Comments on the Portland Harbor Superfund Site Cleanup
To the
National Remedy Review Board and
Contaminated Sediment Technical Advisory Group
from
Portland Harbor Community Advisory Group
October 19, 2015

Introduction

These comments are submitted to the National Remedy Review Board (NRRB) by the Portland Harbor Community Advisory Group (CAG) regarding the EPA remediation options for the Portland Harbor Superfund Site. The CAG appreciates the opportunity to submit these comments and provide the community perspective on cleanup of our river, our resources, our community. Our comments introduce the CAG, present technical issues concerning the remedial options and provide the community perspective on various aspects of the cleanup. We have reviewed the Feasibility Study (FS) and received briefings from EPA regional staff and from our own technical advisor.

These comments provide detail on a number of key issues of community concern regarding the cleanup of contaminated sediments in the lower Willamette River and the long term viability of the final remedy. It is unacceptable that even the most aggressive remedy, described by EPA as Alternative G in the FS is not sufficient to satisfy requirements of the Clean Water Act.

We are deeply concerned that those entities responsible have spent considerable time, energy and funds to undermine the cleanup effort and thwart attempts by the CAG and EPA to achieve a successful remedy.

The Portland Harbor Community Advisory Group (CAG)

We are members of the Portland community, both representing organizations and here as individuals. We are the people who live closest to the river and who will be living with the remedy. After some of the businesses have left Portland, our families and our grandchildren will remain to experience the work we have all done together on this site.

Organizations Represented on the CAG either now or in the past are:
Audubon Society of Portland
Cathedral Park Neighborhood
Environmental Justice Action Group
Linnton Neighborhood Association
Northwest Industrial Neighborhood
North Portland Odor Abatement Committee
Northwest Toxic Communities Coalition
Oregon Bass & Panfish Club
Oregon State Public Interest Research Group (OSPIRG)

Portland Harbor Community Coalition which includes:
- American Indian Movement (AIM: Portland Chapter)
- Asian Pacific American Network in Oregon (APANO)
- Czech School of Portland
- East European Coalition
- Groundwork Portland
- Iraqi Society of Oregon
- Lideres Verde
- Oregon AFSCME
- Portland Youth and Elders Council
- Right 2 Survive
- Wiconi International
- Wisdom of the Elders

Sierra Club
St. Johns Neighborhood Association
University Park Neighborhood
Willamette Riverkeeper

Before the lower Willamette River was listed as a superfund, one of the nation's most contaminated sites, CAG members were concerned about its health. The river is an integral part of our community, providing recreation, food through fishing, an attraction for development and visitors and builds our identity as a gateway to nature. We take seriously the goal of a long-term remedy meant to last into future centuries and recognize this process as a unique opportunity. We have persevered though this overly-long process for more than ten years despite stalling by polluters, external pressures and the challenges of bringing together a very diverse community. Now it is finally time for the community to be heard.

CAG meetings have included presentations from EPA, Lower Willamette Group, Oregon DEQ, Oregon Department of Geological and Mineral Industries, Metro, Oregon Health Authority, City of Portland, US Coast Guard, Army Corps of Engineers, Division of State Lands, site updates from PRPs, technology presentations from cleanup service providers, professors from Oregon State University and the University of Washington, and presentations from community groups. We have reached out to numerous groups and organizations, plus hundreds of individuals who have attended the CAG meetings over the last 14 years (see Attachments for details). Now the EPA regional office comes to the NRRB and CSTAG with a conceptual plan for cleaning up our river.

While there is general consensus among the CAG on these comments, we include a broad array of opinions from a diverse group of interests. Not every point in these comments is fully agreed upon by every group, but this document works to express the consensus of the CAG members. The following is a summary of key issues raised in these comments:

- Even the most aggressive clean-up option(G) is insufficient to achieve the health and ecological goals of the community and required by law. The CAG favors a

more vigorous cleanup than Alternative G, we refer to this alternative as G+, a more protective and permanent remedy;

- The CAG does not support remedies that leave extensive amounts of contaminated materials in the river including over-reliance on Monitored Natural Recovery (MNR) and use of Confined Disposal Facilities (CDFs) ;
- We support the use of effective alternative treatment technologies for dredged contaminated sediment and for in situ treatment when available;
- EPA needs to require monitoring during dredging operations to ensure that the health of our communities and river is not compromised during operations on the river;
- Source control is a critical component, which requires assurances of effectiveness, even if under the jurisdiction of the state of Oregon;
- The remedy needs to be designed to withstand a Cascadia Subduction Zone earthquake, meaning a level 9 earthquake;
- The remedy must ensure that public trust values are preserved including opportunities to restore the ecology of the river and improve recreational access.
- It is critical that EPA allow sufficient time for public notice and comment on whatever remedy is selected following the assessment of the Remedy Review Board.

Getting it right is the most important criterion. The options that EPA has put forward in the Feasibility Study (FS) include a range of methods and approaches, some of which are simpler and less costly. The CAG and other members of the community have repeatedly expressed the desire to have this remediation completed the right way this time, and not have lingering issues, problems or threats of failure that have plagued other CERCLA sites. We greatly stress that while timely completion and controlling costs are important, we do not want pressure for cheap and fast to override the need to get it done right!

Technical Issues

1) We favor maximum removal of contamination from Portland Harbor because of the level of permanence and assurance that removal provides. Contamination left behind is subject to re-exposure by flood, geological events or navigational accidents and so poses an ongoing risk to human health and the environment. Even the most aggressive clean-up alternative (Alternative G) is not sufficient to reach “clean” goals, meet the requirement of the law, and would leave our communities and environment at a high level of risk for generations to come. All of the options rely far too heavily on approaches such as monitored natural recovery (MNR) that leave contamination in place across most of Portland Harbor (Alt G for example relies on MNR across more than 60% of the Superfund Site), unreliable institutional controls, and fail to provide credible evidence that compliance with Applicable Relevant and Appropriate Requirements (ARARs) will be achieved. The end result of any of the options would be that our river would remain severely contaminated, our communities, especially our most vulnerable underserved communities, would remain at risk for generations, fish and wildlife populations would continue to experience significant risk of exposure and

bioaccumulation, and access to the river would remain restricted. The community has already lived with decades of contamination and persevered through 15 years of the Superfund process. It is time now to move forward with effective, vigorous, long term clean-up strategies that place a significantly higher priority on removing contaminants from our river,. We call on EPA to implement a more aggressive plan that we refer to as Alternative G+, described in more detail in an ensuing section. This alternative will reduce the acreage of MNR from that in Alternative G, reduce the extent of capping and increase the amount of surface contamination removed.

2) Source control is necessary for success, throughout the Portland segment of the site, but also upriver. The final alternative needs to include a rigorous analysis strategy to ensure that Portland Harbor does not experience ongoing recontamination or result in further spreading of contamination downriver.

3) Newer methods should be used to treat the contaminated sediments either in place or *ex situ*, following removal. If a new method can detoxify the sediments, then transport and disposal are far simpler and cheaper. A detailed description of some newer methods and technologies is presented in a subsequent section, providing examples to support the EPA decision to retain these methods as options in the remedial action. The CAG refers to the information in Section 3 of the EPA version of the FS in which EPA presents alternatives for treating dredged materials, including on-site remediation through biological (biodegradation), chemical (sorption and oxidation) or physical (sedimentation or dispersion) processes. The CAG supports and encourages implementation of pilot projects to determine the potential effectiveness of these methods in the lower Willamette River.

4) It is critical to protect members of our community who have suffered the effects of exposure to contamination for many decades, whether as a matter of Environmental Justice or Cumulative Risk. These effects include direct health impacts, the psychosocial stresses and strains of living with contamination in our community and the loss/ reduction of critical cultural and community opportunities such as subsistence fishing, recreation and access. We are particularly concerned about underserved communities, communities that rely on subsistence fishing for both cultural and economic reasons, and the neighborhoods in general that are near or adjacent to the river. Minority and Native American communities, and those in the neighborhoods of industry have been exposed and EPA needs to address both Environmental Justice and Cumulative Risk issues by implementing a more aggressive remedy- G+.

Communities adjacent to the North Reach of the Willamette have been a historic dumping ground for the negative effects of industry including not only the Superfund site, but hazardous materials tank farms, industrial air pollution, truck diesel exhaust and truck movement. North Portland is also the location for a sewage treatment plant for the entire City, and a major, former city-wide dump. As St. Johns activist Ben Poe said, "North Portland is becoming weary of being the repository of everything that stinks, burns or blows up." Alternatives that leave either significant amounts of unconfined contamination in the river or which result in a CDF are inequitable and environmentally

unjust, and adds to the cumulative effects on community members of existing pollutants and industrial impacts.

5) Monitored Natural Recovery (MNR) should be a very limited option utilized only in areas of lowest and least toxic contamination and where there is a very high degree of certainty that it will be effective. MNR leaves contamination in place with a presumption that it will either be covered by additional sediment, disperse down river or gradually lose its toxicity. However, Portland Harbor is contaminated with highly toxic, pervasive contaminants and decades of data demonstrate that MNR is not in most cases an effective strategy for persistent contaminants such as heavy metals, PCBs, PAHs, dioxins and furans. If we are committed to restoring our river to health for current and future generations. In most cases, contaminants have already been in place for decades and show little or no sign of abating. It is at odds with years of research and common sense to ask the public to accept that natural recovery would suddenly represent an effective clean-up strategy for contaminants which have already remained in the river for 50 to 100 years or more.

We agree with EPA Region 10 that the site is largely not depositional, many areas are erosional, and much of the near shore areas are subject to prop scour, tidal action, ship wakes, seasonal scouring and other disturbances, and thus MNR must be employed sparingly, not widely. Natural recovery is not effective for contaminants that do not breakdown, in fact, we view natural recovery as what it is- burial and dispersal, not treatment. Natural recovery did not work on the James River, VA (Kepone) or the Hudson River, NY (PCBs). We know of no site such as Portland Harbor where MNR has proven effective over decades, much less longer.

It is important to note here that both the EPA and DEQ have stated that the modelling of MNR provided by the LWG is clearly and unequivocally inaccurate and unreliable in terms of its predictive value for deposition and accretion. It shows several sites where on the ground research demonstrates that the outcomes described by the modelling are simply wrong and show that MRN is effective in locations where we know for certain that it can not be effective. In fact, due to the complexity of the river, both EPA and DEQ have stated that a reliable predictive model may be impossible to create. In the absence of a reliable predictive model, the EPA should err on the side of caution with aggressive removal of contaminants---not leave them in place and hope without any scientific basis that a strategy that has not been effective over the course of many decades will suddenly become effective now.

