
	Pyrene	µg/L	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
	Total PAHs <sup>(2)</sup>	µg/L	0.040 ND	0.040 ND	0.040 ND	0.040 ND	0.040 ND

**Table A4-23**  
**2015-2017 Stormwater Quality Control Sample Results - Field Decontamination Blank Samples**

		Field Decontamination Blanks <sup>(1)</sup>					
Class	Analyte	Units	Sampling Round 1	Sampling Round 1	Sampling Round 2	Sampling Round 3	Sampling Round 4
			(Composite sampling) W16C070-01	(Grab Sampling) W16C092-11	(Grab Sampling) W16I149-02	(Grab Sampling) W16I112-10	(Grab Sampling) W17B060-02
			3/9/2016	3/9/2016	5/19/2016	10/13/2016	2/8/2017
<b>Phthalates (EPA 8270-SIM)</b>							
	Bis(2-ethylhexyl)phthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
	Butylbenzylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
	Di-n-butylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
	Di-n-octylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
	Diethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
	Dimethylphthalate	µg/L	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
<b>Polychlorinated Biphenyl (PCB) Congeners</b>							
	Total PCB Congeners <sup>(2,3)</sup>	µg/L	0.00316 ND	0.00286 ND	0.003 ND	0.00297 ND	0.000201 ND

**Notes:**

NA = not analyzed

ND = not detected

U = The analyte was not detected above the reported sample quantification limit.

-- = not established

µg/L = micrograms per liter

mg/L = milligrams per liter

<sup>(1)</sup> In accordance with the Sampling and Analysis Plan for this project (BES, 2016), one field decontamination blank was prepared and submitted for analysis for each round of stormwater sampling. A round of sampling is defined for this purpose as one set of samples from each basin-scale monitoring location. Four rounds of sampling were conducted for this project, so four field blanks were collected over the course of this project.

<sup>(2)</sup> For purposes of calculating total PAH values and total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

<sup>(3)</sup> Refer to Table A4-24 for individual PCB congener results.

**Table A4-24**  
**2015-2017 Stormwater Quality Control Sample Results - Field Decontamination Blank Samples**  
**Polychlorinated Biphenyl Congeners**

IUPAC Number <sup>(1)</sup>	Units	Field Decontamination Blanks <sup>(2)</sup>					
		Sampling Round 1 (Composite sampling) W16C070-01	Sampling Round 1 (Grab Sampling) W16C092-11	Sampling Round 2 (Grab Sampling) W16I149-02	Sampling Round 3 (Grab Sampling) W16I112-10	Sampling Round 4 (Grab Sampling) W17B060-02	
		3/9/2016	3/9/2016	5/19/2016	10/13/2016	2/8/2017	
<b>Polychlorinated Biphenyl (PCB) Congeners (PCBs) (EPA 1668A)</b>							
PCB 1	2-MoCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000589 U
PCB 2	3-MoCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000716 U
PCB 3	4-MoCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000667 U
PCB 4	2,2'-DiCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000523 U
PCB 5	2,3'-DiCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000201 U
PCB 6	2,3'-DiCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000201 U
PCB 7	2,4'-DiCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000201 U
PCB 8	2,4'-DiCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000503 U
PCB 9	2,5'-DiCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000201 U
PCB 10	2,6'-DiCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000503 U
PCB 11	3,3'-DiCB	µg/L	0.00258 U	0.00234 U	0.00245 U	0.00243 U	0.00101 U
PCB 12/13	3,4'-DiCB + 3,4'-DiCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.000503 U
PCB 14	3,5'-DiCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000201 U
PCB 15	4,4'-DiCB	µg/L	0.000347 U	0.000315 U	0.000330 U	0.000327 U	0.000201 U
PCB 16	2,2',3'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000988 U
PCB 17	2,2',4'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000871 U
PCB 18/30	2,2',5'-TriCB + 2,4,6'-TriCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.000729 U
PCB 19	2,2',6'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.00102 U
PCB 20/28	2,3,3'-TriCB + 2,4,4'-TriCB	µg/L	0.00136 U	0.00123 U	0.00129 U	0.00128 U	0.000606 U
PCB 21/33	2,3,4'-TriCB + 2',3,4'-TriCB	µg/L	0.00142 U	0.00129 U	0.00135 U	0.00134 U	0.00064 U
PCB 22	2,3,4'-TriCB	µg/L	0.00100 U	0.000907 U	0.000950 U	0.000942 U	0.000615 U
PCB 23	2,3,5'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000613 U
PCB 24	2,3,6'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000629 U
PCB 25	2,3',4'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000599 U
PCB 26/29	2,3',5'-TriCB + 2,4,5'-TriCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.000639 U
PCB 27	2,3',6'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000606 U
PCB 31	2,4',5'-TriCB	µg/L	0.00137 U	0.00124 U	0.00130 U	0.00129 U	0.000597 U
PCB 32	2,4',6'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000578 U
PCB 34	2',3,5'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000624 U
PCB 35	3,3',4'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000633 U
PCB 36	3,3',5'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000611 U
PCB 37	3,4,4'-TriCB	µg/L	0.000558 U	0.000506 U	0.000530 U	0.000526 U	0.000591 U
PCB 38	3,4,5'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000628 U
PCB 39	3,4',5'-TriCB	µg/L	0.000263 U	0.000239 U	0.000250 U	0.000248 U	0.000573 U
PCB 40/41/71	2,2',3,3'-TeCB + 2,2',3,4'-TeCB + 2,3',4',6'-TeCB	µg/L	0.00158 U	0.00143 U	0.00150 U	0.00149 U	0.00101 U
PCB 42	2,2',3,4'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.00101 U
PCB 43/73	2,2',3,5'-TeCB + 2,3',5',6'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.000511 U
PCB 44/47/65	2,2',3,5'-TeCB + 2,2',4,4'-TeCB + 2,3,5,6'-TeCB	µg/L	0.00158 U	0.00143 U	0.00150 U	0.00149 U	0.00101 U
PCB 45/51	2,2',3,6'-TeCB + 2,2',4,6'-TeCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.000613 U
PCB 46	2,2',3,6'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.000702 U
PCB 48	2,2',4,5'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.000566 U
PCB 49/69	2,2',4,5'-TeCB + 2,3',4,6'-TeCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.00101 U
PCB 50/53	2,2',4,6'-TeCB + 2,2',5,6'-TeCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.00101 U
PCB 52	2,2',5,5'-TeCB	µg/L	0.00162 U	0.00147 U	0.00154 U	0.00153 U	0.000568 U
PCB 54	2,2',6,6'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.000419 U
PCB 55	2,3,3',4'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.000503 U
PCB 56	2,3,3',4'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.000503 U
PCB 57	2,3,3',5'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.000503 U
PCB 58	2,3,3',5'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.000503 U
PCB 59/62/75	2,3,3',6'-TeCB + 2,3,4,6'-TeCB + 2,4,4',6'-TeCB	µg/L	0.00158 U	0.00143 U	0.00150 U	0.00149 U	0.00101 U

