

Moore-Love, Karla

From: Dee White <deewhite1@mindspring.com>
Sent: Monday, March 06, 2017 1:32 PM
To: Moore-Love, Karla
Subject: Agenda item 215/235 for March 8 PWB contract with Confluence
Attachments: 042999 EPA archive Letter from PWB withdrawing from program 1999.pdf; 070199-2 letter from EPA July 1999.pdf; Portland Water Bureau _ Project XL _ US EPA letter from epa.pdf; Portland Water Bureau _ Project XL _ US EPA.pdf

Karla,

Please include these documents in the record for this agenda item. Please also send me a receipt that you have received.
THANKS so much.

Dee White

US EPA ARCHIVE DOCUMENT



CITY OF
PORTLAND, OREGON

BUREAU OF WATER WORKS

Erik Sten, Commissioner
Michael F Rosenberger, Administrator
1120 S.W. 5th Avenue

Portland, Oregon 97204
Information (503) 823-7404
Fax (503) 823-6133
TDD (503) 823-6868

April 29, 1999

Mr. Chuck Findley
Deputy Regional Administrator
Environmental Protection Agency, Region 10
1200. Sixth Avenue
Seattle, Washington 98101

Dear Mr. Findley:

During the last year the City of Portland Bureau of Water Works, represented by Rosemary Menard, Portland's Wholesale Water Customers, and the Environmental Protection Agency have been working toward developing a Project XL for Communities agreement for Portland's Lead Hazard Reduction Program. This effort followed two years of preliminary discussions between our agencies regarding the City's proposed multi-media approach to complying with the Lead and Copper Rule, an approach that has been accepted by the Oregon Health Division as satisfying the requirement to provide optimum corrosion control. Implementation of the program has been underway since 1997.

The underlying premise of the Lead Hazard Reduction Program and our participation in the XL for Communities program is that a multi-media approach to lead in the environment could produce a better public health outcome than would be produced through water treatment alone. Early indications are that the home lead hazard reduction program, and the education, community outreach, and stakeholder involvement efforts are leading to new and highly effective partnerships to address lead in the environment with individuals, agencies, and community based organizations. These partnerships significantly increase the prospects for success for the Lead Hazard Reduction Program, and we are very excited to be a part of the energy and commitment that is being generated around the environmental lead issue.

Our experience working to develop a final project agreement for the Lead Hazard Reduction Program, however, have not been so promising. Regretfully, we have come to the conclusion that we must withdraw from the XL for Communities program.

Our reasons for withdrawing are several, but most important is our inability to support the workload required to develop the final project agreement. We've come to this unfortunate realization after considerable investment of staff and other resources, and find that we simply cannot proceed without harming the at risk populations we seek to help.

An Equal Opportunity Employer

Mr. Chuck Findley

Page 2

April 29, 1999

When we accepted EPA's offer to develop a final project agreement in April 1998, we did so based on the assurances we received in the meeting held in Washington D.C. on March 25, 1998 that EPA had no significant issues with the updated program proposal we submitted for review in February 1998. We also understood that stakeholder involvement in the process of developing a final project agreement was both important to EPA and necessary, and we undertook these outreach efforts beginning in September 1998.

During the several formal stakeholder meetings as well as during ongoing community interactions associated with program implementation, we have been struck by the differences between the community's concerns and needs and EPA's. In particular, stakeholders strongly supported (and continue to support) our efforts and focused on what might be described as more "real time" questions and directions for the program. EPA's concerns during this same time were typically more focused on program clarifications and enhancements. We became concerned that EPA's comments were raising potentially significant financial, policy, or implementation issues, and we were unable to see how we could resolve these issues without considerable additional investment of limited resources.

While we certainly acknowledge that any program can be improved, the consistent message we received from community based stakeholders was satisfaction with both what was being done and the process that was being used to engage them in decision-making about the program. The consistency of this input as well as the lack of interest of these stakeholders in EPA's issues made us question the relevance of EPA's concerns, especially in light of the what we saw as the growing workload and associated time commitment necessary to resolve the issues raised. In the end, we concluded that continuing to work on the XL agreement detracted from our ability to implement the program. Our decision to withdraw is directly related to our belief that our community benefits significantly more from actual implementation of the program than from continuing to invest our limited resources in the achieving recognition under the XL for Communities program.

Our mutual efforts to develop a final project agreement have resulted in several important and beneficial outcomes, including an actively engaged community stakeholder group, and many highly successful community partnerships. We are most proud of the spirit of cooperation and common purpose that has developed in working with the Urban League, Physicians for Social Responsibility, local, regional, and national environmental justice interests, and community based social service and health care providers. We reached out to these interests not only because of the XL for Communities requirements for stakeholder involvement but also because we understood that community acceptance and participation was critical to our ability to successfully accomplish program objectives. We have been continually impressed by the dedication and commitment of these community partners to improved public health outcomes for our citizens, and we fully expect to continue working with these partners.

Mr. Chuck Findley

Page 3

April 29, 1999

It is indeed unfortunate that such a successful and novel program could not achieve XL for Communities designation, but lacking this designation does not in any way detract from its contribution to improving public health in our community.

Please feel free to contact Rosemary Menard or me should you have questions about our decision or wish to discuss further.

Sincerely,

Michael F. Rosenberger
Administrator

MR/tm

cc: Cynthia Dougherty
Rosemary Menard

US EPA ARCHIVE DOCUMENT



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

July 1, 1999

OFFICE OF
THE ADMINISTRATOR

Michael F. Rosenberger
Administrator
City of Portland, Bureau of Water Works
1120 S.W. 5th Avenue
Portland, Oregon 97204

Dear Mr. Rosenberger:

We at EPA wanted to take this opportunity to acknowledge your letter of April 29 and the withdrawal of the Portland Water Bureau from the process of developing an XL for Communities (XLC) Final Project Agreement (FPA). We regret that circumstances prevent the Water Bureau from moving forward with the Lead Hazard Reduction Program (LHRP) as an XLC project. We remain convinced that the LHRP has substantial merit and the potential to achieve the superior public health outcome that is the hallmark of EPA's Project XL.

We also wanted to thank you for providing the resources of the staff at the Portland Water Bureau to bring the project to the point of a well developed draft XLC FPA. We understand that it required a considerable investment of time and resources. We also recognize and are encouraged that, despite the decision not to proceed with XLC, a version of the draft Agreement will continue to be useful to the Water Bureau as an education and outreach tool.

EPA continues to believe that testing the concept presented by the LHRP through an XLC project was, and is a good idea. We support the innovative approach taken by a local water authority to strategically target its resources to address populations at greatest risk and address lead exposure from multiple sources. In addition we believe that the XLC project provided an additional forum for stakeholder participation in the LHRP. Using the XLC stakeholder involvement process as a framework, the Water Bureau successfully recruited and maintained the involvement and participation of a diverse group of community and national stakeholders. We want to acknowledge the contribution that this group has made to the project and encourage their continued involvement in the LHRP. Portland will be well-served by their input and advice.

While continuing to express support for the overall LHRP, we also feel it appropriate to state our position on several of the points raised in your April 29 letter to us that reflect on EPA's goals and intentions related to this XLC project.

First, we would like to respond to your statement that the Water Bureau could not continue with the XLC project without harming the at-risk populations it sought to help. EPA does not believe that any of the program improvements suggested in our comments would have diverted resources to the point of harming at-risk populations in Portland. EPA wants to assure both the Water Bureau and the project stakeholders, that the Agency in no way intended or believed that an investment in XLC would jeopardize the Water Bureau's core services or the services offered through the LHRP. If this did emerge as an issue for the Water Bureau, and EPA had been made aware of it, we would have fully supported an open and complete discussion to assist in working through the competing demands on the Water Bureau's resources.

We would also like to respond to statements made in your letter concerning the March, 1998 meeting with EPA and the Water Bureau's subsequent decision to move forward with the XLC project. We understand that this decision was based on EPA's assurances that the February 1998 updated program proposal did not raise new significant issues and that the information contained in the Update indicated that good progress had been made in implementing the LHRP since March of 1997. However, the Agency's comments in March of 1998 did not supersede or replace the discussion of issues included in EPA's November 26, 1997 letter. In that letter and in a subsequent letter to Rosemary Menard following the March 1998 meeting (dated August 4, 1998, five months prior to the first draft of the FPA), EPA highlighted issues that the Agency sought to have addressed during Final Project Agreement development. The primary issue and one that EPA considers basic to the implementation of any XL project, was an effective evaluation and monitoring program for the LHRP.

In part, your choice to develop and implement the LHRP through an EPA national level program brings with it a commitment to work within the framework and expectations established by that program. Project XL (including XLC) is a set of regulatory experiments that test new approaches in contrast to EPA's existing regulatory programs. EPA's participation in any of these regulatory experiments is not credible without a meaningful evaluation and monitoring program. EPA regrets, that despite offers of Agency assistance to help develop this evaluation plan, we were not able to engage with the Water Bureau and other project stakeholders to fully develop this aspect of the LHRP.

Lastly, you question the relevancy of EPA's concerns about the Final Project Agreement in light of what you perceived to be a lack of stakeholder interest for the issues EPA raised. EPA's position in the group of direct participant stakeholders is unique. EPA's positions on policy and technical issues represent an assortment of Agency interests ranging from programmatic and technical expertise (which EPA had offered to share with the Water Bureau and community stakeholders) to obligations under Federal statutes. No other stakeholder would hold or be responsible for this same range of perspectives. For example, individual community stakeholders also have an important interest in monitoring project results, but may lack the expertise or time to engage in the sort of detailed discussion that EPA had proposed in its comments on the draft FPA. In EPA's view this does not at all negate the community's interest in the issues EPA had raised. In fact, community stakeholders often rely on EPA to provide technical expertise not available locally and consequently to safeguard their interests in that way.

EPA has worked diligently on this project to fulfill the commitments made through the national XLC Program. We have supported the LHRP as an XLC project, both conceptually as a valid and important public health perspective to be tested and also very concretely in providing many hours of staff time and financial resources to facilitate FPA and overall project development. At the same time, the work done through this XLC project has been a learning experience. EPA has gained a broader and deeper understanding of public health issues as viewed and managed from a local perspective. This has also been an opportunity to test and hone our skills for practicing Community-Based Environmental Protection. As such, we have welcomed this opportunity to work with the Portland Water Bureau. Even though the LHRP will no longer be part of EPA's regulatory experiment through XLC, we look forward to the results that promise to emerge from the Water Bureau's lead hazard reduction work.

Sincerely,

Chuck Findley,
Deputy Regional Administrator
Region X

Lisa Lund,
Deputy Associate Administrator for Reinvention
EPA, Headquarters

cc: Rosemary Menard, Portland Water Bureau
Dave Leland, Oregon Health Division
XLC Community Direct Participant Stakeholder Group
Barbara McAllister, Region 10 Office for Innovation
Cynthia Dougherty, Office of Ground Water and Drinking Water
Jim Nelson, Office of General Counsel

Stephen Johnson, Office of Prevention, Pesticides and Toxic Substances
Sylvia Lowrance, Office of Enforcement and Compliance Assurance
Diane Regas, Office of Water



Project XL

You are here: [EPA Home](#) [Office of Policy](#) [OSEM](#) [Historical Information](#) [Industry Partnerships](#) [Project XL](#) [Portland Water Bureau](#) [Letter](#)

Portland Water Bureau (XLC)



November 26, 1997 Letter to Rosemary Menard from David Gardiner

Rosemary Menard, Director
Water Resources Management Group
City of Portland Bureau of Water Works

1120 S.W. 5th Avenue
Portland, OR 97204-1926

Dear Ms. Menard:

On behalf of the United States Environmental Protection Agency, I am writing to thank you for your application to our XL for Communities (XLC) pilot program and to invite you to negotiate a Final Project Agreement. Your proposal for an integrated, risk-based, multi-media approach to lead hazard reduction is consistent with XLC's goal to achieve greater levels of public health protection by providing communities with the flexibility to meet environmental goals in the way that makes most sense locally.

Bringing your proposal to a completed Final Project Agreement is premised on our mutual commitments to the overall objectives of XLC. These include superior environmental results; broad stakeholder participation and support; accountability for results; community capacity building; and innovation and flexibility. EPA expects that the Final Project Agreement, if we are able to agree upon one, will reflect each of these principles, and that they will form the basis for our work together in the coming months. Only the signing of the FPA will constitute acceptance as an XL Communities pilot project.