6) While the community strongly prefers dredging and removal as the predominant clean-up strategy, it is important that it be done with an eye toward protecting community health and livability during cleanup operations.. The community is not opposed to 24 hour dredging as some PRP’s have suggested. The fact is that the community would like to see work completed as quickly as possible and the noise caused by nighttime dredging would be limited relative to the significant amount of noise already generated during nighttime hours by working harbor industries. This issue is nothing more than a self-serving argument raised by PRPs to extend the clean-up time period and demonstrates faux concern for the community. What is important to the

community is that disruption within the neighborhoods be kept to an absolute minimum. To that end sediments should be transported to appropriate landfills to the greatest extent possible by barge, with train transport being a secondary option where necessary and truck transport kept to an absolute minimum. Any contaminant transport through neighborhoods should require the absolute highest standards for containment to ensure that fugitive dust is kept to a minimum. Materials dredged at night should be stored until daylight hours when transport through neighborhoods is required.

7) While cost is a consideration, it should not be elevated above all other factors. Too much focus has been on the raw numerical potential costs of clean-up without any reference to context for those costs. There are several important elements of the cost that should be considered. First, cost is just one factor. All the other factors need to be given due consideration as well---the CAG is deeply concerned that cost appears to be trumping community health, environmental health and public trust doctrine values. Second, the Portland Harbor is one of the largest and most complex Superfund sites in the country spanning more than eleven miles of river—it includes dozens of sites that could stand alone as individual superfund sites---comparisons to costs at other sites need to account for this fact. Third, the Portland Harbor Superfund Site includes more than 150 PRPs including the Federal Government, State of Oregon, City of Portland, Port of Portland, and some of the largest and most profitable corporations on the planet. In short, PRPs have extensive financial resources on which to draw. (see attachment). Fourth, the EPA should consider the tremendous resources that historically have already been expended and will continue to be expended on restoring the Willamette and Columbia Rivers---The public has spent billions of dollars on restoration. It is estimated that we will continue to spend upwards of $200 million/year going forward. The contamination in Portland Harbor directly undermines these long-term investments. Finally the clean-up is not only a cost generator; it is also a revenue and job generator. An EcoNorthwest Study of Portland Harbor showed that every dollar of cost to clean-up Portland Harbor will generate more than a dollar's worth of economic activity.

8) The FS in section 4 addresses the requirement that remedies meet regulatory requirements and the Proposed Plan will have to explain how the proposed remedy meets regulatory requirements in other statutes. The CAG is especially concerned with the need to meet Clean Water Act criteria and standards for the contaminants of concern for the Portland Harbor site. Water Quality Standards for PCBs, dioxins, PAHs, DDT, metals need to be met by the remedy such that the waters of the Willamette support native animals and plants, do not further harm threatened and endangered species, and are safe for human recreation and more. Alternative G+ is needed to remove the additional contamination that prevents achieving Clean Water Act requirements.

9) In those cases where remediation requires substrate removal, the PRPs need to restore the habitat to conditions that are suitable for living resources, in terms of quality of substrate, physical characteristics and replant any vegetation that is removed. Any significant temporary or permanent loss of natural resource function as a result of clean-up actions should be fully mitigated within Portland Harbor and mitigation sites should be permanently protected via easement or other legally binding mechanism.

10) Portland Harbor is a huge site spanning more than 11 river miles. Using large spatial scales for analysis risks missing serious hotspots within larger geographic areas that overall may be less contaminated. While we support the smaller spatial scale of analysis, we are concerned that the “hotspot” approach now being advocated by EPA appears to revert back to a very large scale approach.

11) EPA has indicated that it intends to utilize a “hot spot” approach that focuses on general areas with the highest level of contaminated sediment. EPA would rely in monitored natural recovery in other locations. The CAG recognizes that the contamination is not distributed evenly across the miles of the Portland Harbor site and that the "hot spots" seem to represent the worst of the contamination problems. However, we believe that the “hotspot” approach is too limited and would leave substantial acreage on the river with unacceptably high levels of contamination. The EPA should prioritize removal of contaminated sediments from the hotspot areas but it should also apply an approach that utilizes a finer scale approach to applying removal, capping and MNR to areas outside the hotspots which still comprise more than 65% of the harbor. Surface sediments that contribute to water quality impairment need to be removed via Alternative G+. While we support EPA’s use of smaller spatial scales in the river than did the LWG, the “hotspot approach” still uses a scale that is far too large to ensure that smaller areas of high contamination are adequately addressed to ensure public and environmental health.

12) One of the more controversial aspects of the FS and remedy is the use of a confined disposal facility (CDF) at T4, Slip 1, the engineering and logistical issues for long-term effectiveness are not proven in a river system as complex as the lower Willamette near the confluence with the Columbia River. "This combination of large rivers interacting, dynamic geomorphology within a transitional landscape, and tidal effects transmitted up the Columbia from the ocean create some of the most complex hydrology in the Willamette Basin…The extent of available information limits the degree to which the full complexity of these patterns can be described..." (City of Portland Bureau of Environmental Services). Additionally, the location proposed is both a hazard zone for flood and earthquake with a fault line located nearby making the fill sand at the site unstable in any kind of unusual event such as the expected Cascadia Subduction Zone earthquake. Unfortunately modeling for the CDF has not reflected anything but usual conditions. CAG members have taken a formal position against the use of a CDF, four adjacent neighborhood organizations have made a formal resolution against its use, and a community petition has circulated in opposition to it with over 1700 signatures. Community-wide rejection of a proposed CDF has been overwhelming. Detailed comments are below with the petition as an attachment.

13) Monitoring environmental and community conditions during and following the remedial work is needed to confirm the effectiveness of the operations, the equipment, and the strategy. We call on EPA to implement a rigorous monitoring program with rapid turnaround of lab analysis, to ensure the safety and welfare of the community.

14) We are deeply concerned about the over reliance on institutional controls as a surrogate for actual clean-up. Institutional controls include approaches such as fish advisories to warn anglers about the potential health effects of consuming contaminated fish. Institutional Controls are not effective and are intended to be temporary. Data indicate that these types of approaches have had limited effectiveness to date and there is no reason to believe that they will become more effective in the future. The community and particularly communities that rely on subsistence and cultural fishing have lived with the impacts of contamination long enough. The focus should be on removing contamination to achieve safe levels for fish consumption as well as other activities as quickly as possible.

15) The Plan needs to include a strong operations and maintenance section that will ensure that any remedies such as capping will be regularly evaluated to ensure that the integrity of the remedy is fully maintained in perpetuity and that any breaches are quickly repaired.

16) We understand that it is preferable to get the current remedy process completed during the current administration; the primary driver still needs to be ensuring adequate clean-up of the river and ensuring that there is time for adequate notice and review of whatever preferred alternative is selected. It will only be next spring that the public is getting its first real opportunity to see and understand what the actual clean-up will look like and the implications for the health of our river and our communities. It will be a significant challenge to disseminate and provide technical support to the diverse communities that will be directly and indirectly affected by this decision. The public does not have either the prodigious technical or legal resources available to the PRPs who have long sought and will continue to seek to limit this clean-up action. It is unacceptable after more than a decade of mostly closed door process to now severely truncate the public review part of this process. We ask that a public comment period of significantly longer than 60 days be planned for.

Feasibility Study Comments

General Comments

The Regional office project managers and team examined the Draft Feasibility Study released by the LWG in 2012, as did the CAG, other community stakeholders and the TAG advisor. The community and technical advisor were not satisfied with the Draft FS, at all. EPA announced that the FS would be redrafted under the immediate direction of EPA staff and not LWG and their contractors. The CAG agreed with this decision, and was pleased with the substance and process of the resulting re-evaluation of the RI and FS by the Region 10 project team under the leadership of Chip Humphrey and Kristine Koch.

The FS redrafting under the leadership of Kristine Koch resulted in several important developments that we bring to the attention of the NRRB, including process issues and substantive items in the FS. First, EPA has been more open and transparent to the public in the FS redrafting, meeting with the CAG and other community members and

apprising the community of the process. Second, the EPA Regional office has been receptive to input, comments and questions regarding the FS. We appreciate receiving the FS sections as the redrafting has proceeded. But this process has been affected by input and actions from LWG and elected officials, slowing the process and obfuscating the efforts to reach appropriate decision points in a timely manner. Basically, outside interests have slowed the process and now seek to derail the cleanup effort by slowing the FS and raising either false claims or erroneous information while at the same time demanding a faster, cheaper cleanup. We address some issues concerning false claims and issues raised by LWG in these comments to the NRRB.

We commend EPA for reformatting the FS, undertaking re-analysis and taking a broader view of the remedial options. The current FS is more concise, direct and easier to understand, presenting the critical information from the redrafted RI into the FS in a more manageable form.

FS Section 3

In the FS, per legal requirements, EPA must consider a "No Action" alternative for comparison purposes. Alternative A is no action and will not be selected. In Section 3, EPA presents Alternatives A through G with each Alternative using a combination of dredging, capping, and Enhanced Monitored Natural Recovery. The proportions of each change from Alternatives B to G.

Several items from Section 3 need to be noted, because Section 3 sets the stage for the analysis of Section 4, and some information in Section 3 is not repeated. The table below gives a most useful summary of what methods are used in what proportions in each Alternative. This table also gives the information that justifies what is in the paragraph following – why Alternative C is dropped from Section 4.

Summary of Total Acres Assigned to Each Technology

Alternative	Technology			
	Dredge	Dredge/Cap or Cap	In-Situ or EMNR	MNR
	(acres)			
B	70	20	110	2,250
C	86	28	106	2,231
D	131	43	91	2,185
E	203	67	59	2,121
F	374	140	24	1,912
G	544	236	15	1,655

Note: EMNR - Enhanced monitored natural recovery

Alternative C was eliminated from further evaluation in Section 4, as explained by EPA in section 3.7 (page 3-48):

> "Based on the information provided in the screening tables of the alternatives, Alternative C was eliminated from consideration of the detailed analysis in Section 4. This decision is primarily due to the small incremental increase in quantities of dredge and borrow materials between Alternatives B and C, and the relatively small incremental decrease in focused COC concentrations when compared between Alternatives B and D or C and D. The differences between Alternatives B and C include only a 0.1 percent increase in overall acres remediated with only a corresponding average 9 percent reduction of focused COC concentrations in surface sediment. Thus, it was concluded that Alternative C was not distinctly different from Alternative B. All other alternatives are carried forward for detailed analysis in Section 4."