**Table A4-24**  
**2015-2017 Stormwater Quality Control Sample Results - Field Decontamination Blank Samples**  
**Polychlorinated Biphenyl Congeners**

IUPAC Number <sup>(1)</sup>	Units	Field Decontamination Blanks <sup>(2)</sup>					
		Sampling Round 1 (Composite sampling) W16C070-01	Sampling Round 1 (Grab Sampling) W16C092-11	Sampling Round 2 (Grab Sampling) W161149-02	Sampling Round 3 (Grab Sampling) W161112-10	Sampling Round 4 (Grab Sampling) W17B060-02	
		3/9/2016	3/9/2016	5/19/2016	10/13/2016	2/8/2017	
PCB 60	2,3,4,4'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 61/70/74/76	2,3,4,5'-TeCB + 2,3',4',5'-TeCB + 2,4,4',5'-TeCB + 2',3,4,5'-TeCB	µg/L	0.00211 U	0.00191 U	0.00200 U	0.00198 U	0.000201 U
PCB 63	2,3,4',5'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 64	2,3,4',6'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 66	2,3',4,4'-TeCB	µg/L	0.000884 U	0.000802 U	0.000840 U	0.000833 U	0.0000503 U
PCB 67	2,3',4,5'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 68	2,3',4,5'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 72	2,3',5,5'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 77	3,3',4,4'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000373 U
PCB 78	3,3',4,5'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 79	3,3',4,5'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 80	3,3',5,5'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 81	3,4,4',5'-TeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000365 U
PCB 82	2,2',3,3',4'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000628 U
PCB 83	2,2',3,3',5'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	NA
PCB 83/99	2,2',3,3',5'-PeCB + 2,2',4,4',5'-PeCB	µg/L	NA	NA	NA	NA	0.000101 U
PCB 84	2,2',3,3',6'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.000075 U
PCB 85/116/117	2,2',3,4,4'-PeCB + 2,3,4,5,6'-PeCB + 2,3,4',5,6'-PeCB	µg/L	0.00158 U	0.00143 U	0.00150 U	0.00149 U	0.000101 U
PCB 86/87/97/108/119/125	2,2',3,4,5'-PeCB + 2,2',3,4,5'-PeCB + 2,2',3',4,5'-PeCB + 2,3,3',4,5'-PeCB + 2,3',4,4',6'-PeCB + 2',3,4,5,6'-Pe	µg/L	0.00316 U	0.00286 U	0.00300 U	0.00297 U	0.000201 U
PCB 88/91	2,2',3,4,6'-PeCB + 2,2',3,4',6'-PeCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.0000667 U
PCB 89	2,2',3,4,6'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000708 U
PCB 90/101/113	2,2',3,4',5'-PeCB + 2,2',4,5,5'-PeCB + 2,3,3',5',6'-PeCB	µg/L	0.00158 U	0.00143 U	0.00150 U	0.00149 U	0.000201 U
PCB 92	2,2',3,5,5'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000584 U
PCB 93/95/100	2,2',3,5,6'-PeCB + 2,2',3,5',6'-PeCB + 2,2',4,4',6'-PeCB	µg/L	NA	NA	NA	NA	0.000201 U
PCB 93/98/100/102	2,2',3,5,6'-PeCB + 2,2',3',4,6'-PeCB + 2,2',4,4',6'-PeCB + 2,2',4,5,6'-PeCB	µg/L	0.00211 U	0.00191 U	0.00200 U	0.00198 U	NA
PCB 94	2,2',3,5,6'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000732 U
PCB 95	2,2',3,5',6'-PeCB	µg/L	0.00100 U	0.000907 U	0.000950 U	0.000942 U	NA
PCB 96	2,2',3,6,6'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000543 U
PCB 98/102	2,2',3',4,6'-PeCB + 2,2',4,5,6'-PeCB	µg/L	NA	NA	NA	NA	0.000201 U
PCB 99	2,2',4,4',5'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	NA
PCB 103	2,2',4,5',6'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000624 U
PCB 104	2,2',4,6,6'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000637 U
PCB 105	2,3,3',4,4'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000426 U
PCB 106	2,3,3',4,5'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 107	2,3,3',4',5'-PeCB	µg/L	NA	NA	NA	NA	0.0000503 U
PCB 107/124	2,3,3',4',5'-PeCB + 2',3,4,5,5'-PeCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	NA
PCB 108/124	2,3,3',4,5'-PeCB + 2',3,4,5,5'-PeCB	µg/L	NA	NA	NA	NA	0.000101 U
PCB 109	2,3,3',4,6'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	NA
PCB 110/115	2,3,3',4',6'-PeCB + 2,3,4,4',6'-PeCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.000101 U
PCB 111	2,3,3',5,5'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 112	2,3,3',5,6'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 114	2,3,4,4',5'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000452 U
PCB 118	2,3',4,4',5'-PeCB	µg/L	0.000674 U	0.000611 U	0.000640 U	0.000635 U	0.0000401 U
PCB 120	2,3',4,5,5'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 121	2,3',4,5',6'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 122	2',3,3',4,5'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000534 U
PCB 123	2',3,4,4',5'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000415 U
PCB 126	3,3',4,4',5'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000415 U
PCB 127	3,3',4,5,5'-PeCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 128/166	2,2',3,3',4,4'-HxCB + 2,3,4,4',5,6'-HxCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.000101 U
PCB 129/138/163	2,2',3,3',4,5'-HxCB + 2,2',3,4,4',5'-HxCB + 2,3,3',4,5,6'-HxCB	µg/L	0.00158 U	0.00143 U	0.00150 U	0.00149 U	0.000201 U

**Table A4-24**  
**2015-2017 Stormwater Quality Control Sample Results - Field Decontamination Blank Samples**  
**Polychlorinated Biphenyl Congeners**