Our assessment of the appropriateness of this project under the XLC Environmental Results criteria is based in part on the most recent monitoring information regarding the levels of lead and copper in Portland's drinking water. Should those levels increase significantly during any subsequent monitoring, the Agency will evaluate whether the project still meets the criteria for participation in the XLC program. We would, of course, coordinate closely with the City and the State if such an evaluation became necessary.

To focus the negotiations for the Final Project Agreement, we want to draw your attention to several remaining concerns. Specifically, we want to ensure that we have adequate information to evaluate the results of the project. In response to these concerns, my colleagues and I have discussed and agreed upon, in addition to the general principles identified above, several conditions that EPA believes will need to be addressed and resolved to our mutual satisfaction before a Final Project Agreement can be reached.

Briefly these include the following:

Clarifying the Scope of the Home Lead Hazard Reduction Program (HLHRP)

EPA will seek commitments by the Water Bureau to implement, monitor, and evaluate a proactive, preventative program that identifies and addresses housing at high risk for lead paint and dust exposure and to perform more comprehensive lead-abatement measures and maintenance where they are warranted. Also as part of this Program, EPA will seek commitments to ensure that lead management and abatement activities are carried out safely and effectively by trained, and where appropriate, certified personnel with the

necessary insurance.

In order to negotiate the components of the HLHRP, EPA will need additional information on activities underway in Portland. In particular, these activities include: intervention activities that are triggered by the discovery of a lead-poisoned child; HUD support for lead mitigation in Portland; CDC support; and lastly current community-initiated activities related to lead poisoning and the role of XLC in initiating, complementing, and enhancing this activity. EPA also believes it will be crucial to the negotiation process to have the direct involvement of local health service providers. Finally, the FPA should address how savings from the water treatment program and any external funding, including the HUD grant recently awarded to Multnomah County, will be invested in and will enhance the lead abatement and education activities of the HLHRP.

Implementing National Primary Drinking Water Regulations for Lead and Copper

Because the State has approved Portland's current treatment program, we understand that the City is not requesting any regulatory relief from the Lead and Copper Rule's (LCR) corrosion control treatment technique requirements. The Agency has no present intention to challenge Oregon's finding that Portland is in compliance with the treatment requirements of the LCR. Portland and its consecutive water systems will be required to maintain the corrosion control treatment approved by Oregon, and to monitor for lead and copper at the tap and water quality parameters at the locations specified in the rule. Our offer to enter Final Project Agreement negotiations does not endorse regulatory relief from any changes to corrosion control treatment that may be required by the State in the future. Relief or variance from any of these provisions would fall outside of Portland's current XLC proposal and any resulting FPA.

In addition to maintaining the current treatment program, the Final Project Agreement should address the Water Bureau's response to homes at-risk for high levels of lead and copper in drinking water. The FPA should include the Bureau's plan to characterize accurately and adequately tap water lead and copper levels for both wholesale customer water systems and the City of Portland. We would also expect the FPA to address monitoring and mitigation of lead and copper in drinking water for schools and day care facilities consistent with EPA's 1994 Guidance.

Finally, you have requested approval of your approach as a substitute for the public education requirements of the Lead and Copper Rule. It is unclear how your proposal would address the need, in the event lead levels should rise above the action level in the future, for providing system-wide information to the public regarding the risks of lead exposure through drinking water and ways to reduce that exposure. This issue should be discussed during FPA negotiations.

Overall Project Conditions

FPA negotiations will also need to define what level of oversight is appropriate, who those oversight parties are and clearly define success in the performance monitoring and evaluation plan for the LHRP. An important term of the implementing agreement for the project will also be a demonstrated financial commitment to the Lead Hazard Reduction Program for the initial XLC project period and for a negotiated period of time beyond that. In this regard, we expect the City to demonstrate specific budgetary commitments, staffing levels, and performance plans prior to project approval.

Finally, the Agency will seek a commitment that the residents of Portland and the Bull Run service area be fully informed about this project. I know you share our interest in the public's right to understand that the benefits expected from the household abatement program would in part come from the successes achieved through past and ongoing efforts to reduce lead concentrations in drinking water. In this light, we believe that none of the various exposure and risk assessments that have been conducted by Portland and by the Agency are sufficiently accurate to be presented as a basis for this proposed program. While the exposure models used are well documented and capable of providing good approximations of population blood-lead levels, the modeling conducted contains significant uncertainties associated with critical estimates related to exposure throughout Portland to lead paint dust, and highly uncertain assumptions regarding the efficacy of paint lead abatements.

I believe these are reasonable and achievable conditions and goals for our negotiations. EPA will commit staff from the Regional Office and relevant Program Offices to work with you, the State, and the residents of Portland and the Bull Run Service Area to forge an agreement that will be the basis for a project that will

achieve superior public health protection. We believe that this concerted effort, combined with your substantive commitments, creates an excellent opportunity to realize the goals envisioned in your proposal. We look forward to working with you.

Sincerely,

David Gardiner

Assistant Administrator

cc: Grant Higginson, MD, MPH, Oregon Health Division

David Leland, PE, Drinking Water Program, Oregon Health Division

Gary Oxman, MD, MPH, Multnomah County Health Department

Chuck Fox, EPA

Chuck Clarke, EPA Region X

Chuck Findley, EPA Region X

William Glasser, EPA Region X

Wendy Cleland-Hamnett, EPA

<https://archive.epa.gov/projectxl/web/html/032197.html>

Last updated on 2/20/2016



Project XL

You are here: [EPA Home](#) [Office of Policy](#) [QSEM](#) [Historical Information](#) [Industry Partnerships](#) [Project XL](#) [Portland Water Bureau](#) [Proposal Submission](#)

Portland Water Bureau (XLC)



March 21, 1997 Proposal Submission

March 21, 1997

WQ 1.11.1

Regulatory Reinvention Pilot Projects: XL Community Pilot Program,
FRL-5322-9

Water Docket, Mail Code 4101

U.S. Environmental Protection Agency
401 M Street SW
Washington, D.C. 20460

To Whom It May Concern:

The Portland Water Bureau is pleased to submit this proposal for the XL Community Pilot Program. The Portland Water Bureau is submitting this proposal to request regulatory flexibility for compliance with the Lead and Copper Rule promulgated under the Safe Drinking Water Act. Specifically, we are requesting approval of our Lead Hazard Reduction Program as a substitute for requirements for optimal corrosion control treatment and public education. We believe that the Lead Hazard Reduction Program will achieve better public health protection from lead exposure, at an equivalent or lower cost, than would be obtained by strict adherence to these Lead and Copper Rule requirements.

The Lead Hazard Reduction Program was developed by the Portland Water Bureau in partnership with the Oregon Health Division (Drinking Water Section and Environmental Epidemiology Section), the Multnomah, Washington, and Clackamas County Health Departments, the Oregon Childhood Lead Poisoning Prevention Program, and the managers of water systems purchasing water from Portland.

Enclosed are one original and three copies of the proposal and a set of attachments containing supporting information. The first attachment is the Lead Hazard Reduction Program Report dated December 1996. Since that report was completed in December 1996, a decision has been made to implement the Home Lead Hazard Reduction Component through the Multnomah County Health Department with an AmeriCorps program called CLEARCorps (Community Lead Education and Reduction). The second attachment includes a description of how the CLEARCorps program will be implemented in Portland, and should be considered an updated description of the Home Lead Hazard Reduction Component.

We look forward to the opportunity to work with you in developing a successful XL project. If you have any questions or would like to discuss this proposal further, please feel free to contact Rosemary Menard at (503) 823-7792 or Babette Faris at

(503) 823-7498.

Sincerely,

Rosemary Menard, Director

Water Resources Management Group

City of Portland Bureau of Water Works

Grant Higginson, MD, MPH

Gary Oxman, MD, MPH

Oregon State Health Officer Multnomah County Health Officer

rcm:kbk

cc: EPA Region X: Larry Worley, Wendy Marshall, Bill Glasser

attachments

CITY OF PORTLAND BUREAU OF WATER WORKS

PROJECT XL PROPOSAL

Introduction

The City of Portland Bureau of Water Works (Portland Water Bureau) is the largest water system in Oregon, serving about 500,000 people within the City of Portland and an additional 300,000 people throughout the Portland metropolitan area through wholesale agreements with 19 other water systems.

Through the XL Community Pilot Program, the EPA grants flexibility in the implementation of environmental regulations to communities in exchange for a commitment to achieve superior environmental performance. The Portland Water Bureau is submitting this XL project proposal to request regulatory flexibility for compliance with the Lead and Copper Rule (LCR). Specifically, we are requesting approval of our Lead Hazard Reduction Program (LHRP) as a substitute for Lead and Copper Rule requirements for optimal corrosion control treatment and public education.

The Lead and Copper Rule

In 1991, the EPA promulgated the LCR under the Safe Drinking Water Act Amendments of 1986 to reduce lead and copper in water at customer taps (Federal Register, 1991). The LCR establishes a treatment

technique that includes a regulatory schedule and requirements for corrosion control treatment, public education, and monitoring.

The LCR requires large water systems such as Portland's to determine the optimal type of corrosion control treatment for their system and provide this treatment by January 1997. The LCR defines optimal treatment as that which minimizes lead and copper levels in drinking water without causing violations of other drinking water standards. The LCR also requires implementation of a specified public education program as long as lead action levels are exceeded¹.

Portland's LCR Compliance Activities

Portland has an excellent record of compliance with drinking water regulations and has complied with all LCR requirements to date. In 1992, initial monitoring was conducted, including monitoring of lead and copper at customers' taps. Lead and copper action levels were exceeded in Portland and in other water systems using Bull Run water². Portland has been implementing the LCR-specified public education program in partnership with its wholesale water customers since 1992.

There is no detectable lead and there are very low levels of copper in Portland's Bull Run source water. Lead and copper enter drinking water primarily as a result of corrosion of building plumbing materials. The most common sources of these metals include lead-soldered joints in copper pipe and faucets and other fixtures made from lead-bearing brass.

Portland's LCR-required corrosion control study (Montgomery Watson and EES, 1994) indicated that lead and copper concentrations could be minimized in the distribution system by increasing Bull Run water pH from approximately 6.8 to pH 9.0-9.5 and increasing alkalinity from 6-12 mg/L to at least 25 mg/L as CaCO₃.

Because optimal corrosion control treatment as defined by the LCR would mean a significant change in water quality with potential adverse effects, the Portland City Council, in accordance with recommendations from the Water Quality Advisory Committee³ and the Water Managers Advisory Board⁴, directed the Bureau of Water Works to investigate alternatives. The resulting reports (EES, 1995; EES and Portland Water Bureau, 1996) describe the development of the Lead Hazard Reduction Program.

Portland has installed a sodium hydroxide feed system which has been operating since January 1997 to increase the pH of Bull Run water. The initial pH goal for water in the distribution system is in the range of 7.3-7.5, as described for the Water Treatment Component the Lead Hazard Reduction Program.

Lead Exposure in the Portland Area

Occurrence of Elevated Blood Lead Levels

The Centers for Disease Control and Prevention offers these guidelines for interpretation of blood lead levels (CDC, 1991):

Blood lead level (ug/dL)	Interpretation and guidance for health care providers
10-14	10 is currently identified as lowest level of concern; provide education to decrease exposure with simple inventions
15-19	Children are at risk for subtle adverse effects of lead poisoning; discuss interventions to reduce levels, do follow-up testing

>19	Children require full medical evaluation, including environmental and behavioral history; >44 requires urgent medical follow-up
-----	---

The median and 90th percentile blood lead levels for children in Multnomah County are estimated at 3.8 and 10 ug/dL, respectively (OCLPPP, 1994).

Medical laboratories in Oregon are required to report cases of elevated blood lead levels (EBLLs) of 10 ug/dL or higher to the Oregon Health Division (OHD). Since 1993, the Multnomah County Health Department (MCHD) has conducted about 120 follow-up investigations of EBLLs. These investigations indicate that lead-based paint is the most likely source of exposure for 70% of EBLLs of at least 15 ug/dL, and for 80% of the EBLLs of at least 20 ug/dL (OHD, 1997). As part of 24 of these follow-up investigations, the Portland Water Bureau was requested to analyze tap water samples for lead. For this group of 24 samples, the median concentration of lead in standing samples is 0.002 mg/L and the 90th percentile concentration is 0.013 mg/L (PWB, 1997), which are below the lead action level of 0.015 mg/L⁵. These data suggest that water was an insignificant or minor exposure pathway in these cases.

