REDMOND & ASSOCIATES

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N Anchor Way

1929/4

Seismic Site Characterization and hazard Evaluation

Proposed North Harbor Site

NE Marine Drive

Portland (Multnomah County), Oregon

for

Prima Donna Development Corp

Project No. 103.005.G
November 20, 1995

REDMOND & ASSOCIATES

November 20, 1995

Mr. Michael Chiu
Prima Donna Development Corp
373 First Street, Suite 200
Los Altos, California 94022

Dear Mr. Chiu:

Re: Seismic Site Characterization And Hazard Evaluation, Proposed North Harbor Development Site, NE Marine Drive (Multnomah County), Oregon

INTRODUCTION

In accordance with the request of Mr. Michael Chiu of Prima Donna Development Corp, we have completed our Seismic Site Characterization and Hazard Evaluation for the above subject project. We previously performed a Geotechnical Investigation for the project the results of which were presented in our formal written report dated November 20, 1995.

The purpose of our work at this time is to assess the regional seismicity and evaluate the ground-motion hazard at the proposed commercial/retail and residential site. The following sections of this report present the regional tectonics and seismicity as well as an assessment of the design earthquakes and site ground accelerations resulting from these events.

REGIONAL TECTONICS AND SEISMICITY

Keizer is located in an active seismic region of the Pacific Northwest. The main tectonic feature in the Pacific Northwest is the Cascadia Subduction Zone (CSZ) where the Juan de Fuca oceanic plate is being subducted under the North American continental plate at the rate of 3 to 4 cm/year (Chase et al., 1975; Adams, 1984; Riddihough, 1984). This subduction is primarily responsible for the seismic and volcanic activity in the region.

Historical Earthquakes

The larger historical earthquakes in the Pacific Northwest include the magnitude 7.1 (M7.1), 1949 Olympia and the M6.5, 1965 Seattle earthquakes, which caused significant damage in the Puget Sound region. Other large earthquakes in the Pacific Northwest include the 1918 (M7.0) and 1946 (M7.3) Vancouver Island earthquakes. Several moderate-sized earthquakes have occurred in or near Portland. The three most recent of these earthquakes are a M5.2 event in 1962, a M5.3 event in 1964 and the M5.6, 1993 Scotts Mill earthquake, which occurred about 56 km south of Portland (EERI, 1993).

Earthquake Source Zones

Three primary earthquake source zones are presented in the site region. The first source zone is in the subducted Juan de Fuca plate at a depth of approximately 40 to 60 kilometers. This intraplate CSZ was responsible for the 1949 and 1965 Puget Sound earthquakes. It is believed that an earthquake from this source zone may also occur directly below the Willamette Valley region. The maximum earthquake magnitude for this source zone is estimated as approximately M7.5.

The North American crustal plate in the Willamette Valley region comprises another source zone typically referred to as the Willamette Valley seismotectonic province. This province, in which Keizer is located, is part of a broad lowland between the uplift Coast Range and Western Cascades physiographic provinces.The northern part of the Willamette Valley province is characterized by low levels of diffuse seismicity. The known or suspected Quaternary structures in this area are (1) the Mt. Angel fault, which is an approximately 22-km long, northwest trending, northeast dipping reverse or oblique slip fault, (2) the Portland Hills fault, which is a 40-km long, northwest trending fault, (3) the Lacamas Creek fault, which is a 24-km long, northwest trending, steeply dipping strike slip fault, and (4) the Grant Butte, Damascus - Trickle Creek fault zone, a 17-km long east-southeast trending zone of relatively short faults (Geomatrix, 1995). The Mt. Angel fault is approximately 20 km northeast of Keizer and may have generated the 1993 Scotts Mill earthquake. The Portland Hills fault is mapped through the western part of Portland and is the closest known fault to the site. Based on this information a M6.0-6.5 crustal earthquake is considered a reasonable estimate of the maximum earthquake for the Willamette Valley province.

In addition to the historical earthquakes, recent geologic investigations in the coastal areas of Washington and Oregon (Atwater, 1987a, b, 1992; Carver and Burke, 1987; Darienzo and Peterson, 1987, 1990; Grant and McLaren, 1987) have uncovered physical evidence of the occurrence of several large prehistoric CSZ interplate subduction earthquakes near the Pacific Northwest coast. Geologic evidence suggests that eight subduction earthquakes may have occurred in the past 4,000 years. The most recent subduction earthquake appears to have occured about 300 years ago and may have been as large as M8.5. Although a subduction earthquake would probably be centered about 100 kilometers west of Portland, a subduction earthquake could produce ground shaking that lasts longer than two (2) minutes. An average return interval of 500 to 600 years has been estimated for large CSZ interplate earthquakes.

DESIGN EARTHQUAKES AND GROUND-MOTION ESTIMATION

Both the historic/prehistoric records of regional earthquakes and the tectonic/geologic data were considered in the postulation of design earthquakes. Attenuation and site-response models were used to estimate ground accelerations at the North Harbor (Portland) site in these events.

Design Earthquakes

In order to estimate ground motions at the site, the following three Design Earthquake events were postulated:

- An intraplate M7.5 CSZ event occurs in the subducted Juan de Fuca plate at a depth of 60 kilometers. The epicenter (projection on the earth's surface of the point where the earthquake rupture starts) is assumed to be approximately 10 kilometers from the site.

- An interplate, M8.5 CSZ subduction event at the interface of the Juan de Fuca and North American plates. The fault rupture associated with this event is assumed to occur at a depth of 20 to 30 kilometers below the coastal area of northwestern Oregon and southwestern Washington.

- A M6.0 crustal earthquake within the Willamette Valley seimotectonic province at a depth of 10 kilometers. The epicenter is assumed to be 10 kilometers from the site.

Justification for two (2) CSZ Design Earthquakes was provided in the previous section. With regard to the crustal earthquake, Dr. I. Madin of the Oregon Department of Geology and Mineral Industries has suggested that M6 be considered as the maximum random crustal event although specific faults may be capable of generating larger earthquakes. However, the low historical seismicity in the site area and the small slip rate estimated for the regional faults indicate that the likelihood of M = 6 and 6.5 earthquakes occurring within 10 km of the site is very small. Thus, a random crustal earthquake of M6 at an epicentral distance of 10 km was selected for this study. The selected focal depth of 10 km was based on the range of depths (0 to ~30 km) reported for crustal earthquakes in the Pacific Northwest.