IUPAC Number <sup>(1)</sup>	Units	Field Decontamination Blanks <sup>(2)</sup>					
		Sampling Round 1 (Composite sampling) W16C070-01	Sampling Round 1 (Grab Sampling) W16C092-11	Sampling Round 2 (Grab Sampling) W16I149-02	Sampling Round 3 (Grab Sampling) W16I112-10	Sampling Round 4 (Grab Sampling) W17B060-02	
		3/9/2016	3/9/2016	5/19/2016	10/13/2016	2/8/2017	
PCB 130	2,2',3,3',4,5'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 131	2,2',3,3',4,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 132	2,2',3,3',4,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 133	2,2',3,3',5,5'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 134	2,2',3,3',5,6'-HxCB		NA	NA	NA	NA	0.000101 U
PCB 134/143	2,2',3,3',5,6'-HxCB + 2,2',3,4,5,6'-HxCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	NA
PCB 135/151	2,2',3,3',5,6'-HxCB + 2,2',3,5,5',6'-HxCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	NA
PCB 135/151/154	2,2',3,3',5,6'-HxCB + 2,2',3,5,5',6'-HxCB + 2,2',4,4',5,6'-HxCB		NA	NA	NA	NA	0.000101 U
PCB 136	2,2',3,3',6,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 137	2,2',3,4,4',5'-HxCB	µg/L	0.000526 U	0.000477 U	0.0005 U	0.000496 U	0.0000503 U
PCB 139/140	2,2',3,4,4',6'-HxCB + 2,2',3,4,4',6'-HxCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.000101 U
PCB 141	2,2',3,4,5,5'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 142	2,2',3,4,5,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 143	2,2',3,4,5,6'-HxCB		NA	NA	NA	NA	0.000101 U
PCB 144	2,2',3,4,5,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 145	2,2',3,4,6,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 146	2,2',3,4',5,5'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 147/149	2,2',3,4',5,6'-HxCB + 2,2',3,4',5',6'-HxCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.000101 U
PCB 148	2,2',3,4',5,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 150	2,2',3,4',6,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 152	2,2',3,5,6,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 153/168	2,2',4,4',5,5'-HxCB + 2,3',4,4',5',6'-HxCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.000101 U
PCB 154	2,2',4,4',5,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	NA
PCB 155	2,2',4,4',6,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000201 U
PCB 156/157	2,3,3',4,4',5'-HxCB + 2,3,3',4,4',5'-HxCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.0000402 U
PCB 158	2,3,3',4,4',6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 159	2,3,3',4,5,5'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 160	2,3,3',4,5,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000201 U
PCB 161	2,3,3',4,5,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 162	2,3,3',4',5,5'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 164	2,3,3',4',5,6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 165	2,3,3',5,5',6'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 167	2,3',4,4',5,5'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000215 U
PCB 169	3,3',4,4',5,5'-HxCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000251 U
PCB 170	2,2',3,3',4,4',5'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 171/173	2,2',3,3',4,4',6'-HpCB + 2,2',3,3',4,5,6'-HpCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.000101 U
PCB 172	2,2',3,3',4,5,5'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000504 U
PCB 174	2,2',3,3',4,5,6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000533 U
PCB 175	2,2',3,3',4,5,6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 176	2,2',3,3',4,6,6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 177	2,2',3,3',4,5,6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000543 U
PCB 178	2,2',3,3',5,5',6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 179	2,2',3,3',5,6,6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 180/193	2,2',3,4,4',5,5'-HpCB + 2,3,3',4',5,5',6'-HpCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.000101 U
PCB 181	2,2',3,4,4',5,6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 182	2,2',3,4,4',5,6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 183/185	2,2',3,4,4',5,6'-HpCB + 2,2',3,4,5,5',6'-HpCB	µg/L	0.00105 U	0.000955 U	0.00100 U	0.000992 U	0.000101 U
PCB 184	2,2',3,4,4',6,6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 186	2,2',3,4,5,6,6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 187	2,2',3,4',5,5',6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 188	2,2',3,4',5,6,6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000332 U

**Table A4-24**  
**2015-2017 Stormwater Quality Control Sample Results - Field Decontamination Blank Samples**  
**Polychlorinated Biphenyl Congeners**

IUPAC Number <sup>(1)</sup>	Units	Field Decontamination Blanks <sup>(2)</sup>					
		Sampling Round 1 (Composite sampling) W16C070-01	Sampling Round 1 (Grab Sampling) W16C092-11	Sampling Round 2 (Grab Sampling) W16I149-02	Sampling Round 3 (Grab Sampling) W16I112-10	Sampling Round 4 (Grab Sampling) W17B060-02	
		3/9/2016	3/9/2016	5/19/2016	10/13/2016	2/8/2017	
PCB 189	2,3,3',4,4',5,5'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000374 U
PCB 190	2,3,3',4,4',5,6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 191	2,3,3',4,4',5',6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 192	2,3,3',4,5,5',6'-HpCB	µg/L	0.000526 U	0.000477 U	0.000500 U	0.000496 U	0.0000503 U
PCB 194	2,2',3,3',4,4',5,5'-OxCB	µg/L	0.000790 U	0.000716 U	0.000750 U	0.000744 U	0.0000503 U
PCB 195	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000790 U	0.000716 U	0.000750 U	0.000744 U	0.0000503 U
PCB 196	2,2',3,3',4,4',5,6'-OxCB	µg/L	0.000790 U	0.000716 U	0.000750 U	0.000744 U	0.0000503 U
PCB 197	2,2',3,3',4,4',6,6'-OxCB		NA	NA	NA	NA	0.000101 U
PCB 197/200	2,2',3,3',4,4',6,6'-OxCB + 2,2',3,3',4,5,6,6'-OxCB	µg/L	0.00158 U	0.00143 U	0.00150 U	0.00149 U	NA
PCB 198/199	2,2',3,3',4,5,5',6'-OxCB + 2,2',3,3',4,5,5',6'-OxCB	µg/L	0.00158 U	0.00143 U	0.00150 U	0.00149 U	0.000101 U
PCB 200	2,2',3,3',4,5,6,6'-OxCB		NA	NA	NA	NA	0.000101 U
PCB 201	2,2',3,3',4,5',6,6'-OxCB	µg/L	0.000790 U	0.000716 U	0.000750 U	0.000744 U	0.0000503 U
PCB 202	2,2',3,3',5,5',6,6'-OxCB	µg/L	0.000790 U	0.000716 U	0.000750 U	0.000744 U	0.000023 U
PCB 203	2,2',3,4,4',5,5',6'-OxCB	µg/L	0.000790 U	0.000716 U	0.000750 U	0.000744 U	0.0000503 U
PCB 204	2,2',3,4,4',5,6,6'-OxCB	µg/L	0.000790 U	0.000716 U	0.000750 U	0.000744 U	0.0000503 U
PCB 205	2,3,3',4,4',5,5',6'-OxCB	µg/L	0.000790 U	0.000716 U	0.000750 U	0.000744 U	0.0000259 U
PCB 206	2,2',3,3',4,4',5,5',6'-NoCB	µg/L	0.000790 U	0.000716 U	0.000750 U	0.000744 U	0.0000591 U
PCB 207	2,2',3,3',4,4',5,6,6'-NoCB	µg/L	0.000790 U	0.000716 U	0.000750 U	0.000744 U	0.0000503 U
PCB 208	2,2',3,3',4,4',5,5',6',6'-NoCB	µg/L	0.000790 U	0.000716 U	0.000750 U	0.000744 U	0.0000346 U
PCB 209	Decachlorobiphenyl	µg/L	0.000790 U	0.000716 U	0.000750 U	0.000744 U	0.0000311 U
	Total Monochlorobiphenyls	µg/L	ND	ND	ND	ND	0.0000589 U
	Total Dichlorobiphenyls	µg/L	ND	ND	ND	ND	0.0000201 U
	Total Trichlorobiphenyls	µg/L	ND	ND	ND	ND	0.0000573 U
	Total Tetrachlorobiphenyls	µg/L	ND	ND	ND	ND	0.000201 U
	Total Pentachlorobiphenyls	µg/L	ND	ND	ND	ND	0.000201 U
	Total Hexachlorobiphenyls	µg/L	ND	ND	ND	ND	0.0000201 U
	Total Heptachlorobiphenyls	µg/L	ND	ND	ND	ND	0.0000285 U
	Total Octachlorobiphenyls	µg/L	ND	ND	ND	ND	0.0000219 U
	Total Nonachlorobiphenyls	µg/L	ND	ND	ND	ND	0.0000346 U
	Total Decachlorobiphenyls	µg/L	ND	ND	ND	ND	NA
	Total PCBs <sup>(3)</sup>	µg/L	0.00316 ND	0.00286 ND	0.00300 ND	0.00297 ND	0.000201 ND