As part of the CDC-sponsored Oregon Childhood Lead Poisoning Prevention Program (OCLPPP), blood lead level screening of children is conducted in Multnomah County by the MCHD. These data show a strong positive relationship between occurrence of elevated blood lead levels and age of the child's home. About 1 out of 6 children tested living in homes built before 1930 had blood lead levels at or above 10 ug/dL, as compared to about 1 out of 15 children tested living in homes built in 1930 or thereafter (OCLPPP, 1994).

The observation that lead-based paint is the most commonly identified source of EBLLs in Multnomah County is consistent with the CDC's statement that lead-based paint is the most common high-dose source of lead exposure for children (CDC, 1991). Also, the EPA has estimated that, for a typical 2-year-old child living in an urban environment or in a non-urban house with interior lead-based paint, household dust and soil account for more than 90 percent of the child's daily intake of lead (EPA, 1995).

Occurrence of Lead in Drinking Water

As part of the studies to evaluate alternatives for LCR compliance (EES, 1996; EES 1997), models were developed to estimate the contributions of lead in water to lead in blood in the Portland area. An "individual-based" model was used to estimate the contribution to a person's total blood lead level that would be due to consumption of water with a specified lead concentration. These calculations made use of absorption coefficients to estimate how much lead in water is absorbed into the blood of infants, children, and adults. The coefficients used were those from EPA-preferred studies (Federal Register, 1991).

A "population-based" model was developed to compare the existing distribution of blood lead levels of infants, children, and adults in Multnomah County to predicted distributions after implementation of various corrosion control treatment alternatives. This model uses as input: 1) the existing distributions of water lead levels and blood lead levels; 2) anticipated reduction of water lead levels with corrosion control treatment; and 3) absorption coefficients as described in the previous paragraph. Because the distribution of blood lead levels, and to a lesser extent, the distribution of water lead levels varies with home age, the model was applied to eight subcategories of homes based on year of construction. For each home age subcategory, a statistical model of the distribution of blood lead and standing water lead levels was developed from existing data. A Monte Carlo simulation technique was used to generate a synthetic population with co-occurrences of blood lead and standing water lead levels consistent with their observed distributions. New blood lead distributions were calculated by reducing the existing distributions by the expected reduction of the water lead level due to various levels of corrosion control treatment. Detailed information about the models is presented in the study reports cited above. Some of the conclusions of the modeling efforts are:

- In general, drinking water is not a major route of exposure in the Portland area. The median lead level in samples of running water from customers' taps is less than 0.001 mg/L (non-detectable).
- However, it is possible that lead in drinking water could significantly contribute to an individual's total lead exposure if he or she regularly consumes standing water drawn from a plumbing system that contains a significant source of lead.
- In such a case, corrosion control treatment alone would not prevent lead in water from substantially contributing to an individual's total lead exposure. Lead source removal (e.g., replacement of piping

and/or faucets), or in most cases tap flushing to remove standing water before consumption, would be necessary to prevent a significant lead exposure from water.

- Assuming a "worst-case" unrealistic consumption scenario in which all children drink only standing water, about 300 children in Multnomah County would experience blood lead level reductions from above to below 10 ug/dL with treatment to minimize lead levels in drinking water (pH 9.0-9.5), as compared to about 200 children with a lesser extent of treatment (pH 7.0 to 7.5). In a much more realistic scenario in which running - not standing - water is predominantly consumed, fewer children would realize this potential benefit of "optimized" corrosion control treatment.

Project XL and the Lead Hazard Reduction Program

Portland is proposing to implement a Lead Hazard Reduction Program as an alternative to the optimal corrosion control treatment and public education requirements of the LCR. The goal of the LHRP is to achieve better public health protection from lead exposure, at an equivalent or lower cost, than would have been achieved with strict adherence to the corrosion control treatment and public education requirements of the Lead and Copper Rule.

The LCR defines optimal treatment as that which minimizes lead and copper levels in drinking water without causing violations of other drinking water standards. The EPA (1995) emphasizes that interventions to reduce lead exposures should be targeted at those exposure pathways that have the greatest impact on the health of the child by reducing his or her body-lead burden. Potentially, an intervention (such as corrosion control treatment) can be successful in reducing a particular environmental exposure (lead in drinking water) and yet produce no positive impact in a child only marginally exposed to the abated lead hazard.

Under our proposal, optimal treatment would include corrosion control treatment that would reduce - but not necessarily minimize - lead and copper levels in drinking water, along with additional interventions to reduce lead exposures that have the greatest health impact on children at most risk. As part of the LHRP, corrosion control treatment would be provided, but at a reduced level (pH adjusted up to 7.3-7.5) than that defined as optimal by the Lead and Copper Rule (pH 9.0-9.5 with an alkalinity increase). The savings in capital and operating costs would be used to fund other targeted interventions to produce real, positive health impacts on the greatest number of at-risk individuals.

Design Objectives

The LHRP was developed using these objectives as a basis of design:

- Prevent lead poisoning before it occurs (primary prevention);
- Focus efforts on those persons who are most risk to significant lead exposure and on those lead source and exposure pathways that would be expected to have the greatest impact on reducing a child's body lead burden;
- Implement feasible and cost-effective methods for reducing lead hazards;
- Supplement and/or complement efforts performed by other organizations with similar objectives;
- Develop and support community participation in lead hazard reduction efforts; and
- Evaluate for effectiveness in achieving objectives on an ongoing basis, and modifying program as necessary to enhance effectiveness.

Components of the Lead Hazard Reduction Program

The four main components of the LHRP are summarized below. The attached Lead Hazard Reduction Program report (EES and Portland Water Bureau, 1996) contains a more detailed description of program components.

Since that report was completed in December 1996, a decision has been made to implement the Home Lead Hazard Reduction Component through the Multnomah County Health Department with an AmeriCorps program called CLEARCorps (Community Lead Education and Reduction Corps). This is a national demonstration project operating in several cities that focuses on targeted, feasible, and cost-effective solutions to reduce lead exposure in high-risk neighborhoods. It is directed nationally from the Shriver Center at the University of Maryland. The second attachment includes a description of how the CLEARCorps Program will be implemented in Portland, and it should be considered an updated description of the Home Lead Hazard Reduction Component.

1. Water Treatment for Corrosion Control

Corrosion control treatment for the Bull Run supply consists of raising water pH to about 7.3 in the distribution system, or slightly higher if needed to achieve the objective of meeting the copper action level. This level of treatment is expected to reduce lead and copper levels in standing water by 40 and 55 percent, respectively (EES, 1995). However, neither this level of treatment, nor the higher level of treatment defined as optimal by the LCR 6, is likely to result in the lead action level being met in water systems using the Bull Run supply 7. Portland has installed a sodium hydroxide feed system, which has been operating since January 1997, to increase the pH of Bull Run water. The initial pH goal for water in the distribution system is in the range of 7.3-7.5 as a component of the Lead Hazard Reduction Program.

2. Expanded Free Lead-in-Water Testing Program

The purpose of this component is to identify customers within the Bull Run service area that may be at significant risk from elevated lead levels in drinking water and to assist them in reducing the risk of lead exposure from this source. Portland currently has a free lead-in-water testing program for its customers. This program would be expanded to include customers within the entire Bull Run service area. The program would also be expanded in terms of services provided. Currently, service is limited to mailing laboratory results with informational brochures. In the expanded program, customers whose tap water samples exhibit elevated levels of lead would be offered some level of assistance in determining the source of water lead and reducing lead exposure. The type and extent of assistance offered would depend on water lead level, but would be consistent with the LHRP the design objective to implement feasible and cost-effective methods of reducing lead hazards.

3. Home Lead Hazard Reduction Program

The purpose of this component is to prevent children from being exposed to hazards due to lead-based paint in their home environments. This program will operate in targeted Portland neighborhoods in which children are likely to be at greatest risk for home lead exposure. Parents in these neighborhoods will be offered individual home lead risk evaluations, child blood lead testing through the OCLPPP, and lead-safe education materials. In homes where significant lead exposure risks are identified, cost-effective in-place management or abatement techniques will be used to reduce lead-based paint hazards, including safe repair of deteriorated painted surfaces, repainting, specialized cleaning, and use of encapsulants. These techniques are consistent with the lead-based paint maintenance and hazard control standards for rental housing recommended by an HUD/EPA task force (HUD, 1995). In-home education and follow-up will be used to sustain the reduction. Work will be conducted by MCHD staff and AmeriCorps members certified as lead abatement workers, lead abatement supervisors, and/or lead inspectors. For the initial year of operation, the goal is to evaluate 350 homes and remediate 75 homes.

4. Lead Exposure Prevention Education

The purpose of this component is to provide primary prevention of lead exposure through public education and to increase the awareness of the entire community about lead health risks. Special efforts will be made to provide relevant information to those populations at greatest risk to lead exposure. Program messages would address multiple sources of lead exposure, not just water. Furthermore, program messages would be delivered to target audiences, especially those providing care to young children.

It should also be noted that, with the exception of corrosion control treatment, some additional development work is required before full implementation of the LHRP. We intend to develop and implement the LHRP according to the preliminary schedule provided in the Lead Hazard Reduction Program Report (EES and PWB, 1996) to the extent possible.

The Water Treatment Component of the LHRP will continue indefinitely. The Portland Water Bureau and its wholesale customers are committed to funding the other three components of the LHRP for a minimum of three years. During this period, much will be learned about the local occurrence of lead exposure risks and cost-effective ways to reduce those risks. This base of knowledge and experience gained through the LHRP will allow the Portland Water Bureau, local public health agencies, and community organizations to work together to develop a plan and the resources for sustained primary prevention of lead exposure in the Portland area.

Evaluation Criteria for Project XL Proposals

There are eight criteria for XL project selection presented in this proposal:

- Superior Environmental Results
- Monitoring, Reporting, and Evaluation
- Stakeholder Involvement and Support
- Innovation / Multimedia Pollution Prevention
- Shifting of Risk Burden / Equitable Distribution of Environmental Risks
- Transferability
- Feasibility
- Cost Savings and Economic Opportunity

A discussion of "Superior Environmental Results" is closely related to a discussion of the "evaluation" of those results. Before presenting these in this proposal, a review of issues related to assessing effectiveness of interventions to reduce lead hazards is presented.

This information that follows is summarized from a recent EPA review of literature regarding the effectiveness of lead hazard interventions (EPA, 1995). Interventions include activities that attempt to remove or isolate a source of lead exposure as well as activities that attempt to modify behavior patterns. Interventions can be assessed for their effectiveness in lowering a child's body-lead burden or the levels of lead in his or her environment.

It is often not feasible to directly assess health benefits following intervention, as some outcomes may not manifest themselves for a long time, and can be subtle, complicated, and costly to measure directly. Blood lead concentrations can serve as a good surrogate health endpoint in some instances due to the established association between blood lead levels and adverse health effects. For example, in studies where interventions sought "secondary" rather than "primary" prevention (*i.e.*, assessing the effectiveness of interventions on already poisoned rather than unexposed children), blood lead concentrations of exposed children have been used as the primary measure of intervention efficacy.

However, assessment is made more difficult when considering interventions targeted at children with low to moderate exposure (as would be the case with primary prevention projects, such as the proposed Lead Hazard Reduction Program.) When it is impractical or inappropriate to measure blood lead levels, levels in environmental media, such as dust lead levels can provide valuable information. Such measures cannot demonstrate an intervention's impact on affected children in terms of actual exposure or health effects, but they can be used to evaluate its effectiveness in reducing or eliminating a targeted lead hazard.

Currently, there is insufficient information available to identify a particular intervention strategy as markedly more effective than others. Comparable reductions in blood lead levels are observed resulting from the abatement of lead-based paint, and dust and soil at elevated lead levels, and in-home educational efforts. It is unclear whether more costly, large scale abatement strategies are more successful than less-expensive in-place management practices.