We agree with this decision to eliminate option C.

The alternatives presented in Section 3 and evaluated in Section 4 for compliance with the nine criteria present a range of options that grade from less area actively remediated to more acreage. The range of options is thus, a quantitative gradation from less to more area addressed with active remediation and Monitored Natural Recovery (MNR). This range of alternatives, we note, is somewhat different from many FS documents, in that the alternatives present a quantitative range of options and not a qualitative choice among quite different methods. We also note that the Alternatives B through G increase the acreage and total mass of contamination given active attention. The range is from 86 acres remediated with alternative B to 780 acres, nearly an order of magnitude increase in area remediated with the same or similar approaches. But even Alternative G will not achieve the goal of fish that can be safely consumed.

The CAG and community partners support more remediation, in the case of the alternatives, meaning more removal and active treatment for the health of the community, the fishing public and the living resources in the harbor and that depend on the harbor. In the long term, addressing more of the problem now will mean less likelihood of recontamination from the present contaminant load.

The CAG supports an enhanced Alternative G as the best option, with modifications to remove more contamination, denoted as G+, as discussed in these comments. Even this most aggressive option, G, as written, leaves too much contamination in place, as total mass, and leaves too much surface contamination exposed in a way that animals will have access to these chemicals.

FS Section 4

The remedial options and projections for MNR and future recovery in nature and time depend on continued input of contaminants from upriver source and floodplain areas adjacent to the Willamette in Portland. At present, only one COPC is anticipated to

contribute to ongoing contamination in the post remediation years, PCBs. PCBs from upriver sources is estimated to be 9 ppb now and in future years. This estimate likely overstates the concentrations of PCBs in future years, a problem that may seem familiar because the Lower Duwamish River faced a nearly identical situation. The point is this- if the concentration of PCBs in sediments flowing into the Willamette from upriver is measurably lower, then the MNR will be faster and the levels lower in the surface sediments. The estimates of PCBs in sediments from upriver coming into Portland Harbor need to be updated with new information. In the case of the Lower Duwamish, older estimates turned out to be too high by nearly twofold- the same is likely true on the Willamette River in Portland Harbor.

Section 4.1.2 explains the problems that EPA identified in the model used by LWG to estimate sediment deposition (in the original FS from 2012). In this section, the FS explains why the model cannot be used and the rationale for setting aside all of the LWG analysis and estimates on which the FS was based. EPA then goes on to discuss Monitored Natural Recovery, recognizing that MNR is basically burial.

Summarizing Section 4, this section gives the analysis of how the various clean up remedies will meet the technical demands of the site and the legal requirements set out in federal law. The requirements are listed as nine criteria for evaluating the remedies and are listed in Section 4 on the first page as the first item in this section. These criteria are explained in the subsequent sections and are, for the most part, self-evident. EPA has provided explanations that go beyond the usual simple explanations.

Several comments need to be made on this specific analysis section for Portland. Under cost, the usual practice is to estimate long term costs for 30 years, but this EPA analysis extends the time longer as explained below:

> "The alternatives retained for detailed analysis all have containment components and thus have indefinite project durations and likely require perpetual maintenance. The assumed period of analysis used to develop estimates of present value costs for each alternative is 30 year, although 100 years was also evaluated since the costs of maintaining the caps will continue in perpetuity. "

The CAG supports that longer period for economic analysis because of the inclusion of burial (MNR) in each alternative.

The last two of the nine criteria that EPA must consider are "modifying criteria" to include

- State Acceptance and Tribal Consultation and Coordination
- Community Acceptance

The Portland Harbor site has had the involvement of six federally recognized Tribes and EPA includes consideration of Tribal input. This consideration is explained in the FS Section 4.1.11.2. The CAG has welcomed the cooperation of the Tribal representatives

and continues to value their input and updates to the CAG. We recognize the importance of their role in the process.

State acceptance can mean that the State insists on a clean-up goal or application of a state standard that the FS is not definitive about. Most state agencies remain involved and apprised of the progress of the RI/FS process. In our experience, EPA is required to obtain input from the state, which can be interpreted in different ways, depending on the state. In this case, Oregon is deeply involved and we can expect no surprises and continued involvement.

Community acceptance is a critical factor in adopting a remedy, but is too often given little consideration or is even ignored. The community in Portland has remained actively engaged in the Superfund Process despite the fact that the process has taken nearly 15 years to reach this point. In fact the community in Portland has repeatedly demonstrated an intense and active engagement with its river seeking to protect natural resources, engaging in restoration activities and participating in extensive recreation activities within Portland Harbor. Additionally the public has spent literally billions of dollars recovering listed salmonids on the Willamette and Columbia and investing in habitat protection and restoration on these systems. It is expected that salmonid recovery costs will continue to range in excess of $200 million/ year for the foreseeable future. The community is well informed and engaged with its river expects a remedy that honors the public trust doctrine, meets the requirements of the law, and most importantly restores ecological health to Portland Harbor in the absolute minimum amount of time and provides the maximum amount of certainty for future generations.

The heart of the matter for this part of any FS is the analysis of how each alternative meets the nine criteria. Alternative G comes closest, but ultimately fails to meet the expectations of the public and the requirements of federal law. In order to meet these objectives, Alternative G would require significantly more removal of contaminated sediment and more aggressive treatments outside the areas defined as “hotspots.”

Expanded Comments on Selected topics

Alternative G+

EPA’s predictions for the most protective remedy analyzed, Alternative G, indicates that water quality standards will not be met and that fish consumption advisories will remain in place for the foreseeable future. The difference in remedial actions from Alternatives B to G is indicated in several figures from FS section 3- Fig.s 3.3-02, 3.3-01, 3.3-06a and others indicate that Alternative G does not reduce contaminant concentrations enough to achieve Preliminary Remediation Goals (PRGs); further removal is needed to reach the target PRGs. Fig. 3.3-01 illustrates the problem that the RAL for Alternative G is still more than 5 times higher than the background level of 9 ug/Kg for PCBs. Even more removal is needed to reach the estimated background concentrations for the chemicals of concern. The data in Fig.s 3-3 -03 et seq. confirm that the amount of contaminated sediment left in place in Alternatives B-F is dramatically more than in G, even though G does not meet PRGs or background. We also note

that the FS assumes background levels of COCs are based on current conditions and not improved background conditions in the future.

We recommend an enhancement to Alternative G in terms of increasing the dredging footprint to reach PRGs for PCBs, PAHs and PCDDs. More surface contamination needs to be removed and much of it can be removed with hydraulic dredging that is logistically simpler than other dredging methods. The dredging footprints need to increase substantially to remove the sediment contamination that contributes to the impairment and failure to meet RALs and Water Quality Standards. At a minimum, the dredge footprint needs to be great enough to reach COC levels much closer to the background concentrations for PCBs. Based on the data in Fig. 3.3-01, this increase would have to be from 500 acres to at least 1000 acres, most of which is in the areas with soft sediments.

Institutional Controls

Institutional controls are a group of actions that seek to limit human activity to decrease exposure to a contaminated ecosystem. The EPA defines institutional controls as "…administrative and legal controls, that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy" (USEPA 2014a). Common examples of institutional controls (ICs) include fish consumption advisories, land use designations, and zoning restrictions. The EPA Feasibility Study for the Portland Harbor Superfund Site relies on ICs in the form of fish consumption advisories and permit requirements. Currently, fish consumption advisories are already in effect for Portland Harbor and other segments of the Willamette River.

Although ICs are meant to protect human health, they are simply a means of removing an exposure pathway by restricting human activity. ICs do nothing to reduce contamination; they simply intend to keep people away from contaminated media at a site. Studies and government reports have found significant flaws in the philosophy and implementation of institutional controls, specifically with fish consumption advisories.

In 2005, the U.S. Government Accountability Office published a report titled "Improved Effectiveness of Controls at Sites Could Better Protect the Public." The study analyzed the implementation and effectiveness of institutional controls at Superfund and RCRA sites throughout the U.S. The researchers found that while the use of ICs has increased over time, there are numerous problems with both the implementation and the organization of ICs. One of the most obvious issues is one of timing and accountability. The GAO found that often documentation did not adequately address when the ICs should be implemented, how long they should last, or who would be responsible for enforcement. This led to ICs not being implemented until after cleanup processes were finished, posing significant risks to local residents. The GAO also found issues with the process for implementation of ICs. Language in the IC documentation was often vague, and the EPA sometimes failed to identify the specific mechanism for each IC. The GAO pointed out that in creating ICs, the EPA needs to identify the parties responsible for enforcing the ICs, such as state governments or site owners (2005). Because of the faulty implementation and enforcement of ICs, ICs come across as recommendations, and are thus taken much less seriously.

In a study on the effectiveness of fish consumption advisories, researchers found that fish consumption advisories are unlikely to be effective in reducing the exposure of infants and

children to persistent organic pollutants that have long elimination rates in the human metabolic system (Binnington et al. 2014). Persistent organic pollutants like PCBs, dioxins and DDT have long elimination half-lives, meaning that the human metabolic system takes longer to break down persistent pollutants than non-persistent pollutants. For this study, scientists used a mechanistic model to estimate and compare prenatal, postnatal, and childhood exposure to PCB-153 under different scenarios of maternal guideline adherence to fish consumption advisories. The scientists assumed realistic time periods for advisory compliance for mothers (from one year to five years before birth), and found that temporarily eliminating or reducing maternal fish consumption for fish contaminated with persistent organic pollutants did very little to reduce the exposure of infants and children to PCBs. This study shows that it is not just the contaminated fish that prove problematic; it is the environmental persistence of the contaminants inside the human body, which can take years to be eliminated.

In a 2008 study concerning public knowledge about fish consumption advisories, Burger and Gochfeld found that many subjects questioned in a general University population could not give any specific answers to questions regarding the existence of fish consumption advisories. Of the respondents, 62% could not give any specific information as to why fish consumption warnings exist. Over half of the respondents did not know which fish are high or low in contaminants, and 16% of the subjects could not provide an answer as to why eating fish can be healthy. The authors point out that government agencies are often concerned that the public will be confused by advisory details, and that information on the nature of risks and benefits of fish consumption can be too complicated to convey. The authors believe that operating based upon that belief is a mistake. They state that the lack of such information is a major part of ineffective communication. The study concluded that public agencies must provide more directed messages regarding the basis for making risk decisions (Burger and Gochfeld 2008).