## Notes:

MoCB = Monochlorobiphenyl

DiCB = Dichlorobiphenyl

TriCB = Trichlorobiphenyl

TeCB = Tetrachlorobiphenyl

PeCB = Pentachlorobiphenyl

HeCB = Hexachlorobiphenyl

HpCB = Heptachlorobiphenyl

OcCB = Octachlorobiphenyl

NoCB = Nonachlorobiphenyl

U = The analyte was not detected above the reported sample quantification limit.

µg/L = Micrograms per liter.

NA = Not analyzed

ND = Not detected.

<sup>(1)</sup> IUPAC = International Union of Pure and Applied Chemistry.<sup>(2)</sup> In accordance with the Sampling and Analysis Plan for this project (BES, 2016), one field decontamination blank was prepared and submitted for analysis for each round of stormwater sampling. A round of sampling is defined for this purpose as one set of samples from each basin-scale monitoring location. Four rounds of sampling were conducted for this project, so four field blanks were collected over the course of this project.<sup>(3)</sup> For purposes of calculating total PCB congener values, non-detect results are set to 0. For results in which no individual constituents were detected, the total "non-detect" concentration is reported as the highest MRL among the individual constituents.

# **Appendix B**

## **Supplemental Information Regarding City Roadways**

**City of Portland Outfalls Project  
ECSI No. 2425**

**June 2018**

**Prepared by  
City of Portland  
Bureau of Environmental Services**

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# B1 Supplemental Information Regarding City Roadways

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This report is written in response to Oregon Department of Environmental Quality (DEQ) comments on the City of Portland's (City) 2015 *Source Control Measures Effectiveness Demonstration Report* (BES, 2015) requesting additional information about runoff from City roadways, and provides a summary of information and qualitative lines-of-evidence regarding potential contaminant contributions to Portland Harbor from City roadways. As previously discussed in the City's *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report; BES, 2013) and *Source Control Measures Effectiveness Demonstration Report* (BES, 2015), runoff from City roadways are not a significant contributor of contamination to Portland Harbor, and sources related to City rights-of-way have been adequately evaluated and controlled.

In most cases, runoff from City roadways discharges to City outfalls. Roads themselves are typically not a significant source of contaminants, but roadway activities, including contaminant migration from erosion and vehicle dragout onto City roads, may contribute to contaminants in roadway runoff. One of the driving principles of the City's overall source control strategy is that sources of contaminants to the City conveyance system should be controlled at the source. This is true with roadways as well, in that sources of contaminated dragout and erosion should be controlled before reaching the roadway.

During the City's source investigation and control efforts of the past 2 decades, where data indicated potential roadway sources, the City identified specific roadways that were being adversely impacted by offsite migration of contaminated erodible soils from nearby industrial sites (e.g., Basins 18, 19A, 52, 52C, 53, and S-1), investigated those pathways, and provided results to DEQ so that site controls could be implemented.

## B1.1 Land Use and Existing Outfall Data

Roads comprise approximately two percent of total land use in Portland Harbor. In previous City evaluations of land use and their contaminant contributions (BES, 2013), roads were included as part of the larger surrounding land use category. As part of the City Outfalls Project, all land uses were evaluated as potential sources. An evaluation of data related to land use is presented in the Municipal Report.

Existing effectiveness monitoring data were collected primarily to be representative of entire drainage basin. This area includes potential contributions from City roadway runoff. Therefore, if roadway runoff was contributing contaminants to City outfall discharges at concentrations that would pose risk of recontamination or risk to human health and the environment in Portland Harbor, it would be evident in the data. However, the data do not show significantly elevated concentrations for contaminants typically associated with roadway runoff, such as PAHs or certain metals, without the presence of other known industrial sources (see Appendix A of the main report). The risk drivers in the Portland Harbor Superfund Site are primarily PCBs, dioxins,

pesticides, and PAHs (in areas with known sources), none of which is typically associated with roads.

Some outfalls drain only roads (Outfalls 48 and 49), but in-water sediment in the vicinity of these outfalls has shoreline sources of contaminants, so in-water data are not indicative of outfall discharge contributions. In-line data related to the outfalls are a stronger line of evidence for understanding potential contaminant contributions from roads. In the case of Outfalls 48 and 49, polycyclic aromatic hydrocarbon (PAH) concentrations, the contaminant most commonly associated with roadway activities, are low. Generally, results of all samples collected from these basins are below values typically associated with industrial stormwater on DEQ’s stormwater curves.

## B1.2 City Measures That Reduce Roadway Runoff

The City’s source control program uses stormwater and stormwater solids analytical concentrations as primary lines of evidence for understanding source control effectiveness. Another line of evidence that could be used in conjunction with analytical data for understanding contributions from various sources is to look at total suspended solids (TSS) because stormwater contaminant concentrations typically correlate with TSS for several contaminants.

While not a data quality objective for the City’s source control effectiveness, the City performs several activities through its Municipal Separate Storm Sewer System (MS4) permit that reduce TSS loading to stormwater. In addition, the National Pollutant Discharge Elimination System (NPDES) industrial stormwater permit program requires individual property owners to meet a reduced TSS loading requirement and prevent offsite migration and tracking.