Ground Shaking

The Design Earthquake scenarios presented above are summarized in Table 1. Peak horizontal ground accelerations (PGA) in the last column of this table were estimated using several attenuation equations. The PGA values for the two CSZ events were computed with the Crouse (1991a,b) attenuation equation (235 component) applicable to firm soil and with the Youngs et al. (1988) equation for rock. The PGA for the random crustal event was computed with the Joyner and Boore (1988) soil-site equation of the randomly oriented horizontal component and with the Campbell (1990) attenuation equation, which is also applicable to soil sites. The use of the Campbell equation requires that the causative fault machanism be specified, which has been assumed to be normal or strike-slip, as opposed to thrust or reverse. For the CSZ earthquake, the range of PGA values in Table 1, represents the variation from the lower values for rock sites to the upper values for stiff soil sites.

Table 1. Design Earthquakes Postulated for the Portland Region and Associated Median PGA Values

Event No.	Earthquake Source	Magnitude	Focal Depth (kilometers)	Hypocentral Distance (kilometers)	Closest Approach Distance (kilometers)	PGA (g)
1	CSZ Intraplate	8.5	25	125	100	0.14-0.18
2	CSZ Intraplate	7.5	60	61	61	0.17-0.25
3	CSZ Intraplate	6.0	10	14	14	0.19-0.22

The North Habor site consists of approximately 40 feet of very soft clayey silt over medium dense to dense sand. Because of the soft 40-ft layer, this site cannot be classified as a stiff-soil site. A site-response analyses was conducted to investigate the potential amplification effects of this layer. The results indicate a minimal increase (~10 to 20%) in the PGA values reported in Table 1. The greatest amplification was observed at frequencies near the fundamental frequency of the 40-ft layer, which is about 1 Hz. The response spectra of the stiff-soil ground motions used as imput excitation to the site-response analysis were amplified by factors of about 1.5 to 2.0 at frequencies near 1 Hz.

The results of the site-response analyses indicate that the Design Earthquake ground motions estimated for the site are less than the motions indicated for Zone 3, the seismic zone for Portland according to the 1994 Uniform Building Code (UBC). For example, taking the PGA values in Table 1, amplifying them by 10 to 20% for site-response, and dividing the result by 1 g yields dimensionless values that are less than 0.3, the Seismic Zone factor (Z) for Zone 3 in the 1994 UBC (ICBO, 1994). Similarly, the response spectra estimated for the Design Earthquakes (with allowance for site response) are less than the Soil Type S3 design spectrum in the UBC normalized to 0.3 g. These results conform with the requirements in the Oregon Structural Specialty Code.

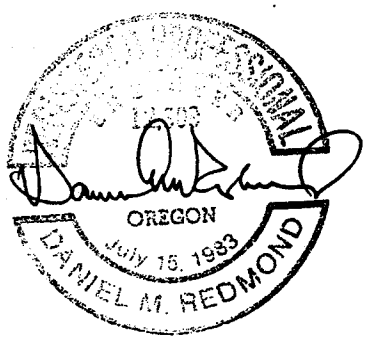
CLOSURE

The services performed by the geotechnical engineer for this project have been conducted with that level of care and skill ordinarily exercised by members of the profession currently practicing in the area under similar budget and time restraints. No warranty, expressed or implied, is made.

We will be pleased to provide such additional assistance or information as you may require in the balance of the design phase of this project. If you have any questions regarding the above information, please do not hesitate to call.

Sincerely,

Daniel M. Redmond, P.E.
President/Principal Engineer



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DOCUMENT SERVICES

Phase I Environmental Site Assessment

Proposed North Harbor Site

NE Marine Drive

Portland (Multnomah County), Oregon

for

Prima Donna Development Corp

Project No. 103.005.E
November 21, 1995

01-144639-CO

REDMOND & ASSOCIATES

Project No. 103.005.E

November 21, 1995

Mr. Michael Chiu
Prima Donna Development Corp
373 First Street, Suite 200
Los Altos, California 94022

Dear Mr. Chiu:

Re: Phase I Environmental Site Assessment, Proposed North Harbor Site, NE Marine Drive, Portland (Multnomah County), Oregon

In accordance with the request and authorization of Mr. Michael Chiu of Prima Donna Development Corp on October 13, 1995, a Phase I Environmental Site Assesssment of the above subject site has been conducted. The purpose of the assessment was to evaluate the presence or absence of environmental concerns at the site and in the immediate area. The assessment results and our conclusions are detailed in the attached report.

If you have any questions regarding the following report, please do not hesitate to call us at (503) 252-6882.

Sincerely,

Daniel M. Redmond, P.E.
President/Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
12,309
OREGON
July 15, 1983
DANIEL M. REDMOND

Expires 12-31-96

P.O. Box 301545 • Portland, OR 97294 • Phone: 252-6882 • Fax: 252-6414

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November 21, 1995

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Proposed North Harbor Site
NE Marine Drive
Portland (Multnomah County), Oregon 97217

1.0 EXECUTIVE SUMMARY

A Phase I Environmental Site Assessment of the above subject site, located north of NE Marine Drive and just east of Interstate 5 in Portland (Multnomah County), Oregon, was conducted by Redmond & Associates to evaluate potential environmental concerns at and near the site. The following information was obtained during the assessment:

- Seven (7) handlers and/or generators listed on the Oregon State Department of Environmental Quality Resource Conservation and Recovery Act (RCRA) Dangerous Waste Handlers/Generators List were documented within one-half mile of the site.

- Eight (8) Underground Storage Tank Facilities (UST's) listed on the Oregon State Department of Environmental Quality List were documented within one-half mile of the site.

- Three (3) Leaking Underground Storage Tank Facilities (LUST's) listed on the Oregon Department of Environmental Quality List were documented within one-half mile of the site.

- Two (2) Confirmed Release Sites and six (6) Environmental Cleanup Sites listed on the Oregon Confirmed Release List (CRL) and Environmental Cleanup Site Information (ECSI) system were documented within one-half mile of the site.

- Diesel contaminated soils which reportedly were previously chemically treated within adjoining property to the southeast and southwest of the subject site, were reportedly spread across two (2) portions of the subject site during the treatment process. However, recent samples taken of the near surface soils within these two areas indicate that Diesel Petroleum Hydrocarbon levels are presently below those recommended for cleanup by DEQ.

- The property presently contains miscellaneous scattered and dumped debris (garbage) across the central portion of the site. The debris includes plastic, glass, metal, wood, brick, tires, concrete, and asphalt as well as various cans and buckets.

This report details the sources of information reviewed and obtained from the Phase I Environmental Site Assessment.

2.0 INTRODUCTION

The following report documents the Phase I Environmental Site Assessment conducted at the referenced site by Redmond & Associates. Authorization to proceed with this project was received from Mr. Michael Chiu of Prima Donna Development on October 13, 1995. The results discussed in this report are representative of the conditions observed and evaluated on the respective days of the site assessment. The site vicinity map is depicted in Figure No. 1.