The results of the Burger and Gochfeld study on public knowledge of fish consumption advisories were echoed by other investigations and the Columbia Slough experience, where residents continue to consume locally caught seafood even after learning of the risks posed by eating contaminated fish. The problem with relying on fish consumption advisories and other ICs for Portland Harbor is two-fold. Half of the problem is that ICs do nothing to reduce contamination; they are simply a means of controlling human behavior. The other part of the problem is that fish consumption advisories are, and will continue to be, an ineffective way to protect human and ecological health. Many residents are unaware of the fish consumption advisories, and many of those that are aware of the advisories choose to ignore the regulations and continue eating contaminated seafood. The City of Portland has experienced this problem with fish consumption advisories on Columbia Slough.

Environmental Justice Issues

Environmental Justice (EJ) is defined by both the EPA and the Oregon Department of Environmental Quality (DEQ) as:

> *Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons*

> *across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.*

Both EPA and DEQ are accountable for protecting EJ populations who use and are affected by the site.

A study done by the US Federal Government found that three out of four hazardous waste disposal facilities are located in low-income, or minority communities that often lack the political power necessary to keep the facilities out of their neighborhoods. Even worse, many of these communities are never involved in the planning of the waste facilities (Bryant, 2003).

Newer technologies

Mention of companies, trade names or other specifics does not constitute endorsement on the part of any individual or organization. We present this information because these examples are available and have worked to a greater or lesser extent in cases that compare with Portland Harbor. These are illustrative only.

In situ treatments are generally cheaper and cause less community and ecosystem disturbance; however, they are less able to handle deep water sediment, woody debris, and multiple contaminants. There are more *ex situ* treatment options, and *ex situ* treatments tend to be more intensive than *in situ* treatments. Ex situ treatments allow for more control over environmental conditions, and removal and isolation from the environment reduces recontamination and or dispersal. However, *ex situ* treatments require a processing site and can be more expensive.

Several newer sediment remediation technologies should be considered for this site, examples of which are environmental dredging, sediment washing, bioremediation, mobile UV decontamination, NASA's redeployable polymer blanket, and EcoSoil®.

Environmental dredging is more precise than navigational dredging, thus ensuring more removal with less disturbance to the ecosystem and contaminants. This technology is cheaper than other removal technologies, and it has less of an impact on the surrounding community and wildlife. Mechanical and hydraulic dredging are two examples of environmental dredging. Mechanical dredges use a bucket or clamshell to move contaminated sediment to a barge for transport. They handle debris well and are better suited for shallow areas and smaller sediment volumes. Hydraulic dredges use a "cutterhead" to break up sediment and a pump and pipe to transport the sediment to a barge or processing site. They can handle high sediment volume, work well in deep water, and provide ease of transport for sediment and water. Hydraulic dredges are not well suited for large debris.

If cleanup levels are achieved, dredging and excavation can result in the least uncertainty regarding future environmental exposure to contaminants since the

contaminants are removed from the ecosystem and disposed of in a contained environment.

According to the 2015 US EPA Phase 2 Dredging, Year 5 summary, the Hudson River PCB site relied on mechanical dredges with environmental buckets for PCB remediation. Contaminated sediments were scooped up from the river bottom and loaded into hopper barges. Computer software was used to identify where to dig, and depth and location of digging was determined by satellites.

Sediment washing is a water-based, multi-step process of remediating sediment to top soil quality ex situ through mechanically mixing, washing, and rinsing soil. Solvents can be combined with the water during the washing process. They are selected based on their environmental and health effects and their ability to solubilize specific contaminants. Contaminant removal occurs in one of two ways: dissolving/suspending them in the wash water that can be sustained by chemical manipulation of pH or by concentrating them into a smaller volume of soil.

Particle size separation, gravity separation, and attrition scrubbing can be used to concentrate the contaminants into smaller volumes of soil. Hydrocarbon contaminants tend to bind to smaller soil particles, so separating the smaller soil particles can reduce the volume of contamination. This allows for the smaller volume of soil containing the clay and silt particles to be further treated by other methods or disposed of. The larger volume of soil is considered to be non-toxic and can be used as backfill.

An advantage of soil/sediment washing included the ability to recover metals and clean a wide range of both inorganic and organic contaminants from coarse grain soils. Additionally, a facility can be constructed where the sediment is unloaded. This is a cost-effective technology since it reduces the quantity of material needing further treatment by another technology.

BioGenesis^{SM} sediment washing was patented in December 2001 to decontaminate both coarse-grained and fine-grained particles. This technology is a low-temperature decontamination process, which uses a proprietary blend of chemicals, impact forces from high pressure water, and aeration to decontaminate sediments off-site. It works by isolating individual particles and removing contaminants and naturally occurring material adsorbed to the particles. According to a 2008 BioGenesis^{SM} Bench-Scale Treatability Study, processing steps include:

1) Soil/sediment preparation;
2) Attrition scrubbing/aeration;
3) Bulk organics;
4) Chemical addition and mixing;
5) Application of collision impact forces;
6) Organic contaminant oxidation
7) Solid/liquid separation
8) Wastewater treatment
9) Disposition of treated solids

The end result of the BioGenesis[SM] process is treated soil or sediment. Depending on the results achieved and on obtaining any necessary regulatory approvals, the treated soil or sediment can also either be disposed of or potentially used as fill material or as raw material in the production of topsoil or other construction grade products.

BioGenesis[SM] offers the advantage of being able to handle large volumes of soil. Additionally, a facility can be constructed where the sediment is unloaded.

In a 2008 Bench-Scale Treatability Study Report using BioGenesis[SM] on the Housatonic River Rest-of-River site, validation test run results showed reproducible reductions in PCB concentrations after just one treatment cycle. Further PCB concentration reductions can be achieved through additional treatment cycles. Furthermore, this process works to reduce other metals effectively in the process, and the study concluded that the arsenic species within the sediment were recalcitrant.

A full-scale operation using BioGenesis[SM] was conducted on dredged material from the New York/New Jersey Harbor. As stated in the 2009 BioGenesis final report on the Demonstration Testing and Full-Scale Operation of the BioGenesis[SM] Sediment Decontamination Process, sediment was treated from three different dredged material sites, and analytical tests on the treated sediment showed significant reductions in PCBs, dioxins, all heavy metals except arsenic. Many contaminants were readily removed; however, others, such as PAHs, were difficult to remove.

Along with PCB remediation, this study sought to determine the cost per unit to treat the contaminated sediment, as well as determine whether such costs are competitive with current prices for the management of contaminated dredged material. In a commercial scale facility (500,000 cubic yards/year), the cost of BioGenesis[SM] is very competitive.

Phytoremediation uses plants and their associated microogranisms to sequester, extract, and degrade contaminants from soil or water either in situ or ex situ. Plants have also been found to take up various organics and either process them for use in physiological processes or degrade them. Some plants have the ability to store large amounts of metals that do not seem to be utilized by the plant. Phytoremediation includes rhizofiltration, phytoextraction, phytotransformation, phytostimulation, and phytostabilization.

Phytoremediation is effective in upland and shallow areas as well as shorelines. It can be used alongside bioremediation with dredged sediment. Many investigations have found that PCBs are capable of being translocated from soil to various parts of plants and can accumulate in particular tissue in higher concentrations than others. The majority of the research centered on phytoremediation has shown that the bacteria growing in the rhizosphere does most of the remediation.

There are three mechanisms involved with PCB phytoremediation: uptake from soils and accumulation in plant tissue, enzymatic transformation/phytodegradation, and rhizoremediation. Rhizoremediation refers to plant enhancement of microbial activity, which takes place in the root zone and improves bioremediation through the release of

secondary metabolites. In order to improve the effectiveness of phytoremediation, genetically-modified bacteria or bacterial genes involved in the metabolism of PCBs have been introduced into the process.

In a 60-week study, Huesemann et al (2009) used eelgrass to remove PAH- and PCB-contaminated marine sediment *in situ*. Both PAHs and PCBs were removed to a larger extent from planted sediments compared to the unplanted control. After the 60 weeks of treatment, PAHs declined by 73% in the presence of plants but only 25% in the controls. Total PCBs decreased by 60% in the planted sediments while none were removed in the unplanted control. Overall, biodegradation was greatest in the sediment layer containing the majority of the eelgrass roots. The presence of eelgrass likely stimulated the microbial biodegradation of PAHs and PCBs in the rhizosphere by releasing plant enzymes, root exudates, or oxygen.

Liang et al conducted a study in 2014 using bioaugmentation to enhance PCB removal in a switchgrass rhizosphere. Switchgrass-treated soil with *Burkholderia xenovorans* LB400 bioaugmentation had the highest total PCB removal. Furthermore, the presence of switchgrass facilitated the LB400 survival in the soil. Overall, the study found that combining phytoremediation and bioaugmentation could be an efficient and sustainable treatment to remediate PCB contaminated soil and recalcitrant PCB congeners.

Phytoremediation is advantageous in that it is accomplished with minimal environmental disturbance. Other advantages include: it is aesthetically pleasing and passive, organic pollutants can be converted to carbon dioxide or water instead of transferring toxicity, secondary waste is minimal, the uptake of contaminated groundwater can prevent the migration of contamination, and it can be used on a large range of contaminants.

Bioremediation uses microorganisms to facilitate degradation of contaminants ex situ. BioTech Restorations, Inc (BTR) pioneered a new method of treating contaminated sediment using tilling. It works on a variety of pollutants, including PCBs and pesticides and can be employed in soil, groundwater, and dredged marine sediments. According to the BioTech Restorations, LLC business synopsis:

> *Natural attenuation and bioremediation are synonymous in that remediation occurs through a biological process where indigenous microbial populations consume the target organic pollutants. In both natural attenuation and enhanced bioremediation microorganisms express enzymes that break down pollutants into less complex non-toxic organic constituents that are consumed for bacterial growth and reproduction. Many chemical pollutants are highly persistent and are effectively immune to biological breakdown. Sites impacted by these persistent organic pollutants (POPs) represent the most costly remediation challenges as well as the greatest risks to the environment and human health.*
>
> *The BTR research team, lead by Dr. Valerie Paynter has dedicated years of research to the development, testing and validation of a biological remedy for the treatment of persistent organic pollutants including PCBs, pesticides and dioxin. BTR's research found that persistent organic pollutants impair the indigenous*

bacteria's ability to secrete reductive enzymes. Absent the capacity to produce reductive enzymes, the indigenous microbial populations are incapable of degrading the target pollutants. A Factor treatment restores microbial enzyme production which results in enzymatic de-chlorination of the target POPs and rapid microbial utilization of the residual organic constituents.