The City does not track roadway maintenance or permit measures on a basin-specific or Portland Harbor-specific basis. However, the tables below are excerpted from the City’s NPDES MS4 Annual Report, and present City-wide activities related to roads and storm system cleaning, many of which are conducted within the Portland Harbor drainage area. For example, the City’s street cleaning program removes dirt and debris from City streets to provide a healthy, safe, and attractive environment for Portland residents and visitors. Regular removal of leaves and debris by members of the public and City crews is necessary to prevent stormwater drains from clogging, which can result in street flooding. Street cleaning protects water quality and minimizes the burden on the sewer system from surface debris. The street sweeping program sweeps more than 4,000 lane miles of curbed streets in the City each year, including residential streets and major arterial streets.

The information presented Tables B-1, B-2, and B-3 is from fiscal year 2016-2017, which is the most recent year for which information is available.

<b>Table B-1. Storm System Cleaning Activities</b>	<b>Number of Cleanings</b>
<b>System Component</b>	
Storm Sewer Culverts and Pipes	12,771 (feet)
Stormwater Conveyance Ditches	49,412 (feet)
Storm Inlets	10,599
Trash Racks	3,039*
<b>Water Quality Facilities</b>	
Green Streets	4,990
All Other Types	85**

Notes.

\* Value represents the number of inspections. Trash racks are cleaned and cleared of debris at the time of inspection, if needed. The true cleaning number is likely much lower.

\*\* Number of maintenance-related work orders recorded.

<b>Table B-2. Storm System O&amp;M Inspection Activities System Component</b>	<b>Number of Inspections</b>
Storm Sewer Culverts and Pipes	17,780 (feet)
Trash Racks	3,039
<b>Water Quality Facilities</b>	
Green Streets	3,078
All Other Types	557*

Notes.

\* This number counts inspections of individual asset components. Many water quality facilities have multiple “treatment train” components that are inspected for their specific maintenance needs.

O&M = operations and maintenance

<b>Table B-3. Roadway O&amp;M Activities Street Sweeping – Frequency</b>	<b>Frequency</b>
Major Arterials	4-6x / year
Residential Streets	1x / year
Downtown Core	5x / week
<b>Material Removed from City Roadways</b>	
Sediment and Material Collected from Street Sweeping Activities	4,385
Leaf Material Collected from Street Leaf Removal Program	6,930*

Notes.

\* Equivalent to 13,541 cubic yards.

## B1.3 Conclusions

In conclusion, City efforts for source control related to roadway runoff have focused on addressing contaminants at the source, and preventing major contaminants from tracking onto roadways through source investigation and referrals to DEQ.

Existing outfall data related to basins that consist primarily or only of roadways indicate contaminant concentrations are within or below the range of typical concentrations associated with the surrounding land use.

Outfall data from larger basins include runoff from roadways and larger basin activities. A source control determination using data near a discharge point for a basin indicates that sources related to roadway runoff within the basin are also controlled.

## B1.4 References

BES. 2013. Municipal Stormwater Source Control Report for Portland Harbor. City of Portland Outfalls Project. City of Portland, Bureau of Environmental Services. December 2013.

BES. 2015. Source Control Measures Effectiveness Demonstration, City of Portland Outfalls Project. Prepared by the City of Portland, Bureau of Environmental Services. September 2015.

# **Appendix C**

## **Summary of City Responses to DEQ Comments on Source Control Measures Effectiveness Demonstration**

**City of Portland Outfalls Project  
ECSI No. 2425**

**June 2018**

**Prepared by  
City of Portland  
Bureau of Environmental Services**

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## Summary of City of Portland Responses to Oregon Department of Environmental Quality (DEQ) Comments on Source Control Measures Effectiveness Demonstration

(DEQ comment letter dated December 28, 2015)

DEQ Comment	City Response
<b>General Comments</b>	
<p>...DEQ disagrees with the narrow objective of demonstrating effectiveness only of measures implemented by the City specifically for recontamination prevention. As such, the analysis omits demonstration that unacceptable risk to in-water receptors is prevented, which is a requirement of the 2005 EPA/DEQ Joint Source Control Strategy for Portland Harbor. Given the extensiveness of City conveyance system, which comingles on-going discharges from multiple sites in every georegion into the Harbor, a more robust approach to demonstration of source control effectiveness is needed. Refinement of methodologies for evaluating in-water impacts from stormwater discharges is anticipated to occur during evolving discussions between DEQ and EPA. Acknowledgement of which basins rely solely on City and DEQ water programs for long-term effectiveness versus those with contaminated sites being addressed under DEQ and EPA oversight may be a good exercise.</p>	<p>The report has been modified to include an evaluation of in-water risk. In the absence of a refinement of methodologies between EPA and DEQ for evaluating in-water impacts from stormwater discharges, a lines-of-evidence approach is presented in this <i>Source Control Measure Effectiveness Monitoring and Assessment Report</i> (this report; BES, 2018) to evaluate the potential for in-water risk from City outfall discharges.</p> <p>Basins that rely only on City and DEQ water programs for long-term effectiveness versus those with contaminated sites being addressed under DEQ and EPA oversight are identified in this report.</p>
<b>Specific Comments</b>	
<p>1. <b>Footnote 1, Page 1-2:</b> DEQ has not definitely determined that termination of the existing IGA (DEQ No. LQVC-NWR-03-10) will be appropriate until long term effectiveness of source control is demonstrated. While a conditional source control decision can be issued upon finalization of the approved Effectiveness Demonstration and Monitoring Work Plans, the existing agreement may be the most expedient way to ensure adequate DEQ oversight for monitoring work and subsequent reporting.</p>	<p>The City looks forward to a continuing partnership with DEQ to demonstrate long-term effectiveness of source control. The current IGA, created before the JSCS is outdated and does not appropriately address the needs of a long-term source control program. Given conversations that have occurred since DEQ's 2015 comment letter, it is the City's understanding that a source control decision will be issued, along with closure of the current IGA, following demonstration of source control effectiveness, which is provided in this report.</p>
<p>2. <b>Section 2 Background – Page 2-1:</b> At the end of the first paragraph in the introduction, the City states that "Work conducted by the City under the IGA is separate from work completed by other City programs under different regulatory authorities, such as the MS4 and CSO programs." While DEQ</p>	<p>The City acknowledges that multiple programs contribute to long-term source control. This report demonstrates that these programs are working.</p>