1. Superior Environmental Results

We believe that implementing the Lead Hazard Reduction Program will provide superior environmental performance by providing better public health benefits than would be achieved by strict adherence to corrosion control treatment and public education requirements of the Lead and Copper Rule. The superior performance would result from the Lead Hazard Reduction Program's design which is based on evaluation of existing local lead risk assessment data.

Demonstration of superior environmental performance involves comparison of benefits achieved by activities required by the LCR and those proposed in the LHRP:

Lead and Copper Rule	vs.	Lead Hazard Reduction Program
----------------------	-----	-------------------------------

Corrosion control treatment to minimize lead and copper in drinking water	vs.	Corrosion control treatment to reduce lead and copper in drinking water + Expanded free lead-in-water testing program + Home Lead Risk Reduction Program
Public Education Program focused on lead in drinking water	vs.	Public Education Program addressing a variety of lead exposure pathways

In order for the LHRP to provide superior environmental performance:

- the expanded free lead-in-water testing program and the high-risk neighborhood-based home lead risk reduction program would have to provide greater health benefits than the *difference* in benefits provided by "optimal" and reduced corrosion control treatment; and
- the LHRP's public education program would have to provide greater health benefits than the public education program required by the LCR.

Consider first the potential benefits resulting from corrosion control treatment. As part of the study to evaluate alternatives for LCR compliance (EES, 1996; EES 1997), models were developed to estimate and compare the potential reduction in blood lead levels that would be obtained with "optimal" and reduced levels of corrosion control treatment. These models are relatively simplistic and make use of best available input data. Results are not intended to be interpreted on a precise quantitative basis, but rather should be used as indicators of potential reductions under various lead exposure scenarios.

It is likely that more people would experience greater blood lead reduction benefits with "optimal" treatment as compared to a reduced level of treatment. However, model results indicate that the difference in benefits may be relatively small, not only in terms the number of people affected, but also in terms of the magnitude of blood lead reductions and the actual health benefits realized.

The expanded free lead-in-water testing program and the high-risk neighborhood-based home lead risk reduction program would be expected to provide greater health benefits than the *difference* in benefits provided by "optimal" and reduced corrosion control treatment. This is because the LHRP's interventions are targeted to children who are at most risk of significant lead exposure, and are targeted at those exposure pathways that would have the greatest impact on a child's body lead burden. However, quantitative prediction of the reduction in blood lead levels due to the free lead-in-water testing program and the high-risk neighborhood-based home lead risk reduction program is not possible, primarily because they are primary prevention programs attempting to prevent rather than reduce significant lead exposures.

For these reasons, a rigorous quantitative "apples and oranges" comparison of benefits of activities required by the LCR and those proposed in the LHRP are essentially not feasible. However, the environmental performance of the LHRP can be assessed with a number of evaluation methods and measures described in the following section describing "Monitoring, Reporting, and Evaluation". Agreement on definitions and measures of superior environmental performance would be developed by stakeholders during the XL project development process.

Water systems nationwide incur significant costs in order to comply with Lead and Copper Rule requirements. In light of this investment, it would be interesting to evaluate the LCR for its environmental performance, i.e., assess its impacts on public health using direct measures (specific health effects) or indirect measures (blood lead levels) of performance.

2. Monitoring, Reporting, and Evaluation

The primary objectives, along with a brief description of evaluation methods and measures are summarized in the table below. Additional information is contained in the attachments.

LHRP Component	Primary Objective(s)	Outcome Evaluation
Corrosion Control Treatment	Reduce risks from exposure to lead and copper in tap water	Track LCR-required lead and copper level data from "Tier 1" homes; track similar data from free lead testing program
	Determine if lead and copper levels are met	Track LCR-required lead and copper level data from "Tier 1" homes
Expanded Free Lead-in-Water Testing Program	Identify buildings in which water may be a significant pathway for lead exposure	Track information for buildings in which significantly elevated lead levels in standing water occur (e.g., location, plumbing system characteristics; lead levels in standing and running samples)
	Reduce risks to residents through education or other assistance; sustain reduction with follow-up education	Track changes in resident behavior (tap flushing) or changes in plumbing system components through surveys/interviews
Home Lead Hazard Reduction in High-Risk Neighborhoods	Identify residences in high-risk neighborhoods in which lead-based paint may be a significant source of lead exposure	Track information for residences in which significantly elevated lead levels in blood, household dust, soil, or other samples occur (location, home age, owner or tenant occupied, maintenance condition, etc.)
	Reduce risks of lead exposure from lead-based paint sources in homes in high risk neighborhoods using cost-effective in-place management or abatement techniques; sustain reduction with follow-up education and monitoring.	Track changes in dust lead levels and changes in resident behavior (maintenance practices) through follow-up monitoring and interviews.
Lead Exposure Prevention Education	Prevent lead exposure throughout the entire community by increasing awareness of lead health risks	Track changes in knowledge and attitudes about lead hazards through OHD's ongoing Behavior Risk Factor Surveillance Survey
	Reduce risks to others at significant risk to lead exposure who are not elsewhere targeted in LHRP (e.g., remodelers not living in high-risk neighborhoods)	Track information distributed (content, extent of distribution, how distributed); to the extent possible, track changes in knowledge and behavior in targeted groups.

Evaluation of the Water Treatment Component will be conducted by the Portland Water Bureau as part of its LCR compliance activities and its supplemental monitoring of the distribution system.

Evaluation of the other components of the LHRP will be conducted by the Program Design and Evaluation Services (PDES) group, an interdisciplinary, inter-agency technical work group composed of public health professionals and research staff whose functions are to design and execute evaluations of public health projects, including designing interventions, crafting and implementing evaluation strategies, and disseminating evaluation results through technical reports and publications. The purpose of the team is also to provide interdisciplinary technical assistance regarding behavioral approaches to disease prevention and

control. PDES activities are supervised jointly by the director of the MCHD Planning and Development unit and the OHD State Epidemiologist. PDES will assist in the formulation and implementation of the LHRP, and be primarily responsible for evaluation of the outcome of these components.

The outcome evaluation of the Home Lead Hazard Risk Reduction Component will add to the universal fund of knowledge about home lead hazards because it will address several areas where additional data is needed. In particular, information is generally lacking on the effectiveness of lead hazard interventions 1) that attempt to prevent elevated blood lead levels before they occur 2) among children with blood lead levels ≤ 20 ug/dL and 3) beyond one year following the intervention. It should be noted that about 30% of the initial year's operating budget for this component is for PDES evaluation services.

Specific monitoring, reporting, and evaluation methods would be agreed upon by stakeholders during XL project development and included in the Final Project Agreement.

3. Stakeholder Involvement and Support

The LHRP was developed as the Portland Water Bureau sought advice from local organizations involved in lead exposure issues to determine how it could best contribute to reducing lead hazards in the community as an innovative component of its regulatory compliance program. The idea was to supplement and/or complement efforts by other organizations with similar objectives and not duplicate existing efforts in the community. The LHRP was developed in partnership with members of a development committee through a series of workshops and numerous subcommittee meetings. The development committee included representatives from the following agencies and organizations: the Oregon Health Division (Drinking Water Program and Environmental Epidemiology Section); Multnomah, Washington and Clackamas County Health Departments; the Oregon Childhood Lead Poisoning Prevention Program; and the managers of the water systems purchasing water from Portland.

Community involvement and support from community-based organizations, businesses and individuals will be critical to the success of the LHRP program. We anticipate that the community will provide valuable advice and assistance in program development, implementation, review, and evaluation. The "community mobilization framework" approach will be applied in this project. This approach was used successfully by the CDC in demonstration projects in Portland and other cities to prevent HIV infection in women and children. This approach includes becoming familiar with the individual, social, and organizational roles and relationships in the community that might be useful in promoting awareness of lead safety issues, then developing a continuum of involvement ranging from simple endorsement of activities to building active coalitions. This approach offers the potential advantages of 1) extending limited resources of single agencies; 2) maximizing exposure to program through collaboration; 3) building on unique strengths and access channels or organizations and individuals in the community, and 4) allowing public health agencies to develop credible relationships with non-traditional community partners.

Portland is in the process of identifying and communicating with additional stakeholders to those who have been involved so far in LHRP development. These include local community members who have a direct interest in the program's outcomes - such as members of neighborhood organizations, businesses, local community health and environmental justice advocates, community development corporations, and those involved with low cost housing issues. These may include but are not limited to the following organizations:

African-American Health Coalition

Albina Ministerial Association

Black United Front

Center for Maternity and Family Support

Coalition of Community Clinics

Community Action Planning Office

Enterprise Foundation

Hispanic Roundtable
Host Development
Housing Authority of Portland
Housing Development Center
MultiFamily Housing Council
Oregon Housing Now Coalition
Portland Bureau of Housing and Community Development
Portland Development Commission
Portland Office of Neighborhood Associations
Reach Community Development
Rose Community Development
Urban League of Portland

Stakeholders also include those who may be interested in the broader implementation of such programs, including national public interest organizations such as the Alliance to End Childhood Lead Poisoning or the National Association for Lead Safe Housing.

These stakeholders may function as direct participants or commentators in project development, implementation, and review. We are in the process of identifying and contacting potential stakeholders to exchange information about what we are working on and learn what interests they may have in the project. We will use the input we receive to frame our ongoing community involvement process and develop a stakeholder involvement plan for Project XL.

The LHRP will strengthen the community by:

- helping to develop community awareness of lead safety issues through a variety of approaches;
- stimulating local public health agencies and community organizations to coordinate efforts to prevent lead poisoning;
- increasing the knowledge base regarding the occurrence of home lead exposure risks in the Portland area so that the community can develop optimal approaches to primary prevention of lead exposures; and
- encouraging dialogue between stakeholders to stimulate awareness of other community health issues and resources

4. Innovation / Multi-Media Pollution Prevention

The Lead Hazard Reduction Program is an innovative alternative for Lead and Copper Rule compliance in that it attempts to contribute to the development of an integrated community response, both in terms of effort and financial resources, to an environmental and public health problem. Also, because the LHRP is tailored to *local* conditions, it can deliver better results than "one-size-fits-all" approaches that structure solutions through national mandates.

The being several fundamental differences between the Lead Hazard Reduction Program and Lead and Copper Rule approaches to lead risk reduction. First, the LHRP recognizes that children are exposed to lead from a variety of sources and through different pathways, not just water. Second, the LHRP was designed based on consideration of local lead risk assessment data. This allowed the program's interventions to be targeted to those persons who are at most risk of significant lead exposure, and to be targeted at those exposure pathways that have the greatest impact on a child's body lead burden in our local community. Third, the LHRP was designed to build on efforts by other organizations in the community with similar objectives.

Another innovative aspect of the LHRP is the plan to implement the Home Lead Hazard Reduction Program through the MCHD with an AmeriCorps program called CLEARCorps (Community Lead Education and Reduction). CLEARCorps members will conduct a number of activities, including providing individual home lead risk evaluations in targeted neighborhoods and, in homes where lead exposure risks are identified, providing in-place management with specialized cleaning, repair, repainting or using encapsulant products for reduction of lead-based paint hazards.

Also, the innovative "community mobilization framework" approach will be applied in this project. This approach was used successfully by the CDC in demonstration projects in Portland and other cities to prevent HIV infection in women and children, as discussed in the "Stakeholder Involvement and Support" section above.

5. Shifting of Risk Burden / Equitable Distribution of Environmental Risks

XL projects must be consistent with Executive Order 12898 on Environmental Justice, the intent of which is to prevent minority and low-income communities from being subject to disproportionately high and adverse environmental effects. In fact, this proposal is likely to have the greatest benefits for these communities of concern.

Children from low-income and/or ethnic minority families are more likely to show elevated blood lead levels than other children because their families are more likely to reside in older homes in deteriorated condition, lack money to undertake home and soil remediation, lack access to medical care, and lack knowledge of the lead exposure issues (CDC, 1997; Phoenix, 1993).

The OHD has developed an index to estimate the relative risk of lead exposure in the home environment in Multnomah County neighborhoods. The neighborhoods with the greatest lead exposure risks are located predominantly in north/northeast Portland, which are among the most ethnically diverse in the city and include the largest African-American, Native American, and Latino populations and the third largest Asian population in the city. Residents of north and northeast Portland communities are more likely to have children, live below the poverty level, be unemployed, live in pre-1950's housing, and less likely to have college degrees than other residents of Portland. Data from the OCLPPP also suggest that some subpopulations may be at higher than average risk, including children 2-3 years old, and African-American and Hispanic children.