BTR has developed a novel remedial biotechnology that is changing the environmental industry. A Factor remedy can reduce the cost of cleaning up a polluted site by 50% and reduce the financial barriers to the cleanup of thousands of polluted sites across the United States. Factor treatments are designed for on-site cleanup where treated soil, groundwater or sediments can be treated without the need for off-site transportation and permitted disposal. Remediation times range from 6 weeks for petroleum hydrocarbons to 6 months for PCBs and other recalcitrant organic chemical pollutants. BTR is the only remediation company so confident in its process that the company guarantees a Factor remedy will achieve the site's mandated cleanup goals.

In 1998 a first generation Factor was developed to eliminate the insecticide toxaphene from soils inside Hercules' former pesticide production facility in Georgia. Over a 24 week period, a single Factor application reduced toxaphene in soils from 3500 ppm to non-detect. Biotech has improved the process, increased efficiencies, pioneered new applications and most importantly lowered costs.

BTR was used on PCB-contaminated sediments from the Housatonic River Rest-of-River site, and the methods and results were recorded in the 2014 Housatonic River BioTech Restorations Remediation Phase I Study: Quality Assurance Project Plan prepared by Environmental Stewardship Concepts, LLC. Samples from the highest PCB contaminated soil and sediment from the site were collected. These samples were delivered overnight to BTR's soil testing lab located in Clemson, SC. There, BTR, combined and mixed the soil and sediment samples and sent a portion of the samples to an independent, certified lab for a measurement of baseline PCB concentration and soil characteristics. BTR used sediment assays to determine the most effective factor formulation to use for this site; the incubation time for the sediment assay is 8-10 weeks. The goal of the sediment assay is to select the best performing one or two factors under the precise soil/bacteria conditions of the site. Over eight formulations with proven efficacy in reducing PCBs and other chlorinated organic chemicals have been developed.

Including the Housatonic River site, BTR treatment factors have been successfully used to reduce PCB and other persistent chlorinated organic pollutant concentrations in the soils of 17 different sites.

Mobile UV decontamination uses a mobile rig that can be transported by truck to process contamination on-site. Ultraviolet light degrades PCBs and other contaminants ex situ. Mobile UV decontamination is only suited for small volumes now but could be up-scaled. This technology is currently being piloted by University of Calgary.

UV-oxidation treatment is a viable technology for treating contaminated groundwater. It uses an oxygen-based oxidant in conjunction with UV light. This technology is applicable to all types of petroleum precuts, PCBs, dioxins, PAHs, and other various forms of organic carbons. A study conducted in 2013 by Kong et al demonstrated that using UV and visible light is effective in treating PCBs in transformer oil.

NASA's redeployable polymer blanket is filled with environmentally safe solvent and is placed onto contaminated sediment. The solvent attracts PCBs, which migrate into the solvent-filled spikes. PCB-laden solvent is then extracted from the blanket and treated ex situ via an activated metal treatment system (AMTS). AMTS is a NASA technology that uses paste containing particles of activated zero-valent metal. The paste is applied to contaminated surfaces and extracts PCBs. Afterwards, the paste is removed and disposed of in an approved landfill.

EcoSoil® is a patented technology available for investors for in situ remediation of contaminated soil in an ecological way. Horizontal and directed drilling techniques are combined with specially designed sockets containing sorbents that are inserted into the holes. Pollutants are removed with adsorption mechanisms.

Microwave energy can be used to remove or immobilize contaminants to achieve soil remediation. Thermal desorption is a mechanism of microwave energy that can be an affordable and sustainable treatment option for persistent organic pollutants, including PCB-oils and pesticides.

Thermal desorption involves excavating, screening, and heating contaminated soils to release petroleum from the soil. Heat increases the volatility of contaminants, allowing them to be removed from the solid matrix. It entails two major components: a desorber and an off-gas treatment system. A study on the effectiveness of thermal desorption was conducted in South West England in 2009. For field application, low temperature thermal desorption was found to be the most effective. Experiments results in 48-70% decomposition of PCBs in sediments through the use of thermal desorption technology. Thermal desorption is one of the most versatile treatment technologies considering it can be implemented either on or off site.

Thermal desorption technology was utilized at the Passaic River basin in New Jersey, which is contaminated with VOCs and PCBs. It was able to remediate approximately 225 tons of soil per day, and treated soils were then used as backfill for the site. On average, PCBs were reduced to 0.16 ppm.

Natural Recovery/Monitored Natural Recovery

Natural recovery encompasses a wide range of processes, including decomposition, burial, dispersion, and volatilization. It involves either the immobilization of contaminants or the transformation of contaminants to less harmful forms, usually through covering contamination with layers of a variety of media. Inactive media includes sand, gravel, and concrete, while active media includes biochar, carbon, and

bioactive materials. Natural recovery does not remove contaminants and requires long-term monitoring.

Monitored natural recovery (MNR) refers to monitoring the progress of natural recovery. If the rate of contaminant degradation is fast enough, it can be used as the only remediation technique. MNR can also be used as a finishing option for other remedial technologies.

The Willamette River is largely not a depositional river due to flooding, fast currents, tidal action, and prop wash; sand covering will not stay in place, and spreading the pollutants further down river and to the Columbia River is not a good solution for a cleanup. MNR seems questionable on this river, especially 65% to 80% of the river as the FS proposes.

The CAG and Portland community recognize that Natural Recovery is not remediation; it is allowing the river to cover up the contaminated sediment. The CAG has examined the data available for natural recovery and is not convinced that the approach works for contaminants such as the ones in Portland Harbor. The CAG agrees with EPA's analysis of the information on siltation rates and the conclusion that sedimentation/siltation/natural recovery will not work in Portland Harbor.

Environmental and Community Monitoring

Monitoring of activities during remediation is central and necessary. Monitoring must include: air, water, noise, odor, light, traffic on the water, etc.

No matter the dredging methods, time, schedule or other logistics, EPA will need to monitor the operations whenever operations are on the water or active on shore. The environmental and quality of life monitoring has to be accompanied by on scene monitors who can oversee operations and confirm that all best management procedures are being followed. In some cases, video monitoring may be appropriate.

The Hudson River PCB site Record of Decision states the following:

> *Short- and long-term (i.e., pre-, during, and post-construction) monitoring programs will be developed to ensure compliance with performance standards and to ensure protection of human health and the environment. The types and frequency of pre-construction monitoring will be developed during remedial design. Plans for monitoring during and after construction will be developed during the remedial design and modified during and after construction as appropriate. This is consistent with the NRC Report recommendation that long-term monitoring evaluates the effectiveness of the approach as well as ensures protection of public health and the environment.*
>
> *The first phase will be the first construction season of remedial dredging. The dredging during that year will be implemented initially at less than full scale operation. It will include an extensive monitoring program of all operations.*

Monitoring data will be compared to performance standards identified in this ROD or developed during the remedial design, with input from the public and in consultation with the State and federal natural resource trustees. Performance standards shall address (but may not be limited to) resuspension rates during dredging, production rates, residuals after dredging or dredging with backfill as appropriate, and community impacts (e.g., noise, air quality, odor, navigation). The information and experience gained during the first phase of dredging will be used to evaluate and determine compliance with the performance standards. Further, the data gathered will enable EPA to determine if adjustments are needed to operations in the succeeding phase of dredging, or if performance standards need to be reevaluated. EPA will make the data, as well as its final report evaluating the work with respect to the performance standards, available to the public.

The second phase will be the remainder of the dredging operation, which will be conducted at full-scale. During the full-scale remedial dredging, EPA will continue to monitor, evaluate performance data and make necessary adjustments.

The data EPA gathers, as well as the Agency's ongoing evaluation of the work with respect to the performance standards, will be made available to the public in a timely manner and will be used to evaluate the project to determine whether it is achieving its human health and environmental protection objectives.

Dredging and processing operations at the Hudson River PCB site, both in-river and at project support facilities were monitored and evaluated continually to determine if changes were needed to improve operations.

On monitoring sites, the Columbia backs the Willamette up some 20 plus miles to the falls at Oregon City. During certain times of the year, high tides will reverse the flow of the river, creating an upriver current. All sites should be monitored both up and downstream for contaminate redistribution.

During the Hudson River dredging, five quality of life performance standards were developed: air quality, noise, odor, lighting, and navigation. These standards were established to reduce the effects of dredging on people, business, and communities. The monitoring was re-evaluated and adjusted as needed as the dredging moved throughout the river.

Cleanup activities, such as sediment handling and processing, can release pollutants into the air. Based on the US EPA 2011 Quality of Life Performance Standards General Overview, the Hudson River PCB site enacted both monitoring and design requirements to minimize the effects of air emissions on people's health and the environment during the cleanup. Air emissions were routinely monitored to predict the amount of emissions from PCBs and other pollutants from the project. Performance standards set PCBs in residential areas at 0.11 micrograms per cubic meter and 0.26 micrograms per cubic meter at commercial/industrial areas.

According to the 2015 US EPA Phase 2 Dredging, Year 5 summary, compliance with the Federal Safe Drinking Water standard of 500 parts per trillion (ppt) for PCBs was monitored through an extensive river water quality monitoring program located up-stream, within 300 meters downstream of dredging, and greater than two miles downstream of dredging. Air monitoring occurred 24/7 during dredge operations. Monitoring occurred regularly and in response to complaints for quality of life issues (noise, lighting, or odor).

Several activities associated with the removal of PCB-contaminated sediment could produce noise. The Hudson River PCB site required monitoring for the sources of noise at the beginning of any change in operations that could result in increased levels of noise compared to complaint noise levels recorded in Phase 1 or in response to new complaints. According to the US EPA 2011 Quality of Life Performance Standards General Overview, standards were determined for both short-term and long-term operations. The performance standard varied from 65 decibels (running refrigerator) to 80 decibels (average street traffic) depending on the time of day and whether the noise occurred in a residential or commercial/industrial area.