2.1 Purpose

The purpose of the Phase I Environmental Site Assessment was to evaluate the presence or absence of environmental concerns based on a site survey and past land-use information available to Redmond & Associates.

2.2 Scope of Services

The objective of the Phase I Environmental Site Assessment are as follows:

- A review of available geologic information regarding the site and surrounding area:
- A review of past and present land-use activities at the site:
- A review of regulatory information pertaining to the site and surrounding area:
- A reconnaissance of the site to evaluate existing or potential observable environmental concerns; and
- Submission of this report.

2.3 Site Description

The site, an irregular shaped parcel of approximately 12.5 acres and comprised of Tax Lot 216, is located in Township 10 North, Range 1 East, and Section 3 of the Willamette Meridian in the city of Portland (Multnomah County) and State of Oregon (See Site Vicinity Map, Figure No. 1).

The site is bounded to the south by NE Marine Drive and Sandy Barr's Flea Market, to the north by the North Portland Harbor and the Corp of Engineers Dike, to the west by Interstate 5 and the Pier 99 Marina, and to the east by undeveloped property.

At the time of our site reconnaissance, the subject property was void of existing structures and associated improvements. Topographically, the site is relatively flat-lying and is estimated to be at about Elevation 20 feet. Vegetation across the site consists primarily of a light to moderate growth of grass and weeds. However, the central and southerly portions of the site also contain a moderate growth of brush and bushes as well as several to numerous small to large sized trees.

3.0 SITE CHARACTERISTICS

3.1 General Geology

Surficial and subsurface soil deposits found within the project vicinity consist primarily of native soil materials composed of Holocene age alluvial deposites. Characteristics of the alluvial deposites include sand, gravel, and silt forming flood plains and filling channels of present streams. In places includes talus and slope wash. Locally includes soils containing abundant organic materials and thin peat beds.

Although a more detailed subsurface soil description of the site was not part of this environmental study, a Geotechnical Investigation performed by Redmond & Associates and dated November 20, 1995 indicates that the site is underlain by an upper unit of dredge fill sand of about 7 feet in depth intum underlain by about 40 feet of soft alluvial silt intum underalin by medium dense to dense sand. All soils were found to be underlain at a depth of about 115 feet by very dense sandy gravel.

3.2 Local and Regional Hydrogeology

Groundwater resources for the area are generally fair near surface but can yield substantial quantities of water at depths which extend into the deeper alluvial deposites and aquafers beneath the site and area. Although existing wells in the Portland (Multnomah County) area generally yield sufficient water for domestic purposes, the quality of the groundwater sometimes requires treatment to be made potable.

From an examination of available publications and maps (USGS Topographic Map, Portland Quadrangle, Oregon, dated 1961 and photorevised in 1970 and 1977), the general groundwater migration direction appears to be from the south to the north, towards the North Portland Harbor and Coulmbia River which borders the northern property boundary. A detailed groundwater study was not part of the scope of services for this project.

4.0 REGULATORY AGENCY INFORMATION

4.1 Oregon State Department of Environmental Quality (DEQ)

4.1.1 National Priorities List (NPL)

The USEPA NPL for sites in Oregon, was reviewed by Redmond & Associates to obtain information regarding activities potentially impacting the environment at this site and surrounding areas. The NPL is a federal Superfund listings of sites which have received a federal hazard ranking score of greater than 28.5. The sites proposed for and listed on the NPL are those which are eligible for remedial action under the federal Superfund program. There are 11 sites listed and 2 proposed for listing (or nominated) for the NPL in Oregon.

No NPL sites were documented within one-half mile of the site. The closest site listed or proposed for listing is Allied Plating located about 1.5 miles to the southeast of the site in Portland.

4.1.2 General Information Resource Conservation and Recouvery Act (RCRA) List of Oregon

RCRA provides the basic framework for federal regulation of hazardous waste. RCRA controls the generation, transportation, treatment, storage and disposal of hazardous waste through a comprehensive "cradle-to-grave" system of hazardous waste management techniques and requirements. RCRA is administered nationally by the USEPA, with major components of the law delegated to the states for ongoing implementation. The General Information RCRA List for the State of Oregon contains a list of all RCRA sites in the Portland (Multnomah County) area. The list provides basic information on the site such as facility name and address, type of facility (i.e. generator, transporter, storage, etc.), I.D. number and status of the facility. The inclusion of a site on the General Information RCRA List does not mean that environmental contamination has occurred, is occurring, or will occur in the future. The General Information RCRA List serves as an information source as to the location of hazardous waste generation, transportation, treatment, storage and disposal facilities in the State of Oregon.

The site was not included on the General Information RCRA List for Portland (Multnomah County). However, seven (7) RCRA small quantity or conditionally exempt generators (generator of less than 220 pounds per month (lb/m) of non-acutely hazardous material) were documented within one-half mile of the site:

. Fruehauf Trailer Corp, 10498 N Vancouver Way

. Harbor Oil, Inc., 11535 N Force Avenue

. Market Transport, Ltd., 110 N Marine Drive

. Portland Mack Sales & Service, 10360 N Vancouver Way

. Superior Stripping Services, 9940 N Vancouver Way

. White GMC Trucks of Portland, 10205 N Vancouver Way

. Yellow Freight System, Inc., 10510 N Vancouver Way

4.1.3 List of Underground Storage Tank (UST) Sites in Portland (Multnomah County), Oregon

All registered UST sites are listed for the State of Oregon and Multnomah County. The list provides information on the site such as facility name and address and permit status (i.e. active, decommissioned).

There are no registered UST's located on the site. There are eight (8) registered UST sites located within one-half mile of the project site:

. GI Joe's, 1140 N Hayden Meadows Drive

. Jubitz Truck Stop, 10210 N Vancouver Way

. Floyd Kogle, 10149 N Vancouver Way

. Market Transport, Ltd., 110 N Marine Drive

. Puget Sound Truck Lines, Inc., 10031 N Vancouver Way

. R & J Metal Fabricators, 10001 N Vancouver Way

. Star-Oilco, 10360 N Vancouver Way

. Yellow Freight System, Inc., 10510 N Vancouver Way

4.1.4 List of Leaking Underground Storage Tank (LUST) Sites in Portland (Multnomah County), Oregon

This list documents all reported below-ground releases, all reported above-ground releases exceeding 42 gallons, and all reported above-ground releases to water which result in a sheen on the water.

A review of the LUST list reveals that there were three (3) reported release within one-half mile of the project site:

. Yellow Freight System, Inc., 10510 N Vancouver Way

. Market Transport, Ltd., 110 N Marine Drive

. H & H Trucking/Star Oilco, 10360 N Vancouver Way

4.1.5 List of Confirmed Release Sites (CRL) and Environmental Cleanup Site Information (ECSI) system reports for Oregon, September/October 1995:

The list of all confirmed and suspected contaminated sites within Portland (Multnomah County), Oregon. These sites and/or facilities may have an affected media consisting of groundwater, surface water, drinking water, soil, sediment, and air.