The Home Lead Hazard Reduction Component of the Lead Hazard Reduction Program is specifically designed to prevent children from being exposed to hazards due to lead-based paint in their home environments in north and northeast Portland neighborhoods. By implementing this component of the LHRP, the disproportionate risk of lead exposure which currently exists in the Portland area will be reduced. Parents in these neighborhoods will be offered individual home lead risk evaluations, child blood lead testing through the OCLPPP, and lead-safe education materials. In homes where significant lead exposure risks are identified, cost-effective in-place management techniques will be used to reduce lead-based paint hazards and in-home education will be used to sustain the reduction.

6. Transferability

The LHRP can serve as a model strategy for other water systems interested in reducing lead exposure in their communities by targeting pathways and sources that otherwise would not be addressed under the Lead and Copper Rule. This LHRP also could serve as a model strategy for compliance with drinking water regulations that target other contaminants found in multiple sources and multiple exposure pathways in the environment (e.g., radon).

Additionally, in a recent review of literature regarding the effectiveness of lead hazard interventions, the EPA notes that information is lacking on the effectiveness of lead hazard interventions 1) that attempt to prevent elevated blood lead levels before they occur; 2) among children with blood lead levels ≤ 20 $\mu\text{g}/\text{dL}$; and 3) beyond 1 year following the intervention (EPA, 1995). Evaluation of results of the Home Lead Hazard Reduction Component of the LHRP will contribute to this fund of knowledge that will be useful to government agencies with public health missions and communities involved in lead-safety issues nationwide.

Lessons learned from implementation of this LHRP will be available to interested parties locally and nationally.

7. Feasibility

The Portland Water Bureau will be responsible for implementing the Water Treatment and the expanded Free Lead-in-Water Testing components of the Lead Hazard Reduction Program. Portland has installed a sodium hydroxide feed system, which has been operating since January 1997 to increase the pH of Bull Run water.

The Home Lead Hazard Reduction component will be implemented by the Environmental Health Section of the Multnomah County Health Department. The Lead Exposure Prevention Education component will be implemented through the Oregon Health Division and community-based organizations. Evaluation of the LHRP will primarily be conducted by Program Design and Evaluation Services, an interdisciplinary, inter-agency technical work group, jointly established by the Multnomah County Health Department and Oregon Health Division.

Contractual arrangements in the form of interagency agreements between the Portland Water Bureau and the Multnomah County Health Department and also the Oregon Health Division will include detailed work plans and budgets. The Portland Water Bureau has included the estimated \$1.0 million cost of implementing the Lead Hazard Reduction Program in its FY 97-98 operating budget.

8. Cost Savings / Economic Opportunity

Implementation of the LHRP is expected to result in cost savings compared to strict adherence to the corrosion control treatment and public education requirements of the Lead and Copper Rule. As part of the LHRP, corrosion control treatment would be provided, but at a reduced level than that defined as optimal by the Lead and Copper Rule. These savings would be used to fund the other LHRP program components, including an expanded free lead-in-water testing program, a program based in high-risk neighborhoods to prevent children from being exposed to lead-based paint hazards in their home environments, and a community primary prevention education program. Preliminary cost estimates indicate that the LHRP could result in a capital cost savings up to \$2 million and an additional \$200,000 or more per year in operating costs, benefiting water ratepayers in the Portland area. Indirect cost savings or valuable benefits for the community such as reduced cost of treatment of lead-poisoned children and increase in the stock of "lead-safer" housing are not included in this estimate.

The Home Lead Hazard Reduction component and the Lead Exposure Prevention Education component of the LHRP will initially be implemented through the Multnomah County Health Department and Oregon Health Division. However, with increased lead-safety awareness in the community, other alternatives with local economic opportunities may emerge with time. For example, existing community-based organizations may wish to expand their activities, or new organizations may be formed specifically to engage in lead hazard reduction activities.

List of References

CDC (Centers for Disease Control and Prevention). Preventing Lead Poisoning in Young Children: A Statement by the Centers for Disease Control. Atlanta, GA. October 1991.

CDC (Centers for Disease Control and Prevention). Updated Blood Lead Levels in the United States. Morbidity and Mortality Weekly Report: Vol 46, No. 7. February 1997.

EES (Economic and Engineering Services). Comprehensive Evaluation of Alternatives for Lead and Copper Rule Compliance. Portland, OR. August 1995.

EES (Economic and Engineering Services) and PWB (Portland Water Bureau). Lead Hazard Reduction Program Report. Portland, OR. December 1996.

EES (Economic and Engineering Services). Comprehensive Evaluation of Alternatives for Lead and Copper Rule Compliance, Technical Memorandum No. 1: Models for Lead Exposure Through Portland's Drinking Water. Portland OR. [expected April 1997].

EPA (US Environmental Protection Agency, Office of Pollution Prevention and Toxics). Review of Studies Addressing Lead Abatement Effectiveness. EPA Report No. 747-R-95-006. July, 1995.

Federal Register. Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper; Final Rules. Vol 56, No 110, p. 26460-26564. June 7, 1991.

HUD (U.S. Department of Housing and Urban Development). Summary Lead-Based Paint Hazard Reduction and Financing Task Force. 1995.

Montgomery Watson and EES (Economic and Engineering Services). Lead and Copper Corrosion Control Study for the Portland Water Bureau and Participating Wholesale Customers. Portland, OR. June 1994.

OCLPPP (Oregon Childhood Lead Poisoning Prevention Program). Status Report to the OCLPPP Task Force. Portland, OR. 1994.

OHD (Oregon Health Division, Occupational, Environmental, and Injury Epidemiology Section). Oral communication from R. Leiker to B. Faris based on review of STELLAR lead exposure surveillance data base. Portland, OR. March 1997.

Person, B., and Cotten, D. A Model of Community Mobilization for the Prevention of HIV in Women and Infants. Public Health Reports 1996; Vol 111, Supplement 1, pages 89-98.

Phoenix, J. Confronting Environmental Racism *in* Getting the Lead Out of the Community, Bullard, R. Ed. South End Press. 1993

PWB (Portland Water Bureau). Interoffice memorandum from M. Sheets. Portland, OR. March 12, 1997

Proposal for Project XL

City of Portland Bureau of Water Works

Date: March 21, 1997

Sponsored by: City of Portland Oregon

Bureau of Water Works

1120 S.W. 5th Avenue

Portland, OR 97204-1926

Submitted in The Oregon Health Division and **association with:** The Multnomah County Health Department

Environmental Problem Addressed by the Project:

Childhood lead exposure from a variety of sources and through a variety of pathways in our community

Description of Project:

The Portland Water Bureau seeks regulatory flexibility in compliance with the Lead and Copper Rule promulgated under the Safe Drinking Water Act. Specifically, we propose to implement a comprehensive Lead Hazard Reduction Program as an alternative to the optimal corrosion control treatment and public education requirements of the Lead and Copper Rule. This program is designed based on local lead risk assessment data and recognizes that children are exposed to lead from a variety of sources through variety of pathways. The Program's interventions are targeted to children who are at most risk for lead poisoning and are targeted at those exposure pathways that would have the greatest impact on a child's body-lead burden.

Project's Anticipated Results:

The Lead Hazard Reduction Program is expected to provide greater public health protection from lead exposure in our community, at an equivalent or lower cost, than would be obtained by strict adherence to Lead and Copper Rule requirements.

Contacts:

Rosemary Menard Babette Faris, P.E.

Director, Water Resources Mgmt Water Quality Engineer

Phone: (503) 823-7792 Phone: (503)823-7498

Fax: (503) 823-6133 Fax: (503)823-6133

E-mail: rmenard@water.ci.portland.or.us E-mail: bfaris@water.ci.portland.or.us

NOTES:

1. The lead action level is met if the concentration of lead in at least 90% of standing tap water samples, collected from a group of sites with LCR-specified characteristics, is less than or equal to 0.015 mg/L. Similarly, the copper action level is met if the concentration of copper in at least 90% of samples is less than or equal to 1.3 mg/L.
2. 1st round of monitoring: 90th percentile lead and copper values = 0.044 and 1.8 mg/L 2nd round of monitoring: 90th percentile lead and copper values = 0.053 and 1.3 mg/L
3. Comprised of 9 members of the public representing various community interests
4. Comprised of the 19 managers of water systems purchasing Portland water on wholesale basis
5. By way of comparison, for the city of Portland, the median concentration of lead in standing samples is estimated at 0.006 mg/L and the 90th percentile concentration is estimated at 0.026 mg/L (EES and PWB, 1996).
6. Portland's LCR-required corrosion control study (Montgomery Watson and EES, 1994) indicated that lead and copper concentrations could be minimized in the distribution system by increasing Bull Run water pH from approximately 6.8 to pH 9.0-9.5 and increasing alkalinity from 6-12 mg/L to at least 25 mg/L as CaCO₃.
7. Based on 1) distribution of standing lead levels at customers' taps for LCR-required initial monitoring in 1992 and 2) estimate that LCR-defined optimal treatment (pH 9.0-9.5, alkalinity $\geq$ 25 mg/L as CaCO₃) would reduce lead and copper levels in standing water by 70 and 80 percent, respectively (EES, 1995).



Project XL

You are here: [EPA Home](#) [Office of Policy](#) [OSEM](#) [Historical Information](#) [Industry Partnerships](#) [Project XL](#) [Portland Water Bureau](#) [Letter](#)

Portland Water Bureau (XLC)



November 26, 1997 Letter to Rosemary Menard from David Gardiner

Rosemary Menard, Director
Water Resources Management Group
City of Portland Bureau of Water Works

1120 S.W. 5th Avenue
Portland, OR 97204-1926

Dear Ms. Menard:

On behalf of the United States Environmental Protection Agency, I am writing to thank you for your application to our XL for Communities (XLC) pilot program and to invite you to negotiate a Final Project Agreement. Your proposal for an integrated, risk-based, multi-media approach to lead hazard reduction is consistent with XLC's goal to achieve greater levels of public health protection by providing communities with the flexibility to meet environmental goals in the way that makes most sense locally.

Bringing your proposal to a completed Final Project Agreement is premised on our mutual commitments to the overall objectives of XLC. These include superior environmental results; broad stakeholder participation and support; accountability for results; community capacity building; and innovation and flexibility. EPA expects that the Final Project Agreement, if we are able to agree upon one, will reflect each of these principles, and that they will form the basis for our work together in the coming months. Only the signing of the FPA will constitute acceptance as an XL Communities pilot project.

Our assessment of the appropriateness of this project under the XLC Environmental Results criteria is based in part on the most recent monitoring information regarding the levels of lead and copper in Portland's drinking water. Should those levels increase significantly during any subsequent monitoring, the Agency will evaluate whether the project still meets the criteria for participation in the XLC program. We would, of course, coordinate closely with the City and the State if such an evaluation became necessary.

To focus the negotiations for the Final Project Agreement, we want to draw your attention to several remaining concerns. Specifically, we want to ensure that we have adequate information to evaluate the results of the project. In response to these concerns, my colleagues and I have discussed and agreed upon, in addition to the general principles identified above, several conditions that EPA believes will need to be addressed and resolved to our mutual satisfaction before a Final Project Agreement can be reached.

Briefly these include the following:

Clarifying the Scope of the Home Lead Hazard Reduction Program (HLHRP)

EPA will seek commitments by the Water Bureau to implement, monitor, and evaluate a proactive, preventative program that identifies and addresses housing at high risk for lead paint and dust exposure and to perform more comprehensive lead-abatement measures and maintenance where they are warranted. Also as part of this Program, EPA will seek commitments to ensure that lead management and abatement activities are carried out safely and effectively by trained, and where appropriate, certified personnel with the

necessary insurance.

In order to negotiate the components of the HLHRP, EPA will need additional information on activities underway in Portland. In particular, these activities include: intervention activities that are triggered by the discovery of a lead-poisoned child; HUD support for lead mitigation in Portland; CDC support; and lastly current community-initiated activities related to lead poisoning and the role of XLC in initiating, complementing, and enhancing this activity. EPA also believes it will be crucial to the negotiation process to have the direct involvement of local health service providers. Finally, the FPA should address how savings from the water treatment program and any external funding, including the HUD grant recently awarded to Multnomah County, will be invested in and will enhance the lead abatement and education activities of the HLHRP.