Dredging at the Hudson River PCB site took place 24 hours a day, six days a week. This allowed the project to be completed ahead of schedule by increasing the efficiency of the dredging. According to the 2015 US EPA Phase 2 Dredging, Year 5 summary, a total of more than 2.75 million cubic yards of contaminated sediment were removed. Approximately 310,000 pounds of PCBs were removed, which is more than twice what was originally estimated.

Based on the US EPA 2011 Quality of Life Performance Standards General Overview, equipment and cleanup activities can also generate odors, which are difficult to measure since they vary depending on the concentration of the pollutant and the sensitivity of the person exposed. Hydrogen sulfide released from decaying plants is the most likely odor during the dredging and sediment process. Therefore, hydrogen sulfide was monitored at the Hudson River PCB site in the event of an odor complaint. The performance standard set the limit of hydrogen sulfide to 0.01 ppm.

Lighting systems are used to illuminate cleanup operations that occur after dark. As stated in the US EPA 2011 Quality of Life Performance Standards General Overview, the performance standard for light at the Hudson River PCB site required the monitoring of light levels at the beginning of any operations that could result in increased light levels compared to operations previously implemented or in response to complaints. The standard varied from 0.2 footcandle to 1 footcandle depending on the type of area-rural, suburban, urban, or commercial/industrial.

In order to avoid the slowdown or unnecessary interference of vessels unrelated to the cleanup, navigation monitoring must be implemented. The performance standard for navigation must comply with the applicable sections of federal and state navigation laws, rules, and regulations. According to the US EPA 2011 Quality of Life Performance Standards General Overview, the Hudson River PCB site called for the following requirements, as needed, to meet the goal of the standard:

1) Evaluating vessel movement;
2) Keeping mariners informed about scheduled project work that might affect vessel movement;
3) Restricting access to work areas and providing sage access around them
4) Scheduling project activities to consider vessel movement;
5) Establishing temporary aids to navigation such as signs and buoys to maintain efficient and safe vessel movement; and
6) Using a vessel tracking system to assist with safe passage of vessels through the project area.

Additionally, the EPA or PRPs need to undertake routine monitoring of vessel traffic, regular outreach to mariners, and follow up on complaints.

The value of quick turnaround of results from monitoring samples makes a mobile lab on site a worthy investment for the cleanup.

Monitoring biota during remedial operations and post-construction period is an important element to confirm the effectiveness of the remedy and confirm that conditions improve. Indeed, experience at other CERCLA sites demonstrates the importance of long term monitoring, especially monitoring animal tissues (fish, shellfish, birds, invertebrates, etc.). Several examples of fish tissue sampling efforts are important to note for the NRRB:

Hudson River, NY – GE PCB site. At this site, PCB levels in fish are the critical target for remediation in order to protect human health via fish consumption and to protect ecological receptors. The fish tissue monitoring at the Hudson River PCB site is designed to address two questions:

- How do current conditions affect PCBs level in fish?
- What are the long term trends in fish tissue PCB concentrations?

To accomplish these two goals, fish sampling has two efforts: 1) young of the year that have only been exposed to current conditions on site or in the vicinity of the active remediation and 2) older and larger fish that have been on-site for some time, are the size of sport fish, and indicate long term patterns. These two efforts indicate if dredging causes substantial changes in the short term and how the remediation affects long term conditions in fish.

Fox River, WI- PCB contamination from paper mills. The remediation at this site included both removal and capping. The fish tissue monitoring indicated post-construction declines in edible fish within a short period, demonstrating the fact that remediation does have the anticipated positive outcome and that fish tissue PCB levels decreased faster than expected in the remediated areas of the river.

St. Louis, MI- Velsicol Site. The initial remediation of this closed chemical plant in St. Louis, Michigan on the Pine River addressed contamination in groundwater and sediment with DDT and PPB and a host of solvents and some metals. Fish tissue monitoring in the Pine River continued in the post-construction period, assessing PBBs

and DDTs especially. Within a few years, not only had DDT and PBB levels not declined, these chemicals began to increase in fish in the Pine River suggesting a possible failure of the remedy (a slurry wall around the site on the banks of the river). Indeed, the remedy had failed structurally.

The PHCAG has been concerned about effective river monitoring during cleanup operations especially since observing an early action dredging at the Gasco site that created a massive, visible toxic sediment plume from a tar ball, that got through a silt curtain and traveled far down the river, killing fish, crayfish and other species in its path. The release of the plume was caused by sloppy dredging as observed by PHCAG members. Aquatic life for 600 yards downriver was dead.river monitoring during cleanup operations

EPA representatives have minimized the toxic effects of the Gasco plume by simply calling it a "learning experience" whereas PHCAG members who witnessed a high number of dead animals felt it was an unacceptable fiasco.

The cleanup must be done from upstream down and monitoring should be done to at least the mouth of the Multnomah channel and perhaps as far as the Sauvies Island bridge. 80% of the Willamette's flow goes down the Multnomah channel. Points cleaned up from Schnitzer downstream should be monitored to the Columbia River slough and upstream from each cleanup site for at least half a mile because of tidal distribution.

Besides monitoring, every cleanup action must contain a contingency plan in case of excessive pollution releases to air or water. There should be an easy process for community members to report problems that result from cleanup operations to the EPA for action.

Confined Disposal Facility (CDF)

A CDF is similar to capping, but contaminants are completely isolated in a water landfill. CDFs are constructed in shallow water or nearshore and must be maintained and inspected in perpetuity.

CDF at T4: We agree with EPA that a CAD at Swan Island or a CDF at Arkema is bad placement for contaminated dredge spoils. But The PHCAG disagrees with EPA about a CDF at T4. All of the nearby neighborhood associations have passed resolutions against locating a CDF at T4. There is a citizen petition against the CDF. It is environmental injustice to locate yet another dump in our neighborhoods when we already have the huge bulk of the polluting industries located in the neighborhoods adjacent to the Superfund site.

The CDF was first proposed as an early action by the Port of Portland along with a long term plan to fill and cover the site with a new port facility and loop rail. The CAG

membership unanimously opposed this as appropriate for an early action. When EPA ruled that the originally proposed CDF would violate the Federal Clean Water Act, the Port of Portland rescheduled their proposal of a CDF so that it could be considered as part of the final cleanup, with a modified design, instead of as an early action. In addition to the potential for re-contamination of the river from leaching and from berm failure in a flood or major earthquake, the proposed site (at Terminal 4, Slip 1) is actively used by white sturgeon.

The Oregon Department of Fish & Wildlife studied the stretch of the Willamette River near Terminal 4 and determined that sturgeon use the area of the river just outside of Slip 1 for juvenile rearing. While that study did not examine sturgeon use of Slip 1, community members who regularly fish the area have reported that large numbers of sturgeon utilize the slip during the winter months. The sturgeon population in the Willamette River continues to decline, potentially leading to consideration for threatened and endangered listing, and the CAG would want to see every effort made to protect, restore, and expand habitat used by sturgeon, and not fill habitat that they currently use. The Trustee council through the Natural Resources Damage Assessment and Restoration (NRDA) process has not been able to identify any potential options to improve or restore Sturgeon habitat. The conceptual plan for the CDF includes a minimal effort to remove fish from the slip, which would only remove fish in the upper 10 feet of water, leaving deeper fish, such as sturgeon, to remain trapped in the slip during and after construction of the berm.

The CDF does not adequately address the impact of the Cascadia Subduction Zone earthquake with the proposed design using an earthen berm and liquefiable contaminated soils that it will contain. Modeling was done for a 7 in which engineers admitted it would suffer damage. It will be unlined, located on a former slough, with several sources of ground water flowing into it. The CAG was told earlier by EPA that the flow through design is an experimental design and EPA has not supplied an example of such a CDF on an active, large volume river such as the Willamette.

The CAG is concerned about the nature of contaminants that would be allowed to be placed in the CDF, and concerns were increased when an engineer on the project stated that higher level contaminants could be placed toward the back of the slip. This seems unlikely to succeed given that the process of filling the slip is described as basically adding a slurry of dredge spoils into a huge vat of water and letting the water then flow through the front of the berm into the river.

The cost of engineering, construction maintenance and monitoring in perpetuity, coupled with the risk of a second clean up if a failure happens, makes the CDF a very expensive proposition, the liability could became the taxpayers problem since T4 is a publicly owned entity, the Port of Portland and the risks of a highly concentrated body of persistent pollutants becomes the burden of the neighboring communities. It seems to be a high price to pay for extra "real estate" for the Port of Portland, since their objective is to fill in the slip.

PHCAG supports the community's view that a toxic waste dump (CDF) at T4 is not what they want.

The FS has under-modeled for earthquakes especially the expected Cascadia subduction zone earthquake. In addition, geologic fault lines have been identified which run directly through or adjacent to the proposed site.

The proposed CDF has been under-modeled for flood hazard. It's been modeled for the 100 yr flood but would be located within both the 100 and 500 year flood hazard zones as defined by federal government flood hazard maps (see attachment). Additionally, the impact of global climate change and sea rise will increase the flood potential and force at this site.

EPA region 10 does not have a reassuring record in regard to locating toxic waste dumps/CDFs in flood zones. A study conducted by the National Academy of Science cites a CDF failure in Silver Valley, Idaho, during a 1997 flood event in which lead levels spiked intensely high. The National Academy said, "The EPA did not fully consider the importance of the interacting processes of surface and groundwater flow…Because the basin has not been considered in the framework of a system and inadequate attention has been devoted to hydrologic and climatic variability, in particular, the CSMs [conceptual site models] seemingly are based primarily on average conditions (Superfund and Mining Megasites: Lessons from the Coeur d'Alene River Basin, 2005)."

EPA has claimed that there have been no CDF failures. Yet the media has reported otherwise (See attached document, "CDF failures").

One of the main reasons the citizens of the North Portland peninsula neighborhoods are so opposed to the Confined Disposal Facility is that they have had one before. It was called the "St Johns Dump" and has cost the City of Portland over $36 million dollars to correct. For fifty years, 14 million pounds of garbage was placed in a landfill that was adjacent to Smith and Bybee Lakes in North Portland. There was nothing wrong with these natural lakes except that they were located in the North Portland peninsula, away from city hall, away from wealthier neighborhoods who would not have tolerated them. Today, Metro regional government continues to oversee garbage collection and the large grants issued to those North peninsula neighborhoods that the city sees as the most affected by the St Johns Dump.