There were two (2) CRL confirmed and/or suspected contaminated sites listed within one-half mile of the project site:

. Oregon waste Sytems - Proposed Transfer Station, 11535 N Force Street

. Redi-Strip of Oregon, 9940 N Vancouver Way

There were six (6) ECSI confirmed and/or suspected contaminated sites listed within one-half mile of the project site:

. Harbor Oil, Inc., 11535 N Force Street

. Oregon Waste Sytems - Proposed Transfer Station, 11535 N Force Street

. Redi-Strip of Oregon, 9940 N Vancouver Way

. Refinishing Services of Oregon, Inc., 9940 N Vancouver Way

. Stockyards - Portland, 11535 N Force Street

. Yellow Freight Systems, 10510 N Vancouver Way

4.2 Oregon State Fire Marshal's Hazardous Material Emergency Inventory Report, October 15, 1995

The State Fire Marshal's list of emergency hazardous material responses dating to October 15, 1995 was reviewed. No record of an emergency response for hazardous materials to the subject property was found. Such records were not maintained by the State Fire Marshal prior to 1987.

5.0 SITE HISTORY REVIEW

5.1 Background

In gathering information regarding past and present land-use activities at the site, file reviews were conducted by Redmond & Associates personnel at various local and county offices. Information regarding this site was collected from Multnomah County, the City of Portland, and the United States Army Corps of Engineers.

5.2 Portland

5.2.1 Portland Planning Department

According to the zoning map and zone description for the City of Portland, the site is located within an area zoned for mixed use consisting of both commercial and/or retail purposes as well as high density residential.

5.2.2 Portland/Multnomah County Department of Public Works

The site currently has water and sanitary sewer services along NE Marine Drive.

5.3 Historical Aerial Photographs

A review of various aerial photographs dating back to 1936 and available through the Army Corps of Engineers revealed that the site has not previously been developed or occupied by any existing structure(s) dating as far back as 1936. In general, the site was found to have been used primarily for farming and/or agricultural purposes. However, in recent years, the site has been used to store and park semi-trucks and trailers along the southerly property line.

6.0 SITE RECONNAISSANCE

The site reconnaissance of the property, located north of NE Marine Drive and adjacent to the North Portland Harbor in Portland (Multnomah County), Oregon, was conducted on October 16, 1995 by a representative of Redmond & Associates. Photographs were taken during the site reconnaissance.

The site, an irregular shaped property of approximately 12.5 acres in size, is bounded to the south by NE Marine Drive and the Sandy Barr's Flea Market building, to the north by the North Portland Habor and the Corp of Engineers dike, to the west by Interstate 5 and the Pier 99 Marina, and to the east by undeveloped property. Presently, the site is undeveloped and void of structures or other improvements.

The site is presently vegetated primarily with a moderate growth of grass and weeds. Additionally, the central and southerly portions of the site contain a moderate growth of bushes and brush as well as several to numerous small to large sized trees.

Our site reconnaissance did reveal the presence of miscellaneous dumping and debris scattered across the brushy and tree covered portions of the site. In general, the dumped debris consisted of tires, glass, plastic, metal, wood, brick, concrete, and asphalt as well as a few miscellaneous cans and buckets. Additionally, the southern portion of the site contains a few semi-truck trailers as well as other miscellaneous debris such as wooden timbers and metal. However, no signs of surface staining or dead or discolored vegetation were observed at the site.

7.0 SUMMARY AND CONCLUSIONS

Redmond & Associates conducted a Phase I Environmental Site Assessment to identify potential environmental concerns on the approximate 12.5 acre site located north of NE marine Drive and adjacent to the North Portland Harbor in Portland (Multnomah County), Oregon. Redmond & Associates reviewed geologic information regarding the site and surrounding areas to determine the general geologic and hydrogeological characteristics of the site. The review of various regulatory records did not reveal any documented underground tank(s) at the subject site. Additionally, the aerial photograph review indicates that the site has previously been used primarily for farming and/or agricultural purposes. However, the storage or parking of semi-trucks and trailers has occured in recent years. Further, the chemical treatment of diesel contaminated soils was reportedly performed on adjacent property to the southeast and southwest of the subject site and during this teatment process some of the diesel soils were spread across the ground surface within the southerly portions of the subject property. However, recent soil sampling and laboratory analysis from these areas indicates that the Diesel Petroleum Hydrocarbon levels are presently below those levels which DEQ recommends for cleanup.

Seven (7) RCRA generator was documented within one-half mile of the site. No RCRA generators were on reported on the subject site.

Eight (8) Undergound Storage Tanks (UST's) were documented within one-half mile of the site. No UST's were reported on the subject site.

Three (3) Leaking Underground Storage Tanks (LUST's) were documented within one-half mile of the the site. No LUST's were reported on the subject site.

Two (2) CRL and six (6) ECSI sites were documented within one-half mile of the subject property. The subject site was not listed as a CRL or ECSI site.

The property presently contains miscellaneous debris and garbage as a result of unauthorized dumping which is located within the brushy and tree covered portions of the site.

8.0 RECOMMENDATIONS

The results of our site assessment have revealed no apparent environmental concern(s) encountered during our site history review or reconnaissance. As such, no further action is recommended at this time. However, should future site grading and/or development activities encounter the presence of any questionable material(s), this office should be consulted.

9.0 GENERAL

Services performed by Redmond & Associates for this project have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area under similar budget and time constraints. No warranty, expressed or implied, is made.