Implementing National Primary Drinking Water Regulations for Lead and Copper

Because the State has approved Portland's current treatment program, we understand that the City is not requesting any regulatory relief from the Lead and Copper Rule's (LCR) corrosion control treatment technique requirements. The Agency has no present intention to challenge Oregon's finding that Portland is in compliance with the treatment requirements of the LCR. Portland and its consecutive water systems will be required to maintain the corrosion control treatment approved by Oregon, and to monitor for lead and copper at the tap and water quality parameters at the locations specified in the rule. Our offer to enter Final Project Agreement negotiations does not endorse regulatory relief from any changes to corrosion control treatment that may be required by the State in the future. Relief or variance from any of these provisions would fall outside of Portland's current XLC proposal and any resulting FPA.

In addition to maintaining the current treatment program, the Final Project Agreement should address the Water Bureau's response to homes at-risk for high levels of lead and copper in drinking water. The FPA should include the Bureau's plan to characterize accurately and adequately tap water lead and copper levels for both wholesale customer water systems and the City of Portland. We would also expect the FPA to address monitoring and mitigation of lead and copper in drinking water for schools and day care facilities consistent with EPA's 1994 Guidance.

Finally, you have requested approval of your approach as a substitute for the public education requirements of the Lead and Copper Rule. It is unclear how your proposal would address the need, in the event lead levels should rise above the action level in the future, for providing system-wide information to the public regarding the risks of lead exposure through drinking water and ways to reduce that exposure. This issue should be discussed during FPA negotiations.

Overall Project Conditions

FPA negotiations will also need to define what level of oversight is appropriate, who those oversight parties are and clearly define success in the performance monitoring and evaluation plan for the LHRP. An important term of the implementing agreement for the project will also be a demonstrated financial commitment to the Lead Hazard Reduction Program for the initial XLC project period and for a negotiated period of time beyond that. In this regard, we expect the City to demonstrate specific budgetary commitments, staffing levels, and performance plans prior to project approval.

Finally, the Agency will seek a commitment that the residents of Portland and the Bull Run service area be fully informed about this project. I know you share our interest in the public's right to understand that the benefits expected from the household abatement program would in part come from the successes achieved through past and ongoing efforts to reduce lead concentrations in drinking water. In this light, we believe that none of the various exposure and risk assessments that have been conducted by Portland and by the Agency are sufficiently accurate to be presented as a basis for this proposed program. While the exposure models used are well documented and capable of providing good approximations of population blood-lead levels, the modeling conducted contains significant uncertainties associated with critical estimates related to exposure throughout Portland to lead paint dust, and highly uncertain assumptions regarding the efficacy of paint lead abatements.

I believe these are reasonable and achievable conditions and goals for our negotiations. EPA will commit staff from the Regional Office and relevant Program Offices to work with you, the State, and the residents of Portland and the Bull Run Service Area to forge an agreement that will be the basis for a project that will

achieve superior public health protection. We believe that this concerted effort, combined with your substantive commitments, creates an excellent opportunity to realize the goals envisioned in your proposal. We look forward to working with you.

Sincerely,

David Gardiner

Assistant Administrator

cc: Grant Higginson, MD, MPH, Oregon Health Division

David Leland, PE, Drinking Water Program, Oregon Health Division

Gary Oxman, MD, MPH, Multnomah County Health Department

Chuck Fox, EPA

Chuck Clarke, EPA Region X

Chuck Findley, EPA Region X

William Glasser, EPA Region X

Wendy Cleland-Hamnett, EPA

Moore-Love, Karla

From: Dee White <deewhite1@mindspring.com>
Sent: Monday, March 06, 2017 3:24 PM
To: Moore-Love, Karla
Subject: Agenda item 215/235 for March 8 PWB contract with Confluence
Attachments: oha-letter-to-pwb-11-4-2016.pdf; Portland Water Bureau wants new approach to cut lead in drinking water _ OregonLive.pdf

Karla,

Please include these documents in the record for this agenda item. Please also send me a receipt that you have received.
THANKS so much.

Dee White

OREGON STATE PUBLIC HEALTH DIVISION
Office of the State Public Health Director

Kate Brown, Governor



800 NE Oregon Street, Suite 930
Portland, OR 97232
Phone: 971-673-1229
Fax: 971-673-1299

November 4, 2016

Mr. Michael Stuhr,
P.E. Administrator
Portland Water Bureau
1120 S.W. 5th Ave., Room 600
Portland OR 97214-1926

Dear Mr. Stuhr:

Thank you for your September 8 proposed schedule to enhance corrosion control treatment and further reduce lead levels at the tap. We have carefully considered your proposal, conferred with experts at EPA, and appreciate your clarifying of issues and questions during our evaluation process. We appreciate the steps the Bureau has taken to improve corrosion treatment. Portland needs to take additional immediate steps to reduce levels of lead in drinking water. Given the known elevated lead levels at some taps in the Portland water service area, we direct the Bureau to take the following interim actions take to further protect public health as it implements the corrosion control treatment improvement schedules committed to and described in this communication:

1. **Increase corrosion treatment using current facilities:** We expect the Bureau to move quickly to further reduce lead levels at the tap as much as possible using the existing treatment and water system facilities. While we agree that Portland must upgrade its water treatment facilities and infrastructure to achieve significant reductions in lead levels, there are short-term steps Portland must take within its current system to treat water and reduce lead. We expect the Bureau to submit a plan to OHA for interim lead reduction by December 2, 2016. This interim plan should include immediate steps and intermediate steps to reduce lead in drinking water. We then expect the Bureau to fully implement an OHA-approved plan as quickly as possible and report on deadlines.
2. **Implement changes in Lead Hazard Reduction Program to protect vulnerable populations:** We expect the Bureau to aggressively conduct, assess, and improve the components of the Lead Hazard Reduction Program: 1) water treatment, 2) free lead in water education and testing, 3) public outreach and education, and 4) lead hazard reduction. The bureau must focus its efforts on vulnerable populations such as pregnant women and children under the age of six. We also expect the Bureau to aggressively and fully implement any recommendations identified by OHA Program Design and Evaluation Services in its evaluation of program elements by December 31, 2017. The Bureau must increase reporting to OHA on status, changes and improvements in the Lead Hazard Reduction Program to quarterly from semi-annually.

We recognize the efforts the Bureau is making to evaluate the impact of corrosion treatment and plan for the construction of a new water treatment facility, which is necessary to make significant and systematic reductions of lead in Portland's drinking water. The Bureau took the first step in this process in spring 2014, when it initiated the water quality corrosion study which is currently underway, and which you have been updating OHA and EPA on its progress. OHA looks forward to reviewing this study when it is completed, no later than July 1, 2017.

We concur with the Bureau's corrosion control treatment improvement schedule as proposed. The action steps of the schedule are listed below with completion dates.

Action Step	Completion Date
Complete Water Quality Corrosion Study	June 1, 2017
Review study data and agree with OHA on treatment options; submit recommendation to City Council for consideration	June 30, 2017
Submit Water Quality Corrosion Study final report to OHA	July 01, 2017
Submit Corrosion Control Treatment Pilot Study Plan to OHA	September 30, 2017
Submit Corrosion Control Treatment Pilot Study results and treatment	December 31, 2018
Begin Improved Corrosion Control Treatment Facility Design	January 01, 2019
Submit Improved Corrosion Control Treatment Plans and Specifications to OHA	September 30, 2020
Begin Corrosion Control Treatment Facility Construction	January 01, 2021
Complete Improved Corrosion Control Treatment Facility	September 30, 2022
Complete demonstration tap monitoring round	November 30, 2022
Comply with Minimum Water Quality Parameters	March 01, 2023

OHA considers the above a compliance schedule. Steps, due dates, and completion dates will be posted and tracked on the Drinking Water Services website. Any modification requires OHA approval in advance, should unforeseen technical or permitting delays occur.

If you have questions, please contact me.

Sincerely,



Lillian Shirley, BSN, MPH, MPA
Public Health Director
Oregon State Public Health Division

Cc: Lynne Saxton, Director, Oregon Health Authority
Jere High, Administrator, Center for Prevention and Health Promotion

Portland Water Bureau wants new approach to cut lead in drinking water



By [Jessica Floum](#) | [The Oregonian/OregonLive](#)

[Email the author](#) | [Follow on Twitter](#)

on February 23, 2017 at 7:43 PM

The Portland Water Bureau will ask the Portland City Council next week to approve a pilot program that would treat the city's drinking water for corrosion to reduce water customers' exposure to lead.

Portland's water from the Bull Run watershed has a low enough pH level that it can leach lead from old pipes and fixtures. Adding chemicals that don't harm human health can make the water less corrosive.

The decision to try doing that comes after the [Environmental Protection Agency](#) instructed Portland to review its lead-prevention efforts, the state [ordered](#) the city to come up with a plan to immediately reduce lead levels in drinking water and [an Oregonian/OregonLive investigation found](#) that regulators turned a blind eye to Portland's lead problems.

Federal regulators require water providers to ensure lead levels remain at or below 15 parts per billion. Portland [exceeded that measurement 10 times](#). It [exceeded federal standards](#) for amounts of lead in drinking water at least twice in three years.

"Exceedances of the federal action level for lead in water in Fall 2013 and Fall 2016, have highlighted the need for further treatment," bureau officials wrote in a press release Thursday.

The bureau's treatment program pilot aims to adjust the water's pH level, which is commonly done by adding sodium carbonate and CO₂. Treating the water is less expensive than replacing home plumbing, an option the water bureau says does not meet a federal Lead and Copper rule anyway.

"Improved treatment will provide all customers with any sources of lead in their household plumbing equal access to its benefits at a fraction of the cost," a report sent to stakeholders from the water bureau said.

Such treatment could change the "feel" of the water, the report said.

"We have begun to reach out to many of our large users such as breweries, manufacturers, bakeries, dialysis clinics and bottlers to inform them of the potential changes," the report said. "So far the potential impacts are not expected to significantly impact their operations."

If the city approves the enhanced treatment program, it could take as long as 5 1/2 years for the water bureau to put the program into place.

LEAD IN WATER

Portland Water Bureau changes approach to treating lead in water

Portland Water Bureau wants new approach to cut lead in drinking water

How can Portland cut lead levels in drinking water? EPA offers clues

Portland school board faces uphill battle with trust

Was Portland's lead crisis preventable?

All Stories

--Jessica Floum

jfloum@oregonian.com

503-221-8306

Registration on or use of this site constitutes acceptance of our **User Agreement** and **Privacy Policy**

© 2017 Oregon Live LLC. All rights reserved (**About Us**).

The material on this site may not be reproduced, distributed, transmitted, cached or otherwise used, except with the prior written permission of Oregon Live LLC.

Community Rules apply to all content you upload or otherwise submit to this site.

Ad Choices

Moore-Love, Karla

From: Dee White <deewhite1@mindspring.com>
Sent: Monday, March 06, 2017 3:33 PM
To: Moore-Love, Karla
Subject: Agenda item 215/235 for March 8 PWB contract with Confluence
Attachments: 00657 Compliance and Enforcement Schedules _ Data Online _ Oregon Drinking Water Services.pdf; 00657_20161104_ic.pdf

Karla,

Please include these documents in the record for this agenda item. Please also send me a receipt that you have received.
THANKS so much.