The Process

The CAG members have watched, listened, spoken up, told our fellow citizens about the issues, wrote letters and met with our elected representatives. And we have tried to be patient as we watched the Potentially Responsible Parties (PRPs) delay and obfuscate.

Over the span of fourteen years, the CAG and CAG members have engaged the community by speaking at meetings of community groups, tabling at river events, attending functions, and inviting people to attend the regular CAG meetings. The CAG has sought to inform and engage the community, to cooperate with EPA and learn the technical details of the problem and potential remedies.

At many turns, the PRPs have sought to delay or interfere. These PRPs only seek to avoid taking any responsibility for the damage. One CAG member notes: "I have collected fish for the LWG and EPA four times in the last 10 years. PRPs have threatened to have me arrested on at least 3 occasions while collecting fish samples in the Willamette adjacent or at their locations even though I identified myself and my purpose and I continued to fish. One PRP would bring out a tug and deploy an oil containment barrier to make it hard to fish their area each time we entered their slip. At one point a green dye used to detect leaks in drain systems was added to an upstream source and turned the water in the Schnitzer slip anti-freeze green and shut off fish collection for three days in the area. No responsibility was ever taken for the dye, roughly 60,000 gallons of dyed water was dumped."

"We were told to leave various other areas as well but, continued to collect fish samples. The people employed by PRPs did not know how to handle fish, demanded we catch sample fish on the exact map references even though some were up on the bank. They had been told by the EPA that structures in the area within 50 yds were appropriate but still wasted time on exact locations. They even told us that the fish stayed on the same spot and did not cross the river. Small Mouth bass range on average four to eight miles and some greater distances."

“PRPs from Schnitzer, Arkema, Exxon and the Vigor marine group came to a PHCAG meeting and tried to convince us that MNR was working in the harbor and we should not only support MNR but should introduce them to other groups. Failing to win their point the manager from Schnitzer said they were willing to hold the clean up in litigation. They said they could buy a lot of lawyers for 2 billion dollars.”

Up to now, there has been no effort by the LWG or EPA to include community recommendations in the FS litigattached "WR_PHCAG meeting 8-31-15.pdf"). In fact, they have expressed little interest in them and instead have concentrated on industrial stakeholder issues. We feel it is high time the people who will be living with the Superfund be heard.

How sites are defined by DEQ as either a brownfield or as an upland source have been unclear. Contaminated sites that are not formally listed as either may be leaking pollutants into the river, making cleanup efforts less effective. Stating a number of recent and historic problems at a site that could affect the river even though it is not listed as a brownfield (see attached DEQ letter "010814ParamountPenalty-1.pdf").

The Site:
The Willamette Superfund site is complex. It has tidal effects transmitted up the Willamette River from the Columbia River. In fact, the confluence of the 10th largest

river in the country, the Willamette, and the 2nd largest river, the Columbia, is complex. According to the City's Environmental Services site: "This combination of large rivers interacting, dynamic geomorphology within a transitional landscape, and tidal effects transmitted up the Columbia from the ocean create some of the most complex hydrology in the Willamette Basin…The extent of available information limits the degree to which the full complexity of these patterns can be described..." (from Portland Bureau of Environmental Services website).

Source Control
While EPA has cooperated with DEQ in the state's efforts to control and remediate sources onshore and upriver, the CAG is concerned that DEQ is not committed and unless EPA places strict requirements on DEQ, the effort will not be sufficient.

DEQ informed the PHCAG in a June 10, 2015, general meeting that upland manufacturing sites are not considered brownfields until they change zoning for development. Only then are they "flagged" by DEQ. PHCAG wants to know how many contaminated industrially zoned sites are not considered brownfields even though they have contaminated groundwater going into the river.

As an example, the Steelhammer site is being considered for residential development. If the zone changes as expected under Portland's in-process Comprehensive Plan, DEQ says it will only then look at site contamination.

Source control must be part of the remedy and we do not want ongoing sources to contaminate the river. Another major area of risk is the hazard posed by the fuel tank farms in the Linnton/Willbridge area where 90% of the entire region's fuel supply passes through. The fuel tank farms are adjacent to the Willamette River edge in the Superfund site on liquefiable soils. During an earthquake, these tanks will cause an environmental catastrophe, contaminating the river with PAH's and other assorted toxic chemicals. EPA should require as part of the to move or stabilize these tanks to prevent an environmental disaster when the Cascadia Subduction Zone earthquake hits.

Cost
A non-LWG potentially responsible party representative from Schnitzer Steel said at a PHCAG Steering meeting on 8-26-15, that industry looks at a billion dollar price tag for the cleanup and thinks, "How many lawyers can I buy with a billion dollars." To PHCAG members present it sounded like a threat even though the rep insisted his company does not ascribe to that philosophy.

Often PRPs have cited the total cost of the cleanup for the entire Portland Harbor Superfund site, in order to convince the public, elected officials, and EPA, that the cost is overwhelming and would be economically disastrous. At the Oregon Environmental Cleanup Conference held September 18, 2016, Philip Spadaro, Managing Director/Principal Scientist for The Intelligence Group, reported on Superfund cleanup costs in which he explained that the "all-in unit cost" of cleanups has increased in general for all Superfund sites, and that the projected costs at Portland Harbor are not out of the ordinary on a per unit basis.

An attached table, while not a thorough analysis, lists estimated assets for several PRPs involved in this site. Among the 150 to 200 identified PRPs there is a total of hundreds of billions in assets and many billions of annual revenues. Considering that the cleanup costs will be spread over a period of many years, and divided among multiple PRPs, the costs are not as significant a barrier as the PRPs would lead us to believe. The full costs of remediation, monitoring and restoration need to be the responsibility of the PRPs, not the taxpayers through EPA or other general funds.

Concluding Remarks

This is our opportunity to greatly improve the condition of this river for the long-term. The community has lived with this polluted river for far too long, and the impacts to people, fish and wildlife can be profound. We need to ensure this cleanup is done right, and we need to do it once. The Willamette River is a Public Trust asset, and the local companies who have often fought the US EPA in the cleanup process to date need to meet their community obligation. They have benefited from the river for years, and now it is time to pay it back. We need to remove contaminated sediment from the Willamette, and enable people once again to consume all game fish from the river without potential impacts to their health.

We urge the NRRB and CSTAG to support the most aggressive remedy, more so than the Alternative G from the FS, what we call G+ that leaves the community with greater assurance that the remedy will be effective.

The Portland Harbor Superfund Community Advisory Group appreciates your consideration of these comments and recommendations.

Submitted by Jim Robison, Chair, Portland Harbor Community Advisory Group.

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Attachments

	Assets in	
Primary Responsible Parties	**Millions**	**Billions**
Arkema Inc	6.8	
Bayer CropScience	104	
BP-WEST COAST		315
EXXON-MOBIL		353
Greenbrier -Gunderson		1.5
NW Natural		2.93
Schnitzer Steel		3.3
Shell Oil	174	
Vigor Industrial	130	

Participating in CAG and Coalition activities, presentations and discussions:
Arbor Lodge Neighborhood
Beyond Toxics
Chinatown/Oldtown
Columbia Riverkeeper
Columbia Slough neighborhood
Cully
Dare to Dream 2
Ecotrust
Eliot
Forest Park/Northwest District Neighborhood Association
Freshwater Trust
Friends of Baltimore Woods
Friends of Cathedral Park
Friends of Columbia Gorge
Friends of Trees
George Middle School 7th Graders
Hacienda
Hmong American Community of Oregon

Impact NW
Iraqi Society
JOIN
Kenton
Latino Network
Lewis and Clark Trail Heritage Foundation
Lideras Verde
McCoy Academy
Native American Youth Association
Neighbors for Clean Air
Neighbors West-Northwest Neighborhood Coalition
Northwest District Neighborhood Association
North Portland residents via tabling St. Johns Farmer's Market
North Portland residents via tabling St. Johns Social
npGreenway
NAYA Native American Youth and Family Center
North Portland Chairs committee
North Portland Greenway Trail
Northwest Earth Institute
Occupy St. Johns
OPAL-Environmental Justice Oregon
Oregon Center for Environmental Health
Oregon Environmental Council
Oregon Physicians for Social Responsibility
Oregon Public Health Division
Overlook Neighborhood
Participants of the Big Float via tabling
Participants of the Cathedral Park Jazz Festival via tabling
Participants at the Portland State University Social Sustainability Colloquium
Portland Harbor Community Coalition
Portland Rising Tide
Portsmouth Neighborhood
Red-legged frog migration help organizers
Resolutions Northwest
ReWild Portland
SOLVE
Streetroots
The Science Project
Tualatin Riverkeeper
University Park Neighborhood Association
Willamette Speaks Story Telling: Linnton, St. Johns and NW Portland
Voice Public Involvement
350.org Portland Chapter
1700 signers of the petition against the CDF

University of Portland
Lewis & Clark University Law

Portland State University
Portland Community College
Oregon State University
University of Washington

Members of the Natural Resource Trustee Council
- Nez Pierce Tribe
- Confederated Tribes of the Warm Springs Reservation of Oregon
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes of Siletz Indians
- Confederated Tribes of the Grand Ronde Community of Oregon
- NOAA Fisheries
- U.S. Fish and Wildlife Service
- Oregon Department of Fish & Wildlife

Yakama Nation Fisheries
East Multnomah Soil & Water Conservation District
West Multnomah Soil & Water Conservation District

Business Associations
- Portland Alliance
- St Johns Booster
- St Johns – Main Street
- Portland Community Media

KBOO Radio Station

Oregon Department of Environmental Quality
News Release
Release Date: Jan. 9, 2014
Contacts:
Ron Doughten, Water Quality Program, Portland, 503-229-6991
Sarah Wheeler, Environmental Law Specialist, Portland, 503-229-6927

DEQ issues $9,636 penalty to Paramount Petroleum for stormwater permit violations at Portland asphalt plant

The Oregon Department of Environmental Quality issued a $9,636 penalty to Paramount Petroleum Corporation for stormwater permit violations at its asphalt plant at 5501 NW Front Ave. in Portland.

During the 2012-13 monitoring year, the company failed to monitor its stormwater discharge for pollutants that can impair water quality in the Willamette River. The company also discharged stormwater with levels of total suspended solids in excess of permitted limits and failed to complete and implement an exceedance report. In addition, Paramount Petroleum failed to meet the numeric limit for pH in its discharges on two occasions, and failed to conduct timely follow-up monitoring of one of those pH exceedances.