DEQ Comment	City Response
<p>understands the administrative structure of the City’s Bureau of Environmental Services has distinctly separate programs for implementation of various stormwater regulatory authorities, the City’s Portland Harbor Superfund program provides an opportunity for cross-program interaction. This is particularly important to acknowledge with regard to the NPDES MS4 program and the CSO Abatement program. Both programs are driven by DEQ authorities and have significant overlap with Portland Harbor outfalls source control work. Importantly, one aspect of the criteria developed in 2008 for making a determination on source control completion for the City Outfalls program is “identification of any non-site-specific measures, practices or actions intended to control or improve stormwater discharges from a basin and documentation of their effectiveness. These may include individual and system-wide line cleanouts and repairs, actions that reduce or divert discharges and programmatic elements.” As we have discussed, DEQ is using the 2008 criteria in drafting the Source Control Decision staff memorandum, which has been shared as a partial draft with you. The 39 outfalls and associated conveyances evaluated for source control are wholly within the MS4 system, which is permitted by DEQ. The CSO abatement project affected 16 of the 39 outfalls into Portland Harbor, and was initiated by a 1991 DEQ order. Importantly, management practices and control measures applied through these and other City stormwater and maintenance programs have been improved in consideration of information developed during the City Outfalls investigation project and the quality of stormwater discharging into the Portland Harbor is assumed to be significantly improved through implementation of these programs. <u>This needs confirmation</u>, since both DEQ and the City rely on this assumption in drawing conclusions about stormwater source control in DEQ’s Portland Harbor Upland Source Control Summary Report, 2014, and the City’s Municipal Stormwater Source Control Report for Portland Harbor, 2013. Finally, DEQ and the City will rely on continued implementation and iterative improvement of various stormwater programs to demonstrate that source control of City stormwater discharges into Portland Harbor has been effectively achieved, such that sediment recontamination and unacceptable in-water risk are prevented. Therefore, while administratively separate, the important overlaps of these programs with Portland Harbor source control objectives must be acknowledged and effectiveness confirmed to support a determination of effective source control being achieved.</p>	

DEQ Comment	City Response
<p><b>3. Section 3 SCM Effectiveness Demonstration – Page 3-1:</b> At the end of the second paragraph of the introduction, when discussing source control measures implemented by individual sites, the City states that “The parties that implemented those measures are responsible for demonstrating their effectiveness.” DEQ agrees that sites are responsible to demonstrate effectiveness of measures put in place to address discharges from those sites and we are working with each site to do so prior to source control decisions being made for those sites. However, the City storm sewer system conveys discharges from many sites within the various basins and a basic presumption of the City’s Outfall Project is that control of each potential source at the site-level will add up to overall control at the end of the conveyance system, where combined discharges enter the river from the outfalls. DEQ views it as the City’s responsibility to confirm that presumption through monitoring at the end of the system, at least in a representative fashion.</p>	<p>The SCM effectiveness monitoring program implemented under the SAP was broadened to evaluate a range of SCMs, including SCMs implemented by other parties at sites that discharge to City stormwater outfall basins. Basins identified for SCM effectiveness monitoring include those with SCMs consisting solely of City and State water quality programs as well as those that also have SCMs implemented under State or federal cleanup programs. This report confirms that source control at the site-level, in conjunction with City, State, and federal programmatic SCMs, contributes to overall control at the end of the conveyance system.</p>
<p><b>4. Decision Points table – Page 3-2:</b></p>	
<p>a. DEQ agrees that Decision Point 2 – whether an outfall discharges to a sediment area of potential concern or not – is a valid decision point for evaluating the potential for sediment recontamination by the outfall. However, in addition to preventing sediment recontamination, the objectives of 2005 EPA/DEQ Joint Source Control Strategy include preventing unacceptable risk to in-water receptors. Therefore, the effectiveness demonstration must also consider in-water risk prevention. DEQ acknowledges that the qualitative and quantitative lines of evidence, as presented by outfall basin in Table 2, begins to get at this demonstration. However, basins ruled out for effectiveness monitoring based on whether or not the outfall discharges to an AOPC (Outcomes 2 and 3 in the table on Page 3-3, on Figure 1 and in Tables 1 and 2) need at least a representative subset of effectiveness monitoring to address potential in-water impacts.</p>	<p>This report uses a lines-of-evidence approach to evaluate the potential for both in-water risk and recontamination from City outfall discharges.</p> <p>In its discussions with the City, DEQ indicated that existing data as well as the new data collected under the SAP would be used for the evaluation of source control effectiveness.</p> <p>The existing data set includes basin-scale stormwater data from basins with outfalls that do not discharge to an AOPC; these include stormwater data collected from Basins 15, 53, S-5, and S-6.</p>
<p>b. DEQ appreciates that the City captured the nuance described in comment 3 above in Decision Point 5a and agrees that additional effectiveness monitoring data is needed, at the site-level or basin-scale, for confirmation that the basin-scale is represented in drawing basin-scale conclusions.</p>	<p>Comment noted.</p>
<p><b>5. Outcome table – Page 3-3:</b> While DEQ appreciates the nuances between whether source control measures were implemented by the sites, the City, or both, the inclusion of distinct Outcomes numbered 4, 5 and 4&amp;5 is confusing and</p>	<p>For the purposes of meeting the objectives of the SMC effectiveness monitoring, the SAP simplifies the groupings of City outfall basins into the following four categories based on source control status:</p>

DEQ Comment	City Response
<p>does not add value to the evaluation. DEQ suggests collapsing all three into one Outcome 4, making only five rather than seven Outcomes total. This will simplify the tables and figures and make the overall rationale easier to follow. The distinction can be preserved, if the City thinks it is valuable, perhaps by noting subcategories of Outcome 4 as a, b, and c; however, the information provided in Tables 1 and 2 already provide specificity on the entities implementing and monitoring source control measures, so these distinctions may not be necessary.</p>	<p>Category 1. Controlled: City/State water quality programs only            Category 2. Controlled: City/State water quality programs, and DEQ/EPA cleanup programs            Category 3. Mostly controlled: City/State water quality programs, and DEQ/EPA cleanup programs            Category 4. Uncontrolled: City/State water quality programs in place, but uncontrolled DEQ/EPA cleanup sites remain.</p>
<p><b>6. Section 3.3.2 Quantitative Lines of Evidence:</b></p>	
<p>a. <b>Page 3-4:</b> Geometric means are not appropriate for plotting on the rank-order curves of concentrations of contaminants measured at heavy industrial site in Portland Harbor, because the curves are composed of raw data rather than averages. This is consistent with direction DEQ gives to individual sites completing source control evaluations. Because the curves presented in Appendix A also contain the City’s raw data, they are acceptable. However, the quantitative entries regarding where the contaminants fall on the curves in Table 2 should be updated.</p>	<p>The data summary table (Table 2 of this report) and the more detailed stormwater analytical tables in Attachment A4 present findings based on individual data points. Geomeans also are presented as a line of evidence in assessing longer-term data trends and assessing the potential for in-water risk.</p>
<p>b. <b>Page 3-5:</b> DEQ appreciates the compilation of the stormwater data into a summary table (as presented in Table A-1), and also that the City conveyance is subjected to discharges from sites at various permitted concentrations that may be higher than the JSCS SLVs and rank-order curve knees. DEQ recommends giving these two the most weight in a multi-screening level scheme, which is consistent with direction DEQ gives to individual sites completing source control evaluations, and providing additional detail in the text as to potential cumulative impacts within the City conveyance system.</p>	<p>Stormwater data are compared to both the JSCS SLVs and rank-order curves in Table 2 (of this report) and Attachment A4, and discussed in the text as lines of evidence in assessing source control effectiveness.</p>
<p>c. <b>Page 3-6:</b> DEQ interprets the knee of the curve for PCBs at approximately 0.3 µg/L, rather than 0.1 µg/l noted by the City in this section.</p>	<p>Comment noted.</p> <p>DEQ Guidance for Evaluating the Stormwater Pathway at Upland Sites (DEQ) states: <i>“The upper and lower bounds of the “knee” are purposefully left undefined on the charts to help avert a misinterpretation of the screening results. Defining these bounds might suggest that the charts were developed with more statistical rigor than was the case, or that the range of typical vs. elevated concentrations is the same for all sites”</i></p>