Dee White

[Introduction](#) :: [Data Search Options](#) :: [WS Name Look Up](#) :: [WS ID Look Up](#) :: [DWS Home](#) :: [Quick Data Links](#)**PWS ID: 00657 --- PORTLAND WATER BUREAU****Compliance and Enforcement Schedules****Schedule Type:** All Groups**Schedule Status:** Open Schedules

Type of Action	Date Issued	Due Date	Closed Date
Other Compliance Schedule	Jan 24, 2017		Open
Other Compliance Schedule	Nov 04, 2016		Open
Submit a plan to OHA for interim lead reduction		Dec 02, 2016	Dec 02, 2016
Complete Water Quality Corrosion Study		Jun 01, 2017	
Review study data and agree with OHA on treatment options; submit recommendation to City Council for consideration		Jun 30, 2017	
Submit Water Quality Corrosion Study final report to OHA		Jul 01, 2017	
Submit Corrosion Control Treatment Pilot Study Plan to OHA		Sep 30, 2017	
Implement recommendations to improve the lead hazard reduction program elements as identified by OHA		Dec 31, 2017	
Submit Corrosion Control Treatment Pilot Study results and treatment		Dec 31, 2018	
Begin Improved Corrosion Control Treatment Facility Design		Jan 01, 2019	
Submit Improved Corrosion Control Treatment Plans and Specifications to OHA		Sep 30, 2020	
Begin Corrosion Control Treatment Facility Construction		Jan 01, 2021	
Complete Improved Corrosion Control Treatment Facility		Sep 30, 2022	
Complete demonstration tap monitoring round		Nov 30, 2022	
Comply with Minimum Water Quality Parameters		Mar 01, 2023	

For all compliance errors please phone Brad Daniels, DWS Compliance Specialist, at 971-673-0405.



Nick Fish, Commissioner
Michael Stuhr, P.E., Administrator

1120 SW 5th Avenue, Room 600
Portland, Oregon 97204-1926
Information: 503-823-7404
www.portlandoregon.gov/water



December 2, 2016

Lillian Shirley
Public Health Director
Oregon Health Authority
Portland State Office Building
800 NE Oregon St., Suite 930
Portland, Oregon 97232-2162

RE: Interim Lead Reduction Plan and Lead Hazard Reduction Plan Changes

Dear Ms. Shirley,

Thank you for your November 4 letter approving our proposed schedule to implement enhanced corrosion control treatment. As always, we appreciate your thoughtful engagement and our shared commitment to protecting public health.

We have reviewed your letter and the suggested interim treatment measures and changes to the Lead Hazard Reduction Program (LHRP) carefully. Our response includes a brief system overview to provide context for the proposed measures, our proposed plan, and potential opportunities to shorten our approved compliance schedule.

Upon Oregon Health Authority's (OHA) approval, we will begin implementation of the individual plan components in accordance with the schedule identified.

We look forward to continuing our collaborative partnership with OHA, and to receiving your approval of the attached plan so that we can begin implementation.

Sincerely,



Michael Stuhr, P.E.
Administrator

Interim Corrosion Treatment and Lead Hazard Reduction Program Changes

2 December 2016

Page 2

Cc: Lynne Saxton, Director,
Oregon Health Authority

Jere High, Administrator, Center for Prevention and Health Promotion
Oregon Health Authority

Dave Leland, Drinking Water Program Manager
Oregon Health Authority

Dan Opalski, Office of Water and Watersheds
EPA Region 10

Nick Fish, Commissioner
City of Portland

Interim Lead Reduction Plan

Prepared by Portland Water Bureau

December 2, 2016

1. Introduction

The Portland Water Bureau (PWB) is committed to reducing all customers' exposure to lead in water at the tap. Consistent with the commitment we made in 2002, PWB is following through with implementation of agreed-to corrosion control treatment modifications. Recently, there have been significant changes to PWB's system, including the disconnection of the uncovered finished water reservoirs and a new multiple-level intake structure. Additionally, the scientific community has an increased understanding of the health effects of low-level exposure to lead. Therefore, PWB is proceeding with the steps included in the Corrosion Control Treatment Compliance Schedule approved by Oregon Health Authority (OHA) on November 4, 2016. PWB is also committed to implementing the interim actions proposed in this plan.

2. Background

Portland's primary drinking water source is the highly protected Bull Run Watershed, the largest water supply in Oregon. As an unfiltered surface water supply, the water parameters of our source water vary seasonally. The raw water pH is approximately 7 and the alkalinity ranges from 5-12 mg/L throughout the year. Portland also has a secondary groundwater source, which is used as an alternative supply when the Bull Run is shut down. It is used during turbidity events, as augmentation supply during hot and dry summers, and seasonally as the wells are brought online for an annual maintenance run.

With an unfiltered system and pristine water source, treatment of the Bull Run source is relatively simple. It consists of a primary disinfectant of free chlorine added at the Headworks facility in the watershed, followed by the addition of ammonia to form chloramines at the Lusted Hill Treatment Facility. At Lusted Hill, sodium hydroxide is also added as a corrosion control treatment to raise the pH at the distribution system entry point to 8.0. When groundwater is used, it is treated for corrosion control to match the Bull Run source.

Portland is fortunate that, unlike many American cities, lead service lines were never installed on either side of the meter, and PWB removed all known lead pigtails (2-3-foot service connections) from its system almost 20 years ago.

In Portland, the primary source of lead in water is not from the water distribution system. Rather, it is from a small subset of home plumbing—either copper pipes with lead solder or from brass plumbing fixtures. Copper plumbing with lead solder is mainly found in homes built or plumbed between 1970 and 1985. About ten percent of Portland’s housing stock was built during this timeframe and could potentially have this type of plumbing. In 1985, Oregon and then Congress banned the use of lead solder. In 2014, the amount of lead in plumbing fixtures was limited to 0.25%.

In 1994, in compliance with the Lead and Copper Rule (LCR), PWB conducted an Optimized Corrosion Control Treatment (OCCT) study. The study recommended raising the pH of the water to 9.0 and alkalinity to 20 mg/L.

In collaboration with the Oregon Health Division (Drinking Water Section and Environmental Epidemiology Section); the Multnomah, Washington and Clackamas County Health Departments; and the Oregon Childhood Lead Poisoning Prevention Program, PWB proposed a comprehensive Lead Hazard Reduction Program (LHRP) as an alternative to optimized corrosion control treatment requirements of the LCR. This program is based on local risk assessment data from state and county health departments, and recognizes that children are exposed to lead mainly from lead-based paint and dust. The program incorporates established best practices to target children who are most at risk for lead poisoning. These interventions were expected to have a greater public health protection from lead exposure in Portland’s community than treatment alone.

The LHRP is a comprehensive lead reduction program. It includes four components:

1. Water treatment (currently raising the distribution system entry point pH to 8.0) and monitoring water quality parameters quarterly and at Tier 1 homes (those with verified lead solder in plumbing) twice a year.
2. Lead-in-water education and testing with free lead-in-water tests available to all Portland and wholesale customers.
3. Public education and community outreach on all sources of lead.
4. A home lead hazard control program which focuses on lead paint remediation in homes.

The US Environmental Protection Agency (EPA) delegated authority for oversight of drinking water regulations to OHA, which continues to be PWB’s primacy agency. Since 1997, OHA has approved the LHRP as equivalent OCCT because of its broader public health approach.

The 1994 OCCT study estimated that Portland’s compliance lead levels, collected at Tier 1 homes with verified lead solder in plumbing, would be reduced by 70-85% from pre-treatment levels by treating to pH 9.0 and alkalinity 20 mg/L. With the current treatment (pH of 8.0), Portland has seen significant – up to 70% – reductions in lead levels at these worst-case homes. Additional treatment is expected to provide further reductions in lead levels.

PWB currently partners with 12 of its wholesale systems to sample more than 100 Tier 1 homes through a Joint Monitoring Plan (JMP). Due to changes in sources of supply in some wholesale systems over the years, the JMP is currently being revised. It will be incrementally altered in the spring of 2017 and again in the fall of 2017. The final JMP will include only systems that use PWB's water as their sole source of supply.

Since increasing the target pH to 8.0 in April 2005, PWB has exceeded the lead action level of 15 parts per billion (ppb) in Fall 2006 (90th percentile of 17 ppb), Fall 2013 (90th percentile of 16 ppb), and most recently in Fall 2016 (90th percentile of 17 ppb). Over the same time period, 18,791 customer-submitted samples from homes all over the PWB service area had a 90th percentile of 5 ppb.

In 2014, in anticipation of changes to the water system, PWB secured funding to begin a water quality corrosion study.

A yearlong sampling effort has been completed and the data collected will provide further information regarding the mechanisms of lead release in PWB's system. A Request for Proposals (RFP) for a corrosion control treatment pilot study has been issued and it is anticipated the study will begin in Spring 2017.

3. Interim Plan Components

3.1. Overview

OHA's November 4, 2016 letter requested an interim plan using existing treatment and water system facilities to further reduce lead in drinking water. PWB met with representatives from OHA on November 10, 2016, to receive additional guidance.

PWB also received written guidance from EPA on November 10, 2016 and met with representatives from the US EPA, EPA Region 10, and OHA on November 21, 2016 regarding expectations for an interim plan. All parties reiterated a commitment to the overarching objective under the LCR of minimizing lead exposure at customer taps.

EPA clarified several interim measures at the November 21 meeting. PWB's proposed action items are described in detail below and incorporates EPA's suggested measures (listed in *italic* at the beginning of each section).

3.2. Action Items

3.2.1. Conduct Comprehensive Corrosion Control Treatment Study

A comprehensive corrosion control treatment study that evaluates the effectiveness of each of the following treatments: (i) alkalinity and pH adjustment, (ii) Calcium hardness adjustment; and (iii) Phosphate or silicate based corrosion inhibitor.

PWB is beginning a comprehensive corrosion control treatment pilot study to evaluate the effectiveness of various corrosion control treatments including alkalinity and pH adjustment; calcium hardness adjustment; and phosphate- or silicate-based corrosion inhibitors. The results of the pilot study will be used to recommend optimized corrosion control treatment for full-scale implementation. An RFP for the pilot study is currently out for bid; proposals are due in December 2016. PWB anticipates selecting a consultant in January 2017 and issuing a Notice to Proceed (NTP) to the selected consultant in March 2017 following City Council approval. An 18-month pilot study, per EPA's OCCT Technical Guidance Manual (2016), is planned with anticipated completion in summer 2018.

3.2.2. Raise pH from 8.0 to 8.2

PWB's existing facility should raise the pH from (8) to pH (8.2).

As previously noted, the current pH target at Lusted Hill (the entry point to the distribution system) is 8.0. Raising the pH above 8.0 reduces theoretical lead solubility and may result in a decrease in lead at customer taps. The pH target at Lusted Hill will be raised from pH 8.0 to pH 8.2. To avoid unintended adverse impacts to water quality, this pH change will be made incrementally as recommended in EPA's OCCT Technical Guidance Manual (2016). The pH target at Lusted Hill will initially be increased by 0.1 pH units, or to 8.1, and maintained until collection of Spring 2017 LCR Tier 1 home sampling in May 2017. Following review of Spring 2017 LCR results with OHA, the pH target at Lusted Hill will be further increased to 8.2. This pH increase to 8.2 will be made no later than July 1, 2017 and maintained until implementation of modified corrosion control treatment as recommended by the corrosion control pilot study.

Prior to any changes in treatment, PWB provides notice to wholesale customers. Upon OHA's approval of the above pH increase, PWB will issue the notice to wholesale customers and increase the pH target at Lusted Hill to 8.1 within 14 days of OHA's approval.

3.2.3. Manage Water Age

Comprehensive water age management plan including (a) storage tank drain/fill practices to reduce water age; (b) ongoing unidirectional and hot spot (high water age or high lead tap) flushing program.

Reducing water age can improve water quality by stabilizing/increasing the chlorine residual as well as reducing nitrification. PWB actively manages water age in the distribution system through a variety of techniques including the following: a robust nitrification monitoring and action plan, taking distribution system storage tanks out of service seasonally, deep cycling storage tanks, adding mechanical mixers to decrease stratification, lowering storage tank levels, adjusting regulator levels, installing new regulators to change the water supply into an area, draining/cleaning storage tanks ahead of schedule if dictated by water quality, and conventional and unidirectional flushing.

In addition, PWB will prepare a water age management plan that documents these practices within 90 days of OHA's approval of the proposed plan. As part of this process, PWB will identify whether additional steps can be taken to decrease water age in the system, and if so, will implement these practices.

3.2.4. Target Flushing and Public Education and Outreach Based on Investigative Sampling

Use current LCR tap sampling results as a basis for an investigative sampling program to identify problem areas (age, construction) to target flushing, public education and outreach and prioritize LSL (lead service line) replacement, if applicable.

While results from PWB's water quality corrosion study indicate that elevated lead levels are not geographically concentrated, within 90 days after approval of this plan PWB will further evaluate current LCR tap sampling results to identify whether problem areas exist. If so, targeted investigations will determine appropriate mitigations.