10.0 REFERENCES

USGS Topographic Map, Portland Quadrangle, Oregon, dated 1961 and photorevised in 1970 and 1977

DEQ Confirmed Release List (CRL) report, September 1995

DEQ Environmental Cleanup Site Information (ECSI) system report, October 1995

DEQ Underground Storage Tank (UST's) List, October 1995

DEQ Leaking Underground Storage Tank (LUST's) List, October 1995

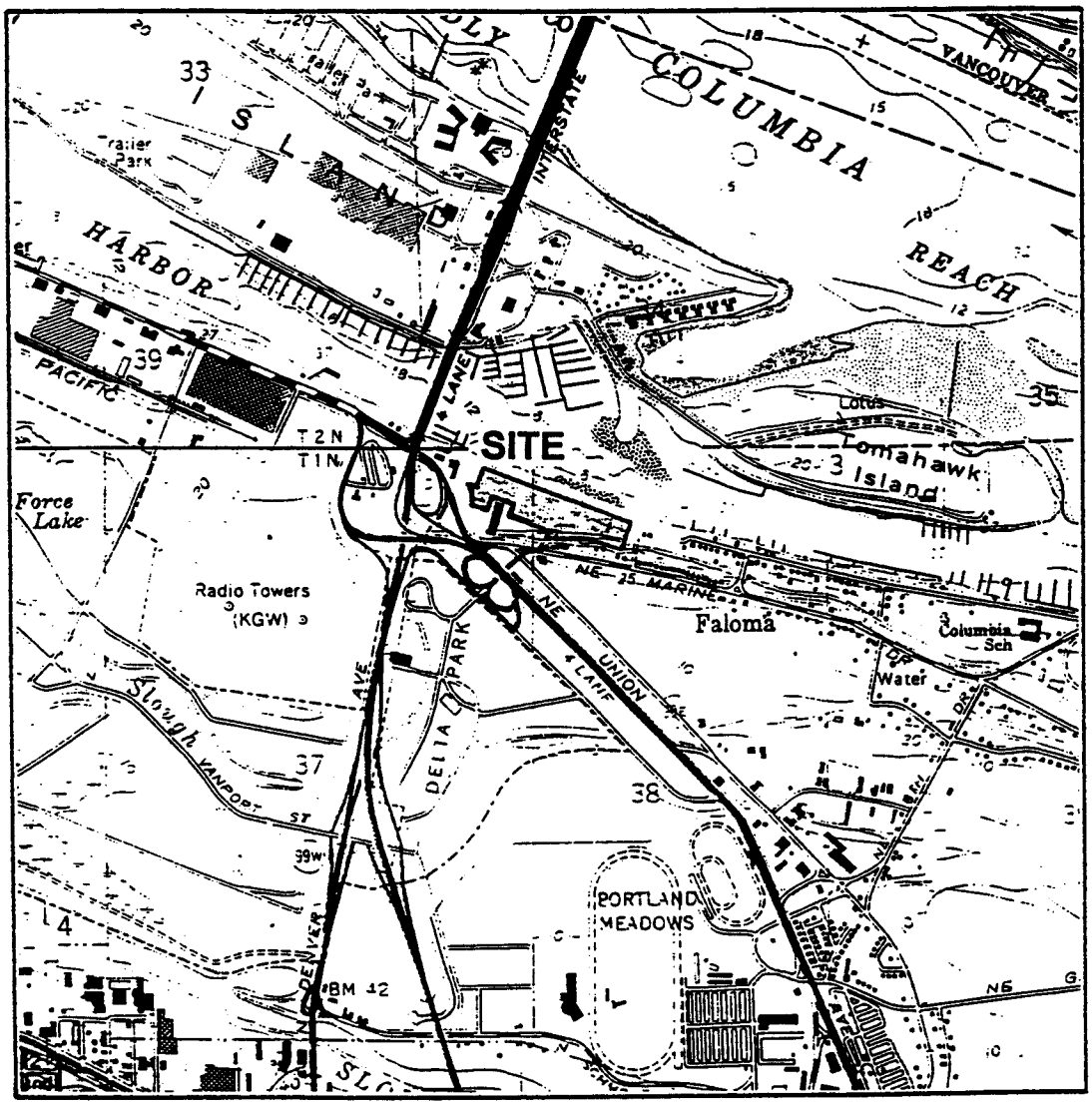
DEQ - NPL, September 1995

DEQ - RCRA, October 1995

Portland Government Offices

Multnomah County Government Offices

United States Corps of Engineers



PORTLAND QUADRANGLE

OREGON–WASHINGTON

7.5 MINUTE SERIES (TOPOGRAPHIC)

SW/4 PORTLAND 15' QUADRANGLE

SCALE 1:24 000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

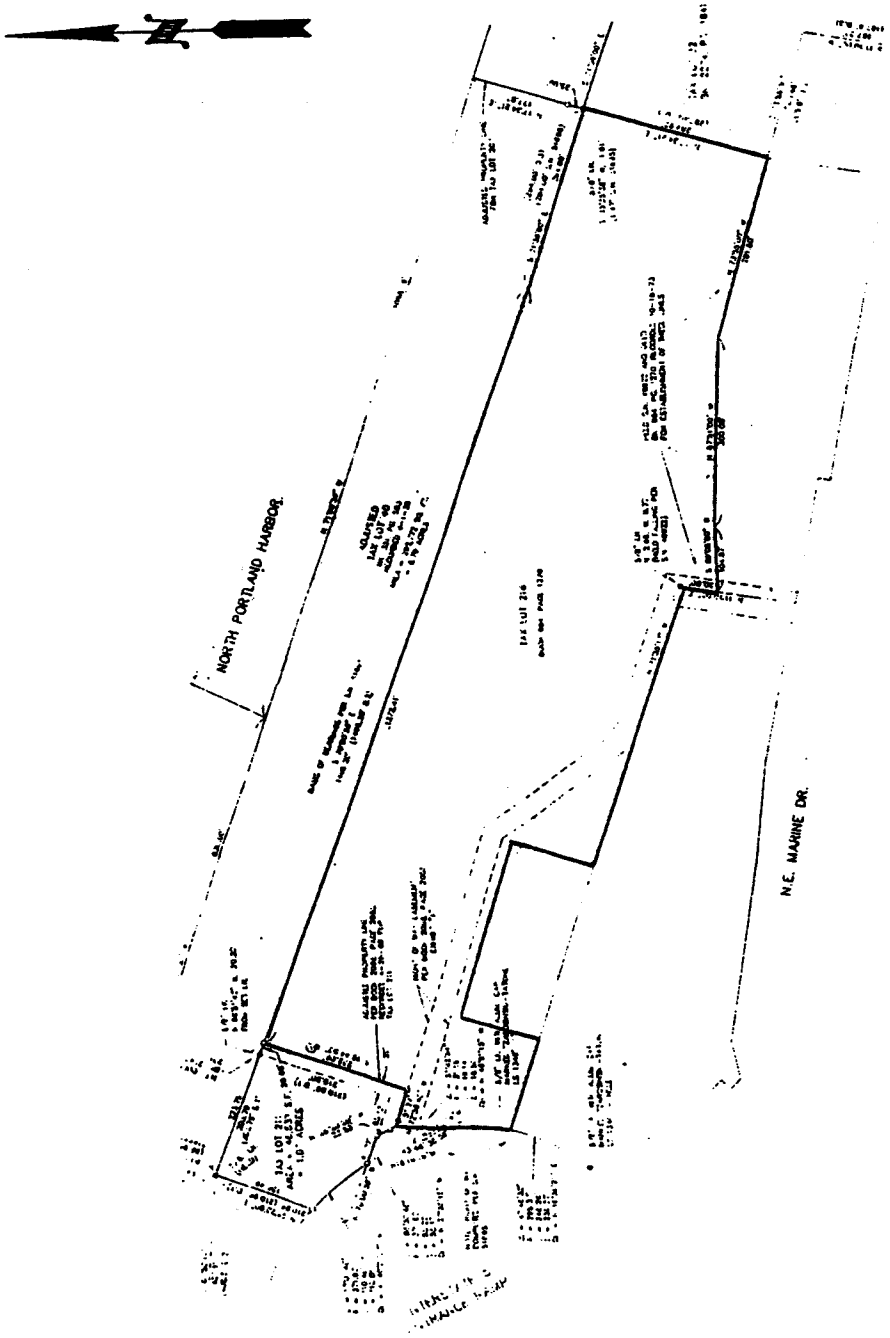
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