DEQ Comment	City Response
	Exact values for knees of the curve have been removed from report tables and text to be consistent with this guidance and provide a lines-of-evidence comparison to inform effectiveness evaluations.
d. <b>Page 3-6:</b> DEQ directs individual sites to evaluate BEHP at the JSCS SLV at 2.2 µg/L and at the knee of the curve at approximately 3 µg/L, rather than the City's suggestion in this section of five times the SLV.	<p>Noted.</p> <p>DEQ Guidance for Evaluating the Stormwater Pathway at Upland Sites (DEQ) states: <i>"The upper and lower bounds of the "knee" are purposefully left undefined on the charts to help avert a misinterpretation of the screening results. Defining these bounds might suggest that the charts were developed with more statistical rigor than was the case, or that the range of typical vs. elevated concentrations is the same for all sites"</i></p> <p>Exact values for knees of the curve have been removed from report tables and text to be consistent with this guidance and provide a lines-of-evidence comparison to inform effectiveness evaluations.</p>
7. DEQ recommends that additional screening and other considerations be incorporated into the rationale for determining in which basins effectiveness monitoring should be undertaken.	In this comment, DEQ identifies a number of elements to be represented in the SCM effectiveness monitoring. To ensure that outfalls selected for additional stormwater monitoring would meet project objectives, the City and DEQ collaborated on outfall selection for the revised SAP. Specific responses that address each of DEQ's basin selection considerations are summarized below; additional details were provided in the Basin Selection TM (City, 2016), which was approved by DEQ.
a. Ensure that basins selected are representative of all Outcomes, except Outcome 1, which no longer discharge.	<p>The decision framework presented in the September 2015 SCM Effectiveness Demonstration evaluated SCMs implemented in City outfall basins and identified six possible outcomes. Table 2 in the Basin Selection TM summarizes the basins in each outcome category, identifies those with available relevant data for evaluating SCM effectiveness, and provides the rationale for the City's recommendations of which basins in each outcome category to include in the SCM effectiveness monitoring. DEQ approved the outfalls selected for each category, which include:</p> <ul style="list-style-type: none"> <li>• Outcome 1 (no discharge): None</li> <li>• Outcome 2 (does not discharge to an AOPC): None. Although</li> </ul>

DEQ Comment	City Response
	<p>DEQ originally requested that Outcome 2 basins be represented in the additional SCM effectiveness monitoring, DEQ approved omission of this outcome in the final suite of basins selected on the basis of the City’s rationale that such basins are adequately represented by existing data and/or drain small areas that have been almost entirely redeveloped and include stormwater treatment.</p> <ul style="list-style-type: none"> <li>• Outcome 3: Basins 17 and M-2</li> <li>• Outcome 4: Basins 44 and 45</li> <li>• Outcome 5: Basins 19, 44, 45, 52D, and 53A</li> <li>• Outcome 6: Basin 16</li> </ul>
<p>b. Include basins where the existing individual data points indicate that end of system discharges still exceed JSCS SLVs and knees of the rank-order curves, particularly for more than two contaminants for which curves have been developed.</p>	<p>The table DEQ provided with this comment did not include all curve contaminants (i.e., As, Cu, Hg, and Zn) and warranted some correction; therefore, the City rescreened all basin data using the same approach used by DEQ. For basins with data sets collected over multiple years (e.g., Basins 22, 22B, 53A), screening was based on the most current data. Additional data and basin-specific considerations are described in the Basin Selection TM. Results of the screening are presented in Table 3 of the Basin Selection TM.</p> <p>In summary, the following basins were associated with previous data that exceeded the JSCS SLVs and the typical values of the rank-order curves for two or more contaminants (without data showing subsequent reduction): Basins 16, 18, 19, 19A, 44, 45, 52D, and S-6. Of these, Basins 16, 19, 44, 45, and 52D were included in the SCM effectiveness monitoring.</p>
<p>c. Basins for which there is no basin-scale dataset (10A, 13, 14, 17, 42).</p>	<p>Before the SCM Effectiveness Demonstration, basin-scale stormwater data already had been collected in 30 of the 35 current City stormwater basins that discharge to Portland Harbor. The five basins that had not been sampled were Basins 10A, 13, 14, 17, and 42. In the fall of 2015, the City conducted three stormwater sampling events at Outfall 17 to support future City restoration planning and to take advantage of the atypical access to the outfall resulting from record dry conditions. The City proposed to use 2015 Outfall 17 data and to collect a fourth event from Basin 17 as part of the SCM effectiveness monitoring. The majority</p>