PWB's education and outreach program is extensive and targets risk factors, including age of home as well as presence of children/pregnant women in the home. If lead results from either an LCR home or a voluntary customer sample exceed 15 ppb, PWB staff call those customers directly to discuss the results and steps that can be taken to reduce lead levels at the tap (including flushing residential premise plumbing). Follow-up sampling is also offered.

PWB does not have lead service lines on either side of the meter, and therefore does not have a lead service line replacement program.

3.2.5. Target Flushing and Investigative Sampling Based on Water Quality Complaints

Tracking of customer water quality complaints to identify problem areas for flushing and investigative sampling.

PWB has a customer water quality complaint tracking system, used to identify areas for flushing as well as follow-up investigative sampling (if needed). Similar to section 3.2.4, if problem pocket areas are identified, targeted investigations/mitigations will be employed. PWB will expand the investigative sampling program, particularly with regard to turbidity, color, and metallic taste and odor complaints.

3.2.6. Homeowner Incentives

Accelerate and provide incentives, such as homeowner subsidy, for lead service line (LSL) or premise plumbing replacement if/where applicable.

As stated above, PWB does not have lead service lines, and therefore does not have a lead service line replacement program.

We understand EPA may allow potentially allow service line and premise plumbing replacement to be eligible for Drinking Water Revolving Loan Funds. In 2017, PWB will work with EPA and OHA to investigate the feasibility of a program to help customers replace plumbing or fixtures that contain lead. If a feasible program is identified and adopted by federal or state agencies, PWB will be a full partner in promoting the program as widely as possible to its customers.

3.2.7. Establish Interim Water Quality Parameters (WQPs)

State sets additional interim WQPs (authority under 141.82 (h)) such as pH, alkalinity, and LSI (Langelier Saturation Index).

WQP samples are collected as part of the LCR sampling program and analyzed for pH and alkalinity. Since PWB is proposing changing the target pH entering the distribution system, it is prudent to also adjust the existing minimum WQP levels. PWB will work with OHA to revise WQP levels.

3.2.8. Increase Unidirectional Flushing and Encourage Premise Plumbing Flushing

In addition to the above steps, PWB is currently engaged in the following activities to adjust water quality in the distribution system and increase education/outreach regarding lead in water.

Flushing Study and Increased Unidirectional Flushing

Unidirectional flushing can decrease nitrification and other microbial growth, which can be factors in lead release. There is also ongoing work in the water industry evaluating the effects of high-velocity flushing on the removal of particulate lead from premise plumbing.

PWB is working with Seattle Public Utilities and the Water Research Foundation to develop unidirectional flushing guidance for the water industry. Through this study, PWB will identify adjustments that can be made to the existing unidirectional flushing program to more effectively improve water quality. Starting in FY 2017, PWB plans to add a staff position to the unidirectional flushing program to increase the amount of flushing that can be completed.

Outreach/Education on Flushing Premise Plumbing

Flushing of premise plumbing by customers is an easy and effective method to reduce lead levels at the customer tap. As part of its existing education program, PWB encourages all customers to flush their premise plumbing after water has been standing for an extended period of time. PWB has documented up to 90% reduction in lead levels between standing and running (flushed) samples. If elevated lead levels are found in standing samples, PWB offers follow-up test kits for both standing and running samples. This provides customers with actual results from their own tap showing how flushing can dramatically decrease lead levels. PWB will continue to conduct outreach and education on the importance of flushing premise plumbing.

3.2.9. Implement Changes in Lead Hazard Reduction Program (LHRP) to Protect Vulnerable Populations

For over 20 years the LHRP has targeted education and outreach about reducing lead exposure from all sources to those most vulnerable, with a focus on children under six and pregnant women. PWB will continue these activities and assess the four components of the LHRP, as outlined below, as part of its efforts to continuously improve the program's effectiveness.

Water Treatment and Monitoring: As outlined above, in the short term, PWB will be increasing the distribution system entry point target to 8.2 and working with OHA to revise water quality parameters.

Free Lead-in-Water Education and Testing: PWB offers education and free lead-in-water testing to all retail and wholesale customers. In annual utility bill inserts, in the Consumer Confidence Report, and through targeted outreach in multiple languages, PWB offers information about easy steps to reduce exposure to lead in water and encourages customers, especially those most at risk, to test their water for lead. On average, over 3,000 customers

request a lead in water test each year. All customers are provided their results, and additional information, by mail. Additionally, customers with high results receive phone calls and are offered follow up testing to provide additional information on how to reduce lead levels at the tap. PWB is also working with district schools, daycares, and other facilities that serve young children and pregnant women to offer free lead testing and technical assistance.

In addition to existing efforts to notify those most at risk for lead in water through on-going and lead action level exceedance-required activities, PWB will work with the Multnomah County Health Department and OHA's Lead Poisoning Prevention Program to expand outreach out to those most vulnerable.

Public Outreach and Education: PWB funds community partners to educate the public about the risks of lead exposure from all sources through a variety of mechanisms. Partner funding supports activities such as lead poisoning prevention workshops, hotlines, soil testing, blood lead level testing, and investigations of elevated blood lead level cases. These activities are all focused on reaching those most vulnerable to exposure from all sources of lead, particularly the lead paint and dust found in many homes throughout Portland and regional water system service areas. As described in OHA's November 4, 2016 letter, PWB is working with OHA's Program Design and Evaluation Services to evaluate the LHRP's education and outreach component. The recommendations of this evaluation will be used to guide any modifications to that component, which will be implemented by December 31, 2017. Additionally, PWB will continue to work with our partners, including OHA's Lead Poisoning Prevention Program, to identify improvements, while also seeking new community partners that can better reach those most at-risk.

Home Lead Hazard Reduction: Because exposure to lead paint and dust is the greatest source of childhood lead exposure in Portland, PWB collaborates with the Portland Housing Bureau on the Lead Hazard Control Program, which is funded by a Housing and Urban Development Agency (HUD) grant. This program provides funding to low-income residents with a young child to reduce lead-based paint hazards from the home. PWB will work with the Housing Bureau to identify and implement potential improvements to the Lead Hazard Control Program while continuing to meet the requirements of the HUD grant requirements.

Reporting: PWB will increase reporting to OHA on status, changes, and improvements to the LHRP from semi-annually to quarterly. These reports will include updates on the interim actions of this plan.

4. Other Considerations

EPA provided PWB with one written suggestion regarding chemical feed systems within the distribution system:

Temporary chemical feed systems at storage tanks and pump stations with focus on pH stabilization and alkalinity.

As discussed in the November 21, 2016 meeting, temporary feed systems at select distribution system sites would not be an appropriate strategy for reducing lead levels in PWB's system. This approach would not allow PWB to thoughtfully evaluate and address potential impacts resulting from a treatment change, which appears contrary to recommendations in EPA's OCCT Technical Guidance Manual (2016). Additionally, PWB has issued an RFP for a treatment pilot project, and those proposals are due in December 2016. Adding chemicals that have not been tested in the system is not recommended and could cause unintended consequences.

Further, having temporary chemical feed systems in unstaffed facilities greatly increases the potential for chemical feed issues (over- or under-dosing); distribution systems can take weeks/months to re-equilibrate after a chemical feed issue. Ultimately, PWB's distribution system is quite complex, composed of 180 pressure zones, 70 storage tanks, 39 pump stations and approximately 2,200 miles of distribution system pipeline. From PWB's water quality corrosion study, it appears that elevated lead homes are not geographically concentrated. Treatment only at certain locations instead of at the treatment plant would only affect customers served by those pressure zones.

5. Schedule Update

As noted above, an RFP for the corrosion control pilot study is currently out for bid. PWB is currently scheduled to begin the study in March 2017, before the approved date of July 2017. We anticipate completing the 18-month study in summer of 2018. Consistent with the agreed-upon schedule, this accelerated schedule may allow design work to begin as early as January 2018. In preparation for a shortened pilot study, PWB will issue an RFP for the treatment design in 2017, with plans to have a design consultant selected and under contract by December 2017.

PWB remains committed to implementing increased corrosion control within OHA's compliance schedule and will work with the selected pilot study and design consultants to identify opportunities for further schedule acceleration.

OREGON STATE PUBLIC HEALTH DIVISION
Office of the State Public Health Director

Kate Brown, Governor



800 NE Oregon Street, Suite 930
Portland, OR 97232
Phone: 971-673-1229
Fax: 971-673-1299

November 4, 2016

Mr. Michael Stuhr,
P.E. Administrator
Portland Water Bureau
1120 S.W. 5th Ave., Room 600
Portland OR 97214-1926

Dear Mr. Stuhr:

Thank you for your September 8 proposed schedule to enhance corrosion control treatment and further reduce lead levels at the tap. We have carefully considered your proposal, conferred with experts at EPA, and appreciate your clarifying of issues and questions during our evaluation process. We appreciate the steps the Bureau has taken to improve corrosion treatment. Portland needs to take additional immediate steps to reduce levels of lead in drinking water. Given the known elevated lead levels at some taps in the Portland water service area, we direct the Bureau to take the following interim actions take to further protect public health as it implements the corrosion control treatment improvement schedules committed to and described in this communication:

1. **Increase corrosion treatment using current facilities:** We expect the Bureau to move quickly to further reduce lead levels at the tap as much as possible using the existing treatment and water system facilities. While we agree that Portland must upgrade its water treatment facilities and infrastructure to achieve significant reductions in lead levels, there are short-term steps Portland must take within its current system to treat water and reduce lead. We expect the Bureau to submit a plan to OHA for interim lead reduction by December 2, 2016. This interim plan should include immediate steps and intermediate steps to reduce lead in drinking water. We then expect the Bureau to fully implement an OHA-approved plan as quickly as possible and report on deadlines.
2. **Implement changes in Lead Hazard Reduction Program to protect vulnerable populations:** We expect the Bureau to aggressively conduct, assess, and improve the components of the Lead Hazard Reduction Program: 1) water treatment, 2) free lead in water education and testing, 3) public outreach and education, and 4) lead hazard reduction. The bureau must focus its efforts on vulnerable populations such as pregnant women and children under the age of six. We also expect the Bureau to aggressively and fully implement any recommendations identified by OHA Program Design and Evaluation Services in its evaluation of program elements by December 31, 2017. The Bureau must increase reporting to OHA on status, changes and improvements in the Lead Hazard Reduction Program to quarterly from semi-annually.

We recognize the efforts the Bureau is making to evaluate the impact of corrosion treatment and plan for the construction of a new water treatment facility, which is necessary to make significant and systematic reductions of lead in Portland's drinking water. The Bureau took the first step in this process in spring 2014, when it initiated the water quality corrosion study which is currently underway, and which you have been updating OHA and EPA on its progress. OHA looks forward to reviewing this study when it is completed, no later than July 1, 2017.

We concur with the Bureau's corrosion control treatment improvement schedule as proposed. The action steps of the schedule are listed below with completion dates.

Action Step	Completion Date
Complete Water Quality Corrosion Study	June 1, 2017
Review study data and agree with OHA on treatment options; submit recommendation to City Council for consideration	June 30, 2017
Submit Water Quality Corrosion Study final report to OHA	July 01, 2017
Submit Corrosion Control Treatment Pilot Study Plan to OHA	September 30, 2017
Submit Corrosion Control Treatment Pilot Study results and treatment	December 31, 2018
Begin Improved Corrosion Control Treatment Facility Design	January 01, 2019
Submit Improved Corrosion Control Treatment Plans and Specifications to OHA	September 30, 2020
Begin Corrosion Control Treatment Facility Construction	January 01, 2021
Complete Improved Corrosion Control Treatment Facility	September 30, 2022
Complete demonstration tap monitoring round	November 30, 2022
Comply with Minimum Water Quality Parameters	March 01, 2023

OHA considers the above a compliance schedule. Steps, due dates, and completion dates will be posted and tracked on the Drinking Water Services website. Any modification requires OHA approval in advance, should unforeseen technical or permitting delays occur.

If you have questions, please contact me.

Sincerely,



Lillian Shirley, BSN, MPH, MPA
Public Health Director
Oregon State Public Health Division

Cc: Lynne Saxton, Director, Oregon Health Authority
Jere High, Administrator, Center for Prevention and Health Promotion