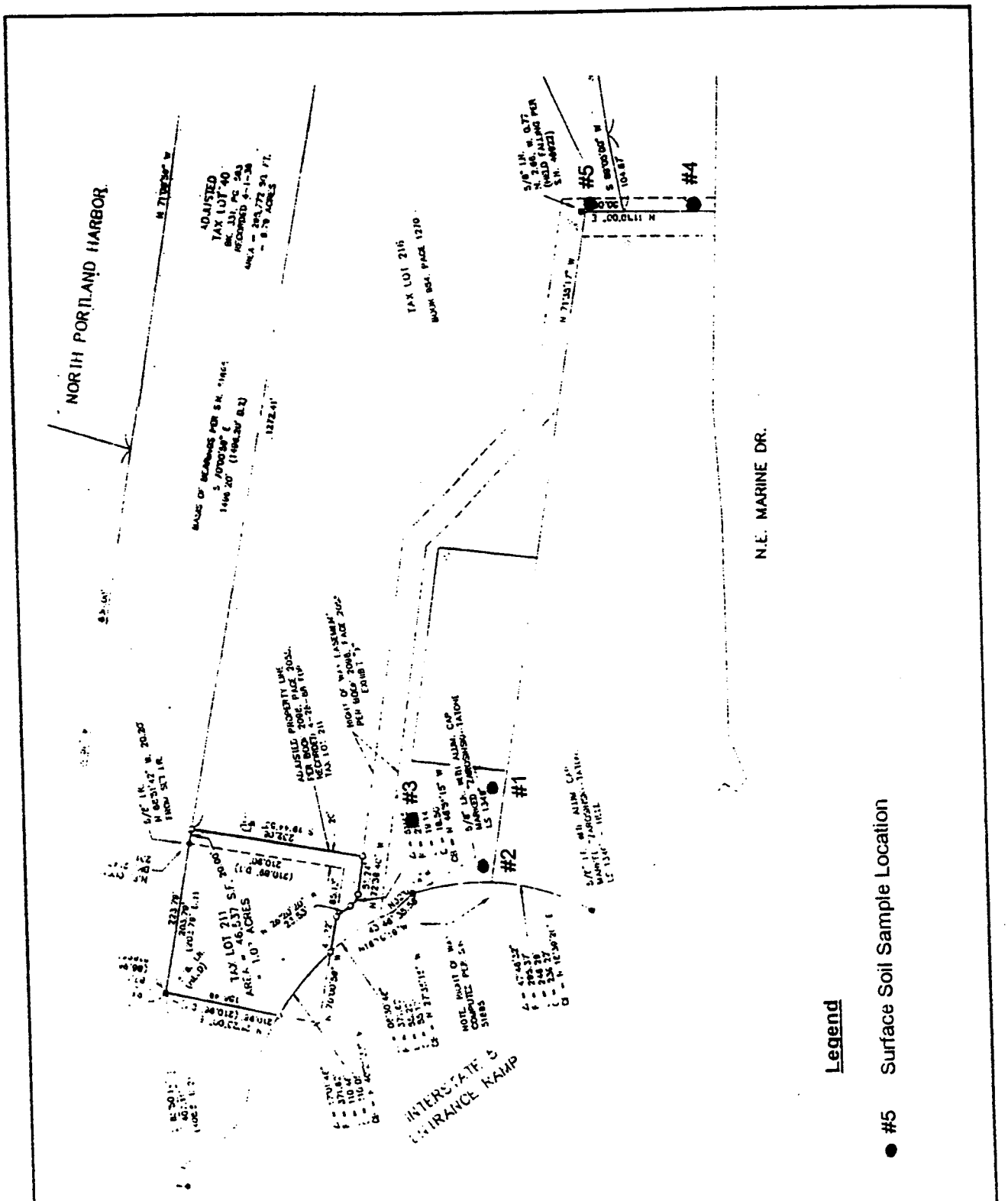
SITE VICINITY MAP

Project No. 103.005.E	PROPOSED NORTH HARBOR SITE	Figure No. 1



PROPERTY TAX MAP

Project No. 103.005.E	PROPOSED NORTH HARBOR SITE	Figure No. 2



SOIL SAMPLING MAP

Project No. 103.005.E	PROPOSED NORTH HARBOR SITE	Figure No. 3

NATIONAL ENVIRONMENTAL TESTING, INC.

Portland Division
17400 SW Upper Boones Ferry Rd.
Suite #260
Portland, OR 97224
Tel: (503) 624-5449
Fax: (503) 639-6889

Dan Redmond
Redmond & Associates
P.O. Box 301545
Portland, OR 97230

Date: 11/09/1995
NET Account No.: 54145
NET Job Number: 95.03705

Project: Prima Donna Development
Location:

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Sample Number	Sample Description	Matrix Type	Date Taken	Date Received
50157	#1	SOIL	11/06/1995	11/06/1995
50158	#2	SOIL	11/06/1995	11/06/1995
50159	#3	SOIL	11/06/1995	11/06/1995
50160	#4	SOIL	11/06/1995	11/06/1995
50161	#5	SOIL	11/06/1995	11/06/1995

Approved by:

Tabatha Brochu
NET, INC. Project Manager

OCEAN GROUP

ANALYTICAL REPORT

Dan Redmond
Redmond & Associates
P.O. Box 301545
Portland, OR 97230

11/09/1995
Job No.: 95.03705

Project Name: Prima Donna Development
Date Received: 11/06/1995

Sample Number 50157 — Sample Description #1

PARAMETERS	METHODS	RESULTS	REPORT LIMIT	UNITS	DATE ANALYZED	FLAG
OAR TPH-HCID (S) PREP	OAR-HCID	-	-		11/06/1995	
OAR TPH-HCID (S)						
Dilution Factor		1	-		11/06/1995	
Gasoline	OAR-HCID	ND	20	mg/Kg	11/06/1995	
Diesel	OAR-HCID	ND	50	mg/Kg	11/06/1995	
Heavy Oil	OAR-HCID	ND	100	mg/Kg	11/06/1995	