DEQ Comment	City Response
	of properties discharging to Outfalls 10A, 13, 14, and 42 have been redeveloped (or are in the process of being redeveloped) in accordance with City stormwater management requirements.
d. Basins previously monitored at the basin-scale (for example 16, 17, 18, 19, 22, 22B, 49), such that a longer term comparison can be made, assumptions about land use can be confirmed and recontamination potential can be assessed.	Table 4 of the Basin Selection TM identifies the City basins that were previously monitored by the City or other parties at the basin scale, and also indicates which of those basins already have multiple years of basin-scale stormwater data. Based on the basin-specific rationale presented in that table, the City sampled the following previously sampled basins to be included in SCM effectiveness monitoring: 16, 19, 44, 45, 52D, 53A, and M-2.
e. Some elements on which the City based decision points need confirmation of effectiveness to support assumptions. These include collective effectiveness of other City stormwater program elements and no significant history of contaminating activities. DEQ recommends sampling in at least one basin where no source control measures were implemented, aside from other City programs (42, 47, 48, 52A, 52C, 53, M2, S5), some of which because there was no significant history of industrial activities or sources.	During follow-up discussion, DEQ clarified that this selection element was intended to include basins for which State water quality programs were also in effect (in addition to City programmatic stormwater measures), but not basins in which contaminated sites were being addressed by State or federal programs. Based on this clarification, the City identified the basins that would satisfy this selection element (Table 5 of the Basin Selection TM) and consequently sampled Basins 17 and M-2.
f. Even if an outfall does not discharge to an AOPC, addressing source control effectiveness for preventing unacceptable risk to in-water receptors is needed. Sampling in at least one basin that does not discharge to an AOPC (10A, 11, 13, 14, 15, 42, 53, S5, S6) is recommended.	As described in the Basin Selection TM, existing data were already available for five of the basins that do not discharge to an AOPC (Basins 11, 15, 53, S-5, and S-6), and stormwater data from all City outfalls (i.e., not only the outfalls that do not discharge to AOPCs) may be used to evaluate potential in-water risks. Based on this rationale, DEQ approved the omission of this selection element in determining the final suite of basins for SCM effectiveness monitoring.
g. While some basin-scale effectiveness monitoring has occurred, confirmation or expansion of these results would be useful. Of the basins categorized as Outcome 4&5 and with multiple elevated contaminants in the list above, some effectiveness monitoring has been completed in Basins 44 and 45. While the subsequent evaluation of PCBs in storm pipe cleanout solids in Basin 44 shows effective decreases, additional elevated contaminants (Cd, Cr, Ni) were not evaluated, though are likely to adhere to sediment and have similar results as PCBs. In Basin 45, some limited post-storm pipe cleanout sampling was evaluated in 2008. As these basins offer similar value in further monitoring, DEQ recommends additional monitoring in Basin 45, to confirm	In response to this comment, the City conducted effectiveness monitoring in Basins 44 and 45, as requested, as well as two additional basins that meet these same criteria (i.e., basins in which SCM implementation by upland sites is either complete or mostly complete): Basins 19 and 52D. (See the Basin Selection TM for additional discussion and considerations.)

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the older effectiveness data and evaluate the five elevated contaminants (and possibly more as determined by screening contaminants beyond those for which DEQ developed rank-order curves).	
h. DEQ and EPA identified areas with higher potential for sediment recontamination and unacceptable in-water risk via stormwater (and other pathways). DEQ recommends City effectiveness monitoring include these areas, when City outfalls discharge into them (18, 22B, 43, 44, 45, 52D, M1, M2, S1).	Table 6 of the Basin Selection TM lists the five in-river areas identified by DEQ and EPA as having a higher potential for sediment recontamination and the City outfall basins that discharge to them. Based on the rationale included in that table, the City sampled the following subset of these basins for monitoring: 44, 45, M-2, 52D, 16, 17, and 19.
i. Timing of source control measure implementation must be considered in timing of effectiveness monitoring for some basins (16, 18, 52D).	The City is in agreement that effectiveness monitoring should take place following completion of SCMs. However, monitoring also can be informative before all SCMs are implemented in some basins. With regards to this DEQ comment, the City proposed to monitor basins that meet all of DEQ's objectives and in which SCM implementation in proposed basin is complete or mostly complete (i.e., basins in Source Control Categories 1 through 3; see response to DEQ Comment 7a, above).
j. Program level assumptions of land use coinciding with increasing levels of contamination should be verified by getting sampling basins representing a variety of differences, including: basin size; industrial intensity; Forest Park drainage contribution; number of permitted sites in basin; etc.	As discussed in the Basin Selection TM, stormwater data have been collected and reported from 30 of 35 basins. One previously unsampled basin and seven others were proposed for additional monitoring that will allow for evaluation of various differences in basin characteristics. In addition, the LWG stormwater land use study included a number of City basins and provides valuable data to support correlations between various land uses and contaminant concentrations. The basins the City monitored for SCM effectiveness also represent a variety of relevant characteristics, as summarized in Table 7 of the Basin Selection TM.
k. The City's Municipal Report minimized the potential contaminant contribution from City roadways throughout the uplands surrounding the Portland Harbor study area. The report lacked basin-specific analysis of City roadways in relation to the stormwater conveyance system, identification of roadway-specific contaminant sources, and information on regular maintenance activities and other source control measures related to roadway sediment and contaminant contributions to the stormwater system. While DEQ acknowledges that roadway contributions in some basins receive regional treatment that has been shown to be effective, more work is	The City has had further discussions with DEQ to clarify remaining questions regarding City streets. City basin stormwater and source tracing data include roadway contributions. During the course of the City basin investigations, where data indicated potential roadway sources, the City identified specific roadways that were being adversely impacted by offsite migration of contaminated erodible soils from nearby industrial sites (e.g., Basins 18, 19A, 52, 52C, 53, and S-1), investigated those pathways, and provided results to DEQ so that site controls could be implemented.

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<p>needed to identify areas where roadways may not be adequately evaluated or controlled. This evaluation should be part of the revised effectiveness demonstration.</p> <ul style="list-style-type: none"> <li>i. More extensive information is needed in targeted areas to determine whether current programmatic or Portland Harbor-specific source control measures are effective or if additional measures are warranted. Needed information includes: portion of street drainage routed through treatment facilities and any effectiveness monitoring; frequency and equipment used for street sweeping; catch basin maintenance frequency; other maintenance actions; and storm line repair and cleaning history.</li> <li>ii. Initial areas to target, based on DEQ observations and communications for cleanup site responsible parties include: Albina georegion – North River Street to North Interstate Avenue and all City streets between; Guilds Lake and Doane Lake/Willbridge Georegions – Northwest Front Avenue from the Fremont Bridge to its terminus, City streets within the OF 16 drainage basin north of Northwest Yeon/Highway 30 to Northwest Front Avenue, City streets within the OF 18 drainage basin west of Northwest Yeon Avenue and into Forest Park; Linnton Georegion –Northwest St. Helens Road/Highway 30 and City streets west into and around Forest Park; T-4/International Slip Georegion – North Lombard Road/North Burgard Road and North Sever Road; Swan Island/Mocks Bottom Georegion – all City Streets within the drainages to OFs M1, M2, M3, S1, S2, S5 and S6.</li> </ul>	<p>In response to this comment, this report includes Appendix B, which summarizes available information and lines of evidence to evaluate potential contaminant contributions from roadways.</p>

Notes:

- AOPC = area of potential concern
- BES = City of Portland, Bureau of Environmental Services
- City = City of Portland
- EPA = U.S. Environmental Protection Agency
- IGA = intergovernmental agreement
- JSCS = Joint Source Control Strategy
- LWG = Lower Willamette Group
- SAP = sampling and analysis plan
- SCM = source control measure
- SLV = screening level value
- TM = technical memorandum