DEQ issued this penalty because a stormwater permittee is required to sample, analyze and report on its industrial stormwater discharges from asphalt emulsion activities to ensure its discharges meet water quality benchmarks and numeric limits in the permit. Failure to meet the benchmarks may indicate the presence of harmful levels of industrial pollutants in discharges to the Willamette River. Discharges outside of the permitted benchmarks for these pollutants may harm aquatic species and their habitat and reduce the safety of waters for public use.

Additionally, the reach of the Willamette River to which the asphalt plant discharges does not meet water quality standards for a number of pollutants, which is why the stormwater permit requires monitoring of those pollutants. Paramount Petroleum has until Jan. 21 to appeal the penalty.

DEQ enforces Oregon environmental laws to protect people's health and to keep our region's air, land and water clean and healthy. These compliance and enforcement efforts also help level the playing field by deterring violators who might otherwise have an unfair business advantage over their environmentally compliant competitors.

For more information about DEQ-issued penalties across Oregon and other information about DEQ's compliance and enforcement, please see the DEQ Office of Compliance and Enforcement web page .

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Oregon Department of Environmental Quality
811 SW Sixth Avenue, Portland, OR 97204 | Tel/503-229-5696

Petition signed by over 1700 community residents

No Toxic Waste Dump in North Portland

To: Governor John Kitzhaber, Secretary of State Kate Brown, State Treasurer Ted Wheeler

cc: Chip Humphreys, EPA, DEQ, Port of Portland, Division of State Lands (DSL), Portland Harbor Trustee Council

We the undersigned ask the Oregon State Land Board and state leaders to deny any request submitted for the purchase of submerged community-owned lands in or adjacent to the Willamette River at Port of Portland's Terminal 4 intended for the creation of a superfund confined disposal facility (CDF) or toxic waste dump in North Portland. We further reject the use of a confined disposal facility for the reasons listed below:

- North Portland is host to a garbage dump and sewage waste site and should not be considered for a toxic waste dumpsite, also known as a CDF*, as a matter of equity (*confined disposal facility).

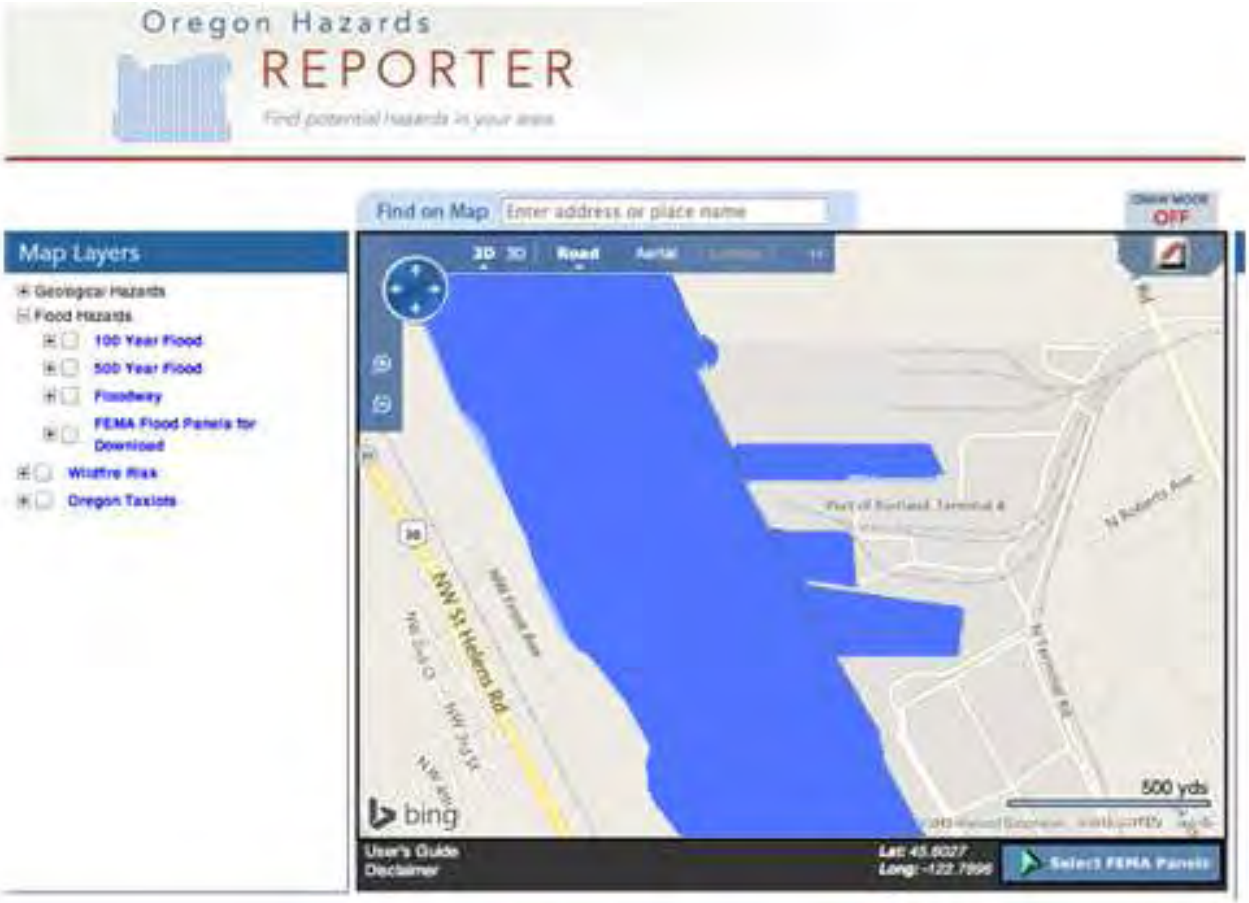
- The proposed dirt berm separating the toxic waste dump at T-4 from the Willamette River has not been proven to withstand major earthquakes or floods and a breech could re-contaminate the river and surrounding land.

- Highly toxic pollutants will seep into the river through the berm and continue to affect both animal and human health.

- Residential communities with toxic pollutants nearby have been shown in studies to have negative health effects including shortened life spans.

- There is some evidence of pollutants such as PCBs may become airborne and affect areas near the river causing negative health impacts on North Portlanders.

- We ask instead that efforts at T-4 be directed to protect sturgeon habitat at the site and restore off-channel habitat for sturgeon, salmon and other native fish and wildlife. We believe there is a unique opportunity to protect and restore additional habitat for native fish populations.



100 year flood zone

List of CDF problems

Here's a list of CDF problems and I will number them so you and I can keep track.

Note: Silver Valley and others were not all called CDF's, Silver Valley was called a *repository* but it is essentially the same. There are several names.

1. Delaware River – Pennsylvania Sending whole paper and website-- http://www.waterprotectionnetwork.org/sitepages/downloads/ToolsAndResources-Reports/CRN-trRpt-DelawareRiverDeepen.pdf

Description begins on page 32.

Confined disposal facilities, the primary disposal method currently proposed by the Army Corps, can be a significant source of toxic pollution for the Delaware River during the dewatering process. Money Island and Fort Mifflin, two existing dredge spoil disposal facilities, have been found to discharge Cadmium, Lead, Copper, Zinc and total suspended solids into the Delaware River at significant levels.80 These two disposal facilities were found to be the eighth largest discharger to the estuary and in the case of lead to discharge more lead than all the other 78 point source dischargers to the estuary combined.81 According to one expert: "CDFs have the potential to impact aquatic life through acute and chronic toxicity, and human health through the bioaccumulation of organic compounds such as PCBs and DDX." 82

Historically the Army Corps has represented that according to their data; levels of toxins in River bottom sediments are not high enough to pose any adverse environmental impact. Yet numerous experts and agencies have raised questions about the accuracy of the Army Corps' sediment and water quality claims.

• The University of Delaware's Sea Grant Program states: the "Corps' heavy metal and pesticide data disagree with ADL [Arthur D Little] data by 800% to 2800% for similar parts of the river" -- ADL values being higher, and that Corps conclusions are "doubtful" because Corps data "is often lacking many of the details, or appropriate references, as provided by ADL..."83

2. Delaware River waste dumped into New Jersey CDF and then leaked. http://www.state.nj.us/dep/newsrel/2010/10_0091.htm

From New Jersey Dept of Environmental Protection

(J's note) "I love it. Pennsylvania complained about the USACE dumping

Superfund Community Recommendations meeting 8-31-15, 2:30-4:30, St. Johns Library meeting room
Present: Travis Williams, Willamette Riverkeeper; Jim Robison, PHCAG; Doug Larson, PHCAG; Darise Weller, PHCAG; Jackie Calder, PHCAG; John Shaw, PHCAG; Barbara Quinn, PHCAG.

Discussion and combination of Peter deFur's and PHCAG recommendations resulted in joint draft community recommendations below. Priority will be on the top 3. Wording, prioritizing of points and possible consolidation will be done by email discussion.

DRAFT COMMUNITY RECOMMENDATIONS:

#1 The goal is to have a healthy lower Willamette River for fish, wildlife, and humans. Until the goal is met, ensure that efforts to discourage fishing are culturally appropriate.

#2 We do not support any clean up methods that leave contaminants in or adjacent to the river. (use Jackie's more specific wording)

#3 Include control of ongoing pollution sources, both local and upriver, in the final cleanup order.

#4 Monitored natural recovery leaves contaminants in the river that will eventually recontaminate or spread downriver. It remains highly controversial and has not, to our knowledge, been demonstrated to be effective on chemicals that do not degrade and in a system like the Lower Willamette River. Don't rely heavily on this remediation method.

#5 A human Health Impact Assessment is needed to inform the clean up.

#6 To minimize air and water contamination during the clean up, require independent air and water monitoring in real time and an action plan to limit exposure in case of excess contamination.

#7 More detailed and site-specific data is needed on all aspects of the clean up based on methods such as computer modeling

#8 Because the clean up must last into perpetuity, the phrase "long-term" in the Feasibility Study and clean up order should be understood as "in perpetuity."

#9 Hire from local communities and educational institutions to work on the clean up. Follow the Davis-Bacon Act to work on technologies for the cleanup.

#10 Ensure that financial tools are in place to cover possible recontamination events. An example would be surety bonds based on inflation to address recontamination over the long-term.

#11 Establish a Pollution Prevention & Mitigation Fund (2.5%) for as long as the