Sample Number 50158 — Sample Description #2

PARAMETERS	METHODS	RESULTS	REPORT LIMIT	UNITS	DATE ANALYZED	FLAG
OAR TPH-HCID (S) PREP	OAR-HCID	-	-		11/06/1995	
OAR TPH-HCID (S)						
Dilution Factor		1	-		11/06/1995	
Gasoline	OAR-HCID	ND	20	mg/Kg	11/06/1995	
Diesel	OAR-HCID	Diesel	50	mg/Kg	11/06/1995	
Heavy Oil	OAR-HCID	ND	100	mg/Kg	11/06/1995	
OAR TPH-DIESEL (S) PREP		-	-		11/07/1995	
OAR TPH-DIESEL (S)						
Dilution Factor		1	-		11/07/1995	
TPH-Diesel	OAR-D	130	20	mg/Kg	11/07/1995	

Sample Number 50159 — Sample Description #3

PARAMETERS	METHODS	RESULTS	REPORT LIMIT	UNITS	DATE ANALYZED	FLAG
OAR TPH-HCID (S) PREP	OAR-HCID	-	-		11/06/1995	
OAR TPH-HCID (S)						
Dilution Factor		1	-		11/06/1995	
Gasoline	OAR-HCID	ND	20	mg/Kg	11/06/1995	
Diesel	OAR-HCID	Diesel	50	mg/Kg	11/06/1995	
Heavy Oil	OAR-HCID	ND	100	mg/Kg	11/06/1995	

A sample result of ND indicates the parameter was Not Detected at the reporting limit.

ANALYTICAL REPORT

Dan Redmond
Redmond & Associates
P.O. Box 301545
Portland, OR 97230

11/09/1995
Job No.: 95.03705

Project Name: Prima Donna Development
Date Received: 11/06/1995

Sample Number 50159 — Sample Description #3

PARAMETERS	METHODS	RESULTS	REPORT LIMIT	UNITS	DATE ANALYZED	FLAG
OAR TPH-DIESEL (S) PREP		-	-		11/07/1995	
OAR TPH-DIESEL (S)						
Dilution Factor		1	-		11/07/1995	
TPH-Diesel	OAR-D	130	20	mg/Kg	11/07/1995	

Sample Number 50160 — Sample Description #4

PARAMETERS	METHODS	RESULTS	REPORT LIMIT	UNITS	DATE ANALYZED	FLAG
OAR TPH-HCID (S) PREP	OAR-HCID	-	-		11/06/1995	
OAR TPH-HCID (S)						
Dilution Factor		1	-		11/06/1995	
Gasoline	OAR-HCID	ND	20	mg/Kg	11/06/1995	
Diesel	OAR-HCID	ND	50	mg/Kg	11/06/1995	
Heavy Oil	OAR-HCID	ND	100	mg/Kg	11/06/1995	

Sample Number 50161 — Sample Description #5

PARAMETERS	METHODS	RESULTS	REPORT LIMIT	UNITS	DATE ANALYZED	FLAG
OAR TPH-HCID (S) PREP	OAR-HCID	-	-		11/06/1995	
OAR TPH-HCID (S)						
Dilution Factor		1	-		11/06/1995	
Gasoline	OAR-HCID	ND	20	mg/Kg	11/06/1995	
Diesel	OAR-HCID	ND	50	mg/Kg	11/06/1995	
Heavy Oil	OAR-HCID	ND	100	mg/Kg	11/06/1995	

A sample result of ND indicates the parameter was Not Detected at the reporting limit.

SURROGATE REPORT

Dan Redmond
Redmond & Associates
P.O. Box 301545
Portland, OR 97230

11/09/1995
Job No.: 95.03705

Project Name: Prima Donna Development
Date Received: 11/06/1995

SURROGATES	METHODS	RESULTS		DATE ANALYZED	FLAG
Sample Number 50157	**Sample Description** #1				
o-Terphenyl (Surr.)	OAR-HCID	141	%	11/06/1995	
Sample Number 50158	**Sample Description** #2				
o-Terphenyl (Surr.)	OAR-HCID	MI	%	11/06/1995	
o-Terphenyl (Surr.)	OAR-D	MI	%	11/07/1995	
Sample Number 50159	**Sample Description** #3				
o-Terphenyl (Surr.)	OAR-HCID	MI	%	11/06/1995	
o-Terphenyl (Surr.)	OAR-D	MI	%	11/07/1995	
Sample Number 50160	**Sample Description** #4				
o-Terphenyl (Surr.)	OAR-HCID	119	%	11/06/1995	
Sample Number 50161	**Sample Description** #5				
o-Terphenyl (Surr.)	OAR-HCID	132	%	11/06/1995	

QUALITY CONTROL REPORT
CONTINUING CALIBRATION VERIFICATION

Redmond & Associates
P.O. Box 301545
Portland, OR 97230

Date: 11/09/1995

NET Job Number: 95.03705

Contact: Dan Redmond
Project: Prima Donna Development

Analyte	CCV True Concentration	Concentration Found	Percent Recovery	Date Analyzed
OAR TPH-DIESEL (S) TPH-Diesel	1656	1795	108.4	11/07/1995
OAR TPH-DIESEL (S) TPH-Diesel	1656	1801	108.8	11/07/1995
OAR TPH-DIESEL (S) TPH-Diesel	1656	1815	109.6	11/07/1995
OAR TPH-DIESEL (S) TPH-Diesel	1656	1796	108.5	11/07/1995
OAR TPH-DIESEL (S) TPH-Diesel	1656	1882	113.6	11/07/1995
OAR TPH-DIESEL (S) TPH-Diesel	1656	1863	112.5	11/07/1995

CCV - Continuing Calibration Verification

Note: Recovery limits for 8240, 8260, 8270, 8010, 8020, 624, 625 specified in method.
Gasoline, Diesel, 418.1, 418.1M limits 80-120%. Metals recovery limits 80-120%.

QUALITY CONTROL REPORT
LABORATORY CONTROL STANDARD

Redmond & Associates
P.O. Box 301545
Portland, OR 97230

Date: 11/09/1995

NET Job Number: 95.03705

Contact: Dan Redmond
Project: Prima Donna Development

Analyte	LCS True Concentration	Concentration Found	LCS % Recovery	Date Analyzed
OAR TPH-DIESEL (S)				
TPH-Diesel	50	94	87.0	11/06/1995
o-Terphenyl (Surr.)	100	122	122.0	11/06/1995

LCS - Laboratory Control Standard

Note: Recovery limits for fuels 80-120%. 8010, 8020, 8240, 8260, 8270, 624, 625 specified in method.
Recovery limits for metals analyses 80-120%. 418.1 limits are 90-140%.

QUALITY CONTROL REPORT
BLANKS

Redmond & Associates
P.O. Box 301545
Portland, OR 97230

Date: 11/09/1995

NET Job Number: 95.03705

Contact: Dan Redmond
Project: Prima Donna Development
Location:

Analyte	Blank Analysis	MDL	Units	Date Analyzed
OAR TPH-DIESEL (S)				
TPH-Diesel	ND	20	mg/Kg	11/07/1995
o-Terphenyl (Surr.)	80	-	%	11/07/1995
OAR TPH-DIESEL (S)				
TPH-Diesel	ND	20	mg/Kg	11/06/1995
o-Terphenyl (Surr.)	89	-	%	11/06/1995

Advisory Control Limits for Blanks:
Metals/Wet Chemistry/ Conventionals/GC - all compounds should be less than the Reporting Limit.
GC/MS - Semi-Volatiles - all compounds should be less than the Reporting Limit except for phthalates which should be less than 5 times the reporting limit.

QUALITY CONTROL REPORT
DUPLICATES

Redmond & Associates
P.O. Box 301545
Portland, OR 97230

Date: 11/09/1995

Job Number: 95.03705

Contact: Dan Redmond
Project: Prima Donna Development

Analyte	Original Analysis	Duplicate Analysis	Units	RPD	Date Analyzed	Flag
OAR TPH-HCID (S)						
Gasoline	ND	ND	mg/Kg		11/06/1995	
Diesel	ND	ND	mg/Kg		11/06/1995	F,R
Heavy Oil	H. Oil	H. Oil	mg/Kg		11/06/1995	
OAR TPH-HCID (S)						
Gasoline	ND		mg/Kg		11/06/1995	
Diesel	Diesel		mg/Kg		11/06/1995	F
Heavy Oil	H. Oil		mg/Kg		11/06/1995	
OAR TPH-HCID (S)						
Gasoline	ND	ND	mg/Kg		11/06/1995	
Diesel	Diesel	Diesel	mg/Kg		11/06/1995	
Heavy Oil	ND	ND	mg/Kg		11/06/1995	
OAR TPH-HCID (S)						
Gasoline	ND	ND	mg/Kg		11/07/1995	
Diesel	ND	ND	mg/Kg		11/07/1995	
Heavy Oil	ND	ND	mg/Kg		11/07/1995	
OAR TPH-DIESEL (S)						
TPH-Diesel	1200	1200	mg/Kg	0.0	11/07/1995	
OAR TPH-DIESEL (S)						
TPH-Diesel	94	110	mg/Kg	15.6	11/07/1995	
OAR TPH-DIESEL (S)						
TPH-Diesel	ND	ND	mg/Kg		11/07/1995	

NOTE: Duplicates may not be samples from this job.

RPD - Relative Percent Difference

A	This sample does not have a typical gasoline pattern.
B1	This sample does not have a typical diesel pattern.
B	The blank exhibited a positive result greater than the reporting limit for this compound.
C	The sample appears to contain a lighter hydrocarbon than gasoline.
D	The sample appears to extend to a heavier hydrocarbon range than gasoline.
E	The sample appears to extend to a lighter hydrocarbon range than diesel.
F	The sample appears to extend to a heavier hydrocarbon range than diesel.
G	The positive result for gasoline is due to single component comtamination.
H	The gasoline elution pattern for the sample is not typical.
I	The oil pattern for this sample is not typical.
J	The result for this compound is an estimated concentration.
L	The LCS recovery exceeded control limits. See the LCS page of this report.
M	MS and/or MSD percent recovery exceeds control limits.
MR	The MS/MSD RPD is greater than 20%. The sample was re-extracted and re-analyzed with similar results. This is due to a matrix interference, likely a non-homogeneity of the sample.
P	A post digestion spike was analyzed, and recoveries are within control limits.
Q	Detection limits elevated due to sample matrix.
R	The duplicate RPD was greater than 20%. The sample was re-extracted and re-analyzed with similar results. This indicates a matrix interference in the sample, likely a non-homogeneity of the sample.
SR	Surrogate recovery outside control limits. See the surrogate page of the report.
W	The duplicate RPD was greater than 20%. Due to insufficient sample, re-analysis was not possible.
X	Sample was analyzed outside recommended holding times.
Y	The result for this parameter was greater than the TCLP regulatory limit.
Z	The pattern seen for the parameter being analyzed is not typical.

NET ENVIRONMENTAL TESTING, INC.

CHAIN OF CUSTODY RECORD

COMPANY Redmond & Assoc.
ADDRESS P.O. Box [illegible]
PHONE 252-6582 FAX 252-[illegible]
PROJECT NAME/LOCATION Prima Donna Development
PROJECT NUMBER
PROJECT MANAGER Dan Redmond

REPORT TO: Dan Redmond
INVOICE TO:
P.O. NO.
NET QUOTE NO.

SAMPLED BY Daniel Redmond (PRINT NAME) [signature] SIGNATURE

(PRINT NAME) SIGNATURE

DATE	TIME	SAMPLE ID/DESCRIPTION	MATRIX	GRAB	COMP	HCl	NaOH	HNO_3	H_2SO_4	OTHER	[illegible]										COMMENTS
11/6/95	1:20	#1									X										
"	1:22	#2									X										
"	1:25	#3									X										
"	1:35	#4									X										
"	1:37	#5									X										

(HCl, NaOH, HNO_3, H_2SO_4, OTHER: # and Type of Containers; columns after OTHER: ANALYSES)

To assist us in selecting the proper method

Is this work being conducted for regulatory compliance monitoring? Yes ___ No ___

Is this work being conducted for regulatory enforcement action? Yes ___ No ___

Which regulations apply: RCRA ___ NPDES Wastewater ___ UST ___ Drinking Water ___ Other ___ None ___

CONDITION OF SAMPLE: BOTTLES INTACT? YES / NO FIELD FILTERED? YES / NO COC SEALS PRESENT AND INTACT? YES / NO VOLATILES FREE OF HEADSPACE? YES / NO TEMPERATURE UPON RECEIPT: ___ Bottles supplied by NET? YES / NO

SAMPLE REMAINDER DISPOSAL: RETURN SAMPLE REMAINDER TO CLIENT VIA ___ I REQUEST NET TO DISPOSE OF ALL SAMPLE REMAINDERS DATE ___

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	RELINQUISHED BY:	DATE	TIME	RECEIVED FOR NET BY:
[signature]	11/6/95	2:04			11/6/95	14:04	[signature]

METHOD OF SHIPMENT

REMARKS: