PETITION TO THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Portland Harbor Superfund Site, Portland, Oregon Superfund Site Identification No. ORSFN1002155	Submitted March 9, 2020 to the Administrator of U.S. Environmental Protection Agency

PETITION FOR MODIFICATIONS TO PORTLAND HARBOR SELECTED REMEDY

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Glossary of Common Terms

ARAR – "applicable" and "relevant and appropriate" requirements
BERA – Baseline Ecological Risk Assessment
BHHRA – Baseline Human Health Risk Assessment
CAG – Community Advisory Group
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC – contaminant of concern
CSM – conceptual site model
CUL – cleanup level
Cy – cubic yard
D/F – dioxins / furans
DDx – dichlorodiphenyltrichloroethane and its derivatives
DEQ – Oregon Department of Environmental Quality
ENR – enhanced natural recovery
EPA – U.S. Environmental Protection Agency
ESD – Explanation of Significant Differences
FS – Feasibility Study
LWG – Lower Willamette Group (former Portland Harbor PRP group)
MNR – monitored natural recovery
NAPL – non-aqueous phase liquid (often concerning petroleum wastes)
NCP – National Contingency Plan
NRRB – EPA's National Remedy Review Board
PAH – polycyclic aromatic hydrocarbons
PCB – polychlorinated biphenyl
PCI Group – Participation and Common Interest Group (Portland Harbor PRP group)
PDI – Pre-Remedial Design Investigation
PRG – preliminary remediation goal
PRP – potentially responsible party
PTW – principal threat waste
RAL – remedial action level
RAO – remedial action objective
RD – Remedial Design
RI – Remedial Investigation
RM – River Mile
RME – reasonable maximum exposure
ROD – Record of Decision
SDU – Sediment Decision Unit
SMA – Sediment Management Area

SOW – Statement of Work
SWAC – surface area weighted average concentration

I. INTRODUCTION

This Petition is a request for a modification to the remedy selected for the Portland Harbor Superfund site (the "Site").

It is submitted on behalf of: Schnitzer Steel; Evraz Inc. NA; Gunderson; and Vigor Industries ("Petitioners"). It is also submitted to preserve the interests of over 90 other parties, including small and large businesses in the Portland area, that are participating in the Portland Harbor allocation process, that helped to fund the sampling and investigation work that led to this Petition, and that have a strong interest in securing the rapid implementation of an environmentally protective remedy for the Site.

Petitioners are submitting this Petition to the Administrator of the U.S. Environmental Protection Agency pursuant to the National Contingency Plan ("NCP"), 40 C.F.R. § 300.825, and ask that EPA, as its substantive response to this Petition and the comments provided in it, modify the Site remedy. The NCP requires EPA to consider and respond to this Petition because it contains significant new information that supports alterations of the response action as described below.[1]

In 2017, EPA issued its Record of Decision ("ROD") which specified and explained the remedy that EPA selected for the Site. However, the remedy decision embedded in the ROD was largely based on very old data, most collected in 2004 and 2006 sampling events. EPA admitted in the ROD that the data was stale, and would need updating.

This was not the only problem with the ROD. EPA's decision-making and administrative process in adopting the remedy were seriously flawed. The ROD as it stands is not defensible. The problems with EPA's decision making and the ROD are described at length in Section V of this Petition.

To EPA's credit, it recognized the need to update the Site data. In late 2017, EPA entered into an administrative settlement and order on consent with four parties to update the data through a Pre-Remedial Design Investigation ("PDI"). The 2018 PDI sampling work was the most comprehensive multimedia sampling effort at the Site since 2004. The PDI Report was submitted to EPA in June of 2019. The results conclusively show that the old data EPA relied on in the ROD do not accurately reflect Site conditions.

The new data confirm that current risks to human health and the environment at the Site have decreased dramatically due to the successful implementation of ongoing source control efforts, and the beneficial effects of natural attenuation. In light of these significant changes in baseline risks, it is evident that a less intensive remedy, that will be faster to implement and at least equally effective, is warranted.

In particular, the Site does not need as much dredging as EPA assumed in 2017, when it relied on the out-of-date data from 2004 - 06. It is now clear that EPA can achieve the same or

[1] *See* 40 C.F.R. § 300.825(c) (requiring EPA to consider comments that "contain significant information not contained elsewhere in the administrative record file which would not have been submitted during the public comment period and which substantially support the need to significantly alter the response action").

faster protection of human health and the environment by updating the remedy to ensure that it can be completed more quickly and with less cost and disruption to the community.

As discussed in this Petition, the PDI data constitutes "significant new information" that requires EPA to "significantly alter" its selected remedy. Failure to do so would violate the NCP and constitute an arbitrary and capricious act.

The 2018 data, summarized in the PDI Data Evaluation Report, supports a broad set of changes to EPA's remedy decision. In discussions with EPA since the June 2019 submission of the PDI report, however, the Petitioners have worked hard to narrow their request for modifications so as to limit the changes to those most critically needed.

The Petitioners have identified a subset of changes to the remedy that are particularly crucial. The changes include:

(1) updates to certain remedial action levels ("RALs");

(2) fixes to the remedy specifications, the decision tree, and the "applicable" or "relevant and appropriate" requirements ("ARARs") to allow capping without dredging and dredging without backfill in certain areas; and

(3) updates to the groundwater cleanup levels for arsenic and manganese.

These key changes are supported by the current data and best scientific understanding of the Site. They are discussed in greater detail in Section IV of this Petition. Making these changes would also provide EPA with an opportunity to correct some of the most glaring defects in the ROD. As documented by this Petition in Section V, the Portland Harbor ROD is fundamentally flawed and would never withstand review under an arbitrary and capricious standard.

The Petitioners specifically request that EPA adopt these three requested changes to the remedy by the appropriate administrative means — preferably by an Explanation of Significant Differences ("ESD"), as authorized under 40 C.F.R. §300.435(c)(2)(i).

If EPA is unwilling to grant this limited request, then the Petitioners ask that EPA consider and grant the Petitioners request for the full suite of changes to the remedy that are supported by the PDI report. Those changes include both the highest priority changes, discussed in Section IV of this Petition, and also the additional changes that are discussed at greater length in Section VII.

For EPA to implement the full set of requested changes would likely require an Amendment to the Record of Decision ("ROD Amendment"). Such an action may take longer, and could lead to a delay in implementation of the remedy. That delay is not the Petitioners preferred path. However, if EPA will not grant the Petitioners first, more limited request, then the Petitioners ask that EPA issue a determination on their full request and grant the modifications to the Portland Harbor remedy that are described in both Sections IV and VII of this Petition.

II. BACKGROUND

The Portland Harbor Site extends along 9.9 miles of the lower Willamette River, from river mile 1.9 to 11.8. EPA listed the Site on the National Priorities List in December 2000. A remedial investigation and a feasibility study were performed between 2001 and 2016 at a cost of over $115 million. Unfortunately, the Remedial Investigation/Feasibility Study ("RI/FS") process took far longer than anticipated, and by the time the ROD was issued, the data that provided the basis for EPA's decision no longer reflected actual in-river conditions.

On January 3, 2017, EPA issued a Record of Decision selecting a remedy to be implemented for long-term Site cleanup. Because key site data were out of date, the ROD explicitly called for a post-ROD sampling effort to evaluate and update the assessment of Site conditions, and, if necessary, the selected remedial actions.

In December 2017, four potentially responsible parties[2] voluntarily entered into an Administrative Settlement Agreement and Order on Consent to perform the PDI sampling. The PDI fieldwork was implemented between March 2018 and May 2019.

The data collected during the PDI work confirm that the Site has recovered significantly in the decade and a half since the last comprehensive sampling program was performed. Concentrations of the focused contaminants of concern have decreased in surface water and surface sediment across the entirety of the Site. Similarly, fish tissue concentrations of focused contaminants of concern ("COCs") have significantly decreased. The PDI study also confirms that the areas of the Site that show elevated concentrations have not migrated substantially.

The PDI results show that several important updates are needed to the remedial approach outlined in the ROD. Adoption of the remedy modifications requested in this Petition would be consistent with EPA's guidance emphasizing the use of adaptive management as a core strategy for addressing contaminated sediment sites.[3] The modifications will also help to optimize and accelerate Site cleanup while resulting in a long-term remedy that is protective of human health and the environment.

Key Findings of the PDI Report

The PDI program generated a set of significant and robust findings, thanks to the volume of data that was collected across multiple media. Those findings are:

- **System Recovery Is Occurring Broadly and Rapidly.** Multiple lines of evidence from the PDI show that Site recovery is consistently occurring on both localized and Site-wide scales.
- **The System and Sediment Bed Are Hydrographically and Geomorphologically Stable.** The PDI bathymetry study shows that river flows and sediment bed have remained consistent and stable throughout decades of human activity and episodic natural events. This long-term stability provides confidence that areas of the Site with concentrations of

[2] Arkema Inc., Evraz Inc. NA, Schnitzer Steel Industries, Inc., and The Marine Group LLC.

[3] *See* EPA, *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* ("Contaminated Sediment Guidance")(2005); EPA, Portland Harbor Superfund Site Sampling Plan for Pre-Remedial Design, Baseline and Long-Term Monitoring (Revised Working Draft), June 6 2017.

COCs above the ROD cleanup levels have not migrated substantially and that *in situ* remedial technologies are likely to remain stable over time.

- **Surface Sediment Concentrations and Surface Area Weighted Average Concentrations ("SWACs") Have Improved.** COC concentrations in surface sediments have decreased throughout the Site. This is most clearly illustrated by the statistically significant reductions in spatially weighted average concentrations of total PCBs since 2004 at multiple spatial scales.
- **Upstream Conditions Support Updates to Background.** PDI data show that concentrations in the areas upstream of the Site continue to exceed ROD sediment cleanup levels ("CULs") and fish tissue targets for a number of the focused COCs, including total PCBs, DDx, and dioxins and furans. The PDI data demonstrate that the ROD CULs and risk-based tissue targets for those focused COCs cannot be realistically achieved and sustained.
- **Fish Consumption Risk Is Reduced Relative to Previous Estimates.** PDI small mouth bass tissue sampling shows significant reductions in concentrations relative to historical tissue data and a corresponding significant decrease in the risk from fish consumption since the Baseline Human Health Risk Assessment was produced using the now obsolete RI/FS data set.

These key findings are explained in detail in the PDI report. Taken together, they warrant the significant modifications to and updating of the remedy requested by the Petitioners.

III. LEGAL FRAMEWORK FOR MODIFICATION OF THE REMEDY

In accordance with the NCP and its own guidance, EPA must respond to this petition and should make the requested changes. EPA must consider and respond in writing to a petition to change a selected remedy when the petition is based on information and comments that are: (1) significant; (2) not otherwise contained in the administrative record; (3) could not have been submitted during the public notice and comment period; and (4) "substantially supports the need to significantly alter the response action."[4] Here, the new data was not available when EPA issued the ROD, and it supports significant updates to the remedy as described below.

EPA shall make changes to a selected remedy under certain circumstances.[5] EPA can incorporate proposed changes to a selected remedy in two ways: by issuing an ESD or by amending the ROD. An ESD requires EPA to explain to the public "the nature of the significant changes" and the reason for such changes.[6] An ESD must also "affirm that the revised remedy complies

[4] 40 C.F.R. § 300.825(c); Memorandum from the EPA Re: Answers to Comments Submitted After the Superfund ROD is Signed, at 1 n.1 (Sept. 21, 1995) (citing OSWER Directive 9355.3-02 ("Guidance on Preparing Superfund Decision Documents," Interim Final, July 1989) and OSWER Directive 9833.3A-1 ("Final Guidance on Administrative Records for Selecting CERCLA Response Actions," December 1990)).
[5] *See* 40 C.F.R. § 300.825(c); 40 C.F.R. § 300.435(c)(2).
[6] EPA, A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Documents § 7.0, at 7-2 (July 1999) [hereinafter "ROD Guidance"].

with the NCP."[7] But an ESD does not require the reissuance or amendment of the ROD. On the other hand, a ROD amendment requires EPA to re-analyze the nine remedy selection criteria and provide an opportunity for public notice and comment.[8]

While EPA has discretion to determine whether it will issue an ESD or amend the ROD, EPA must address and should make the Petitioner's requested changes. If EPA determines that a change is "significant," then the agency will issue an ESD.[9] A change is "significant" if it is a "generally incremental change[] to a component of a remedy that do[es] not fundamentally alter the overall remedial approach."[10] On the other hand, if EPA determines that a change is "fundamental," then the agency must amend the ROD.[11] A change is "fundamental" if it fundamentally alter[s] the basic features of the selected remedy with respect to scope, performance, or cost."[12]

EPA has issued ESDs and ROD amendments for a wide variety of reasons. For example:

- A 1997 ESD by Region 10 at the Commencement Bay Nearshore/Tideflats in Washington increased sediment RAL for PCBs from 240-300 ug/kg to 450 ug/kg and the PCB sediment quality objective from 150 ug/Kg to 300 ug/kg to be achieved 10 years after cleanup. In issuing the ESD, Region 10 noted "EPA believes it is appropriate in some circumstances to make changes to existing Superfund sites to enhance overall remedy effectiveness and cost-effectiveness, as long as it does not compromise protectiveness or other objectives of the Superfund program."[13]

- A 2007 ROD Amendment was issued for the Lower Fox River and Green Bay superfund site in response to *new data* that was collected and analyzed after the ROD was issued. The remedial design sampling supported the conclusions that (1) a much higher volume of contaminated sediment would need to be dredged than anticipated in the ROD and (2) the projected SWAC goals would not be met even if that larger volume of sediment was dredged. The amended remedy cut dredging volume in half and reduced the cost and time of construction.

- A 2010 ESD at the Sheboygan River and Harbor in Wisconsin data changed the areas of dredging based on post-ROD sampling, requiring less dredging overall than under the ROD.

- A 2002 ESD at the Harbor Island (Lead) Superfund Site in Seattle Washington increased the soil RAL for hot spots of TPH and changed excavate and cap locations based on post-ROD investigation work. In issuing the ESD, Region 10 noted that

[7] *Id.*
[8] *Id.* at 7-5
[9] 40 C.F.R. § 300.435(c)(2)(i); ROD Guidance at 7-2.
[10] 55 Fed. Reg. 8666, 8772 (Mar. 8, 1990); *see* ROD Guidance at 7-2.
[11] 40 C.F.R. § 300.435(c)(2)(ii); *see also* ROD Guidance at 7-2, 7-5.
[12] 40 C.F.R. § 300.435(c)(2)(ii).
[13] Explanation of Significant Differences, Commencement Bay, Near Shore/Tide Flats, Operable Unit 01 – Sediments & Operable Unit 05 – Source, Pierce County, WA, at 1 (July 28, 1997) available at https://nepis.epa.gov/Exe/ZyPDF.cgi/9100NGII.PDF?Dockey=9100NGII.PDF.

"[s]ubsequent to the ROD, pre-remedial design studies . . . have better defined the nature and extent of contamination" and stated "[t]h[e] sediment characterization has been further used by EPA to determine the most technically feasible, cost-effective approach for implementing the dredge and cap remedy."[14]

- A 2015 ESD for the Harbor Island Lockheed Sediment Operable Unit updated the remedy based on additional information from the pre-remedial design investigation. "Subsequent to the ROD, pre-remedial design studies for the Lockheed Shipyard Sediment Operable Unit have better defined the nature and extent of contamination. The sediment characterization has been further used by EPA to determine the most technically feasible, cost-effective approach for implementing the dredge and cap remedy." The ESD changed the dredge and cap locations by sediment management area and the size of the contaminated area requiring remediation.

- A 2001 ESD for the Upper and Lower Harbor Operable Unit of the New Bedford Harbor Superfund Site located in New Bedford, Massachusetts changed the RAL for PCBs based on post-ROD sampling and a dredging field test.

- A 2014 ESD for the Onondaga Lake Bottom Sub-site of the Onondaga Lake Superfund Site in Syracuse, New York, in part, reduced the extent of dredging because additional sampling in the subject area found that dredging in the vicinity of a particular shoreline area could result in shoreline and railroad line instability.

- A 2019 ESD for the Centredale Manor Restoration Project Superfund Site in North Providence, Rhode Island, in part, modified the source area soil CULs to reflect leachability criteria for soils based on Rhode Island's new groundwater protection program.

- A 2019 ESD by Region 10 at the Portland Harbor Site itself revised the CULs and principal threat waste thresholds for carcinogenic polycyclic aromatic hydrocarbons ("cPAHs") and changed the total PAH RAL from 13,000 to 30,000 ug/kg thereby reducing the area of active remediation.

As demonstrated by EPA's approach at these and other Superfund sites across the country, EPA can and should update ROD remedies where circumstances warrant. As can be seen by these examples, many of these updates were based on pre-remedial design information and were implemented prior to remedy design. EPA should follow the same approach and modify the selected remedy here.

IV. PROPOSED FOCUSED MODIFICATIONS TO THE REMEDY

The new PDI data support a broad set of changes to EPA's remedy decision. However, in an effort to expedite moving the site forward quickly, the Petitioners have worked hard to narrow this request for modifications in an effort to limit the changes to those most critically needed.

[14] EPA Superfund Explanation of Significant Differences: Harbor Island (Lead), at 17 (Feb. 22, 2002) available at https://semspub.epa.gov/work/HQ/185801.pdf.

The Petitioners specifically request that EPA adopt the following three requested focused changes to the remedy by the appropriate administrative means — preferably by an ESD, as authorized under 40 C.F.R. § 300.435(c)(2)(i).

If EPA is unwilling to grant this limited request, then the Petitioners ask that EPA consider and grant the Petitioners' request for the full suite of changes to the remedy that are supported by the PDI report. Those changes include both the highest priority changes, discussed below in this Section IV, and also the additional changes that are discussed at greater length in Section VI.

A. Update Remedial Action Levels

EPA should update the Portland Harbor RALs based on the 2018 PDI data. RALs are a common tool at sediment sites used to evaluate different remedial alternatives to ensure that sediment CULs can be achieved in a reasonable time frame.[15] CULs are the long-term contaminant concentrations that must be achieved to ensure protection of human health and the environment.[16] Like CULs, RALs are contaminant specific concentration thresholds, but they identify the maximum level of contaminants that can exist within a given area to ensure that the area, as a whole, will meet the required CUL. RALs are critical for sediment cleanups because they are used to delineate areas of capping or dredging. At Portland Harbor, these areas of active remediation are called sediment management areas ("SMAs").[17]

EPA developed a range of RALs for Portland Harbor based on the surface sediment data for each focused COC.[18] This range was developed by plotting the acres of contaminated sediment remediated against the resulting post-construction sediment concentrations.[19] Each point on the curve represents a possible RAL and corresponds to the volume or acreage of material that would have to be remediated in order to achieve the associated post-construction sediment concentration.[20] As the value of the RAL decreases, the areas of dredging or capping increases, resulting in more intensive alternatives. EPA selected various points on the curves as the basis to develop remedial alternatives.

The 2018 PDI data demonstrates that the RALs in the ROD are no longer valid and should be updated to reflect more current Site conditions. EPA has updated RALs and action levels where

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[15] EPA, Portland Harbor Record of Decision ("ROD"), at 59 (2017).
[16] *Id.* at 53.
[17] *Id.* at 59.
[18] The six "focused COCs" identified in the ROD are polychlorinated biphenyls (PCBs); total polycyclic aromatic hydrocarbons (PAHs); dichlorodiphenyltrichloroethane and its derivatives (DDx); and three dioxin/furan congeners (2,3,7,8-tetrachlorodibenzo-p-dioxin [TCDD]; 1,2,3,7,8-pentachlorodibenzo-p-dioxin [PeCDD]; and 2,3,4,7,8-pentachlorodibenzofuran [PeCDF] (EPA 2017a, p. 59) (EPA 2017a, Table 21). The remedial alternatives, including the selected remedy, Alternate F Modified (Alt F Mod), were developed using focused COC data. As stated in Section 10.1 of the ROD,

> *The COCs used to define the SMA boundaries encompassed most of the spatial extent of contaminants posing the majority of the risks as identified in the baseline risk assessments. However, since it is difficult to design a range of alternatives for multiple COCs that have different distributions in various media throughout the Site, the FS alternatives were developed using COCs that were the most widespread and posed the greatest risk, called "focused COCs."*

[19] *Id.* at 59.
[20] *Id.* at 59.

warranted in the past, including in Region 10. For example, as noted above, EPA has done so at the Commencement Bay/Thea Foss site in Tacoma, WA, the Harbor Island (soil cleanup) site in Seattle, and even at the Portland Harbor Site itself for PAHs. Modifying the RALs to account for the natural recovery that has occurred at Portland Harbor will advance, not detract from, EPA's remedial goals. Updating the RALs will allow for a cleanup that achieves EPA's remedial goals more quickly, at less cost, and with less disruption for the community, compared to the current RALs as discussed below.

1. *RALs Are Dynamic Values Dependent on Surface Sediment Concentrations*

Since RALs are calculated based on the levels of contaminants found in the sediment, RALs can change over time. RALs are dynamic because they are a function of surface sediment concentrations.[21] In other words, if site conditions worsen over time, then a more stringent RAL would be necessary to achieve the target post-construction CUL. In contrast, if site conditions have improved, then a less stringent RAL will achieve the same remedial goals. This is inherent in the method of calculating RALs. RALs are calculated based on a relationship between the current and target surface weighted average concentrations—i.e., the concentration of a contaminant in sediment calculated as an average over a specified area. The RAL is the value that corresponds to the amount of contaminated sediment, based on the current SWAC, that needs to be remediated in order to achieve the target post-construction SWAC.[22]

At sediment sites, contaminant concentrations can change over time due to the dynamic nature of river environments. A decrease of contaminants from natural processes is referred to as "natural recovery." Natural recovery includes many different physical, chemical, and biological processes. In rivers such as the Willamette, natural recovery also occurs due to the deposition of cleaner sediment from upstream as well as dispersion and mixing.[23] These processes reduce contaminant concentrations in sediment over time.[24]

Monitored natural recovery is a key component of the Portland Harbor remedy. The effectiveness of natural recovery processes depends in large part on surface sediment concentrations; sediment concentrations need to be low enough that natural processes will achieve CULs in a reasonable time frame.[25] In areas where natural recovery processes are not expected to be effective within a reasonable time frame, EPA applies active remedial measures — dredging or capping — to immediately reduce sediment concentrations.[26] The sediment concentrations triggering the application of dredging or capping are defined by RALs.[27]

The 2018 PDI data confirms that substantial recovery has occurred at the Site since 2004 when the largest sediment data set used in the ROD was collected. Over the past 16 years, substantial source control efforts have been implemented allowing natural recovery processes to

[21] *Id.* at 59.
[22] EPA, Portland Harbor Feasibility Study ("FS"), App. D, at D-1 (2016).
[23] ROD at 66.
[24] *Id.*
[25] *Id.* at 101.
[26] *Id.* at 59.
[27] *See id.* The presence of principal threat waste (PTW) also determines that footprint of active technology areas.

proceed. A RAL calculated for a sediment site using data obtained years prior to the engineering design process (which is the case at Portland Harbor) is likely to vary significantly from a RAL based on conditions at the time of the design process. If a RAL is based on a "snapshot" of site conditions from some time in the past, its value will not represent current site conditions, and it will lead to sub-optimal choices in the selection and application of remedial alternatives and technologies.

2. *The Pre-Remedial Design Investigation Shows that Portland Harbor Is Broadly and Rapidly Recovering*

The PDI work was the most comprehensive, multi-media sampling effort performed at Portland Harbor since 2004. The PDI Report definitively shows that Site conditions have improved considerably and are no longer accurately represented by the older RI/FS data set used in the ROD.

a. Extensive Deposition of Cleaner Sediment

The PDI studies show that Portland Harbor is subject to extensive sediment deposition. Over the past 14 years, there has been approximately 5 million cubic yards (cy) of net deposition site-wide, averaging about 1.5 ft of accumulation. During that same period, approximately 491,000 cy of sediment has been deposited in the 339 acres of ROD SMA footprints, which amounts to an average of nearly a foot of deposition throughout the area. Such deposition of cleaner sediments is a primary mechanism of natural recovery. The evidence that Portland Harbor is net depositional supports expanded reliance on monitored natural recovery as a cost-effective and less intrusive remedial technology.

b. Declining Surface Weighted Average Concentrations

The positive effects of ongoing sediment deposition are evident in declining focused COC concentrations in surface sediment. SWACs for the focused COCs have shown statistically significant declines on multiple spatial scales. The most significant reductions are seen in depositional areas.

PCBs. The 2018 Site-wide SWAC for PCBs is 44 µg/kg, a 52% decrease from the SWAC reported in the ROD.[28] There have also been statistically significant declines on a Rolling River Mile ("RRM") scale (95% of the SWACs are lower than ROD SWACs) and Sediment Decision Unit ("SDU") scale (2018 SWACs anywhere from 10% to 85% lower than ROD SWACs).[29] Outside of SMAs, SWACs have largely recovered to background conditions for PCBs.

DDx. The 2018 Site-wide SWAC for DDx has decreased 31% from the SWAC reported in the ROD.[30] There have also been statistically significant declines in 82% of RRMs and in 2 of the 3 DDx-focused SDUs (14% and 36% lower).

[28] PDI Rep. at xvi, 35, App. D.2.
[29] PDI Rep. at 16.
[30] *Id.*

PAHs. The 2018 Site-wide SWAC for PAHs has decreased 79% from the SWAC reported in the ROD. There have also been statistically significant declines in 65% of the RRMs and within 5 of the 6 PAH-focused SDUs (23% to 74% lower).

Assessment of temporal trends for the focused dioxin/furan congeners (D/F) congeners (2, 3, 7, 8-TCDD, 1, 2, 3, 7, 8-PeCDD, and 2, 3, 4, 7, 8-PeCDF) is constrained by (i) the low data density of the RI/FS data and (ii) the large percentage of qualified D/F data for the PDI dataset. But, the PDI data shows that background and Site-wide concentrations of D/F were significantly higher than understood in the ROD.[31]

c. Declining Fish Consumption Risk

Concentrations of PCBs, DDx, and three D/F congeners in fish tissue have also shown statistically significant declines.[32] Since 2002, the median total PCB concentration in Site whole body smallmouth bass tissue has decreased 65% and median concentrations of DDx and three D/F congeners have also declined by at least half (64%, 55%-76%, respectively).[33] Current smallmouth bass tissue samples are within the range of upper confidence limits and upper tolerance levels of upstream smallmouth bass samples.[34] Applying the 2013 Baseline Human Health Risk Assessment ("BHHRA") exposure assumptions, cancer risks and non-cancer hazards have decreased by 70% to 96%.[35]

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Thus, conditions at Portland Harbor have improved significantly since 2004. Focused COC concentrations have decreased in surface sediment and fish tissue and risks from fish consumption have decreased. The PDI studies are proof that natural recovery processes are effective and ongoing. EPA should update the Portland Harbor RALs to reflect the reality of current Site conditions.

3. *The RALs Should Be Updated Based on Current Site Conditions*

Given the substantially improved conditions at the Site, reflected in the significant decrease in SWACs, the sediment RALs can and should be updated prior to the remedial design phase. Because RALs are a function of SWACs, when the SWACs decrease, the RALs needed to achieve the same target SWAC increase. The new data therefore shows that EPA can achieve the same post-construction target SWACs identified in the ROD with fewer acres actively remediated. The PDI Evaluation Report summarizing the 2018 data presents updated RAL curves applying the same hill-topping methodology used by EPA in the FS and the ROD, but with the new and more relevant site-wide data.[36] For each targeted contaminant of concern, a RAL and the post-

[31] PDI Rep. App. E.
[32] PDI Rep. at 12.
[33] *Id.*
[34] *Id.*
[35] *Id.* at 23.
[36] A detailed explanation of the RAL methodology used by the Pre-RD AOC Group, including a comparison to the RAL methodology used by EPA in the FS/ROD, is set forth in App. I to the PDI Report.

construction target SWAC was selected from the RAL curve range.[37] A priority was given to the choosing a RAL with post-construction target SWACs similar to the ROD.

This analysis shows that the RALs for PCBs, DDx, and the three D/F congeners[38] should be updated based on the 2018 data as follows:

Focused COC (in µg/kg)	**ROD Site-Wide RAL**	**Updated Site-wide RAL per PDI Data**	**Basis for Update to Site-wide RAL**
Total PCBs	75	200[39]	Achieves a Site-wide SWAC of 20.5, which is better than the Alt F mod post-construction SWAC of 24 µg/kg reported in ROD
DDx	160 *	578/160	578 µg/kg is the goal for ROD RAO 5 (578 achieves a lower Site-wide SWAC [9.6] than the 16 µg/kg achieved by ROD Alt F mod) The 160 µg/kg is the ROD value to be applied in the Sediment Decision Unit RM7W[40]
2,3,7,8-TCDD	0.0006 *	0.0011	95% upper confidence limit ("95 UCL") background concentration of the 2018 PDI downtown / upriver (D/U) reach sediment data used as target SWAC because SWAC reported in ROD did not fall within RAL curve range
1,2,3,7,8-PeCDD	0.0008 *	0.025	95 UCL background concentration of the 2018 PDI D/U reach sediment data used as target SWAC because SWAC

[37] PDI Rep., App. I at 5-7.

[38] The RAL for polycyclic aromatic hydrocarbons (PAHs) has already been updated by EPA in a December 2019 ESD. EPA, Portland Harbor Explanation of Significant Differences (Dec. 2019).

[39] The analyses in the PDI Report support an updated RAL of 350 µg/kg in order to achieve EPA's target PCB SWAC. Out of conservatism to ensure protection of human health and the environment, and for consistency with the principal threat waste levels in the ROD, Petitioners request that EPA update the PCB Site-wide RAL to 200 µg/kg from the current 75 µg/kg.

* The ROD RAL curves cover a small area of the Site where adequate data were available; the RAL was then applied Site-wide. For the PDI data evaluation, Site-wide RAL curves were developed using the Site-wide 2018 dataset.

[40] Out of conservatism, the RM 7W SDU can be addressed by applying the DDx ROD/Alt F Modified nearshore RAL of 160 µg/kg and the higher ESD Approach RAL (578 µg/kg RAL) for the remainder of the Site. Discussed in more detail *infra* Section IV.D.

			reported in ROD did not fall within RAL curve range
2.3.4.7.8-PeCDF	0.2 *	0.35	Same SWAC of 0.002 µg/kg as reported in ROD

4. *The Updated RALs Provide a Remedy that is as Protective as the ROD Remedy at Less Cost and Disruption*

Adopting the updated RALs will be protective of human health and the environment; will meet the interim risk targets set by EPA in the ROD; and will address the non-focused COCs.

The revised remedy will shrink the footprint of active remediation from 354 to 176 acres. This not only reduces the cost of the remedy from approximately $2.5 billion to $1.3 billion, but will also significantly reduce the disruption to the community and the environment. As discussed further *infra*, it is well-documented that dredging projects release contaminated sediments that cause fish tissue concentrations to increase. Tissue concentrations may remain elevated for years afterward.

At Portland Harbor, EPA itself has acknowledged the adverse impacts of fish exposure to increased levels of contaminants from sediments being disturbed by dredging activities in the selected remedy. EPA noted that the then-existing Oregon Health Authority fish advisory at the Site which limits fish meals to no more than 12 per year for the general population would be reduced to allow no more than 0.6 fish meals per year during the construction period — just 5% of the pre-construction consumption levels for the at least 13 years and more likely 26 years of the construction period.[41]

EPA described these adverse impacts of dredging as follows:

> "During implementation of EPA's selected remedy, fish could be exposed to increased levels of contaminants from sediments being disturbed by dredging and capping activities. During construction, people would be advised to eat no more than 0.6 fish meals per year or 4.8 ounces per year (considering an 8-ounce fish meal) for most populations and 0.1 fish meals (8 ounces per year) for women who may breastfeed. This advisory would be in place for the 13 years of construction of the selected remedy."[42]

In April 2018, the Oregon Health Authority updated its fish advisory to reflect the increased exposure to fish during the dredging and also taking into account the extended post-construction period that would be required for fish to recover. The Oregon Health Authority's revised fish advisory recommends that no resident fish or shellfish be eaten from the Site during construction and until new data are available.

[41] EPA, Portland Harbor Proposed Plan ("Proposed Plan"), at 58 (2016).
[42] EPA, Portland Harbor ROD, Responsiveness Summary, at 2-28 to 2-29 (2017).

In its Frequently Asked Questions for the updated fish advisory, the Oregon Health Authority explained this as follows:

> "When cleanup starts for the Superfund site, the cleanup activities will disturb the contaminated mud and sediments where the pollution is. Because of this, OHA will recommend that NO resident fish or shellfish be eaten from the Lower Willamette River. OHA will update the advisory to 0 resident fish and shellfish until new data is available."[43]

The extent of natural recovery demonstrated by the PDI data show that the extensive dredging contemplated by the ROD is unnecessary. EPA can significantly reduce the amount and duration of dredging and achieve an equally protective remedy by adopting the updated RALs. The proposed modifications will facilitate the prompt remediation of Portland Harbor and benefit the community and the environment.

5. *The 2017 ROD Was Based on Stale Data at the Time it Was Issued*

Region 10's selected RALs are based on a data set that was stale at the time of the 2017 ROD. The Region chose to ignore that defect and issue a flawed ROD. The Region's refusal to consider the improvements in Site conditions before it issued the ROD was arbitrary and capricious, and another reason that EPA should update the RALs based on the PDI data. *See, e.g.*, *Dist. Hosp. Partners, L.P. v. Burwell*, 786 F.3d 46, 56-57 (D.C. Cir. 2015) ("To be clear, agencies do *not* have free rein to use inaccurate data. . . . These requirements underscore that an agency cannot *ignore* new and better data."); *Northern Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1086 (9th Cir. 2011) ("Reliance on data that is too stale to carry the weight assigned to it may be arbitrary and capricious.").

The largest dataset in the RI/FS database was collected in 2004, and other datasets used extend back as far as 1997.[44] On the original project timeline, it was expected that a ROD would be issued by 2009. But the project timeline expanded, and the ROD was not be issued until 2017. As the Project fell behind schedule, the 2004 sediment data became less and less representative. Three factors were particularly significant for changing Site conditions. First, Oregon Department of Environmental Quality (DEQ) progressively controlled sources of contamination from upland sites. By 2014, DEQ had completed source control activities at 119 of 168 uplands sites that were screened as potential sources of contaminants to the River. Second, DEQ was completing remedial actions in the downtown reach (e.g., Zidell waterfront property and River Miles 13.1 and 13.5). Third, natural recovery processes were ongoing.

By 2012, Region 10 recognized that it needed to update its understanding of Site conditions and ordered the Lower Willamette Group ("LWG") to collect additional smallmouth bass tissue samples. After collecting and analyzing the samples, LWG concluded that there were statistically significant declines in smallmouth bass PCB tissue concentrations compared to previous data

[43] *See* Oregon Health Authority, Lower Willamette Fish Advisory, Frequently Asked Questions, https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/RECREATION/FISHCONSUMPTION/Pages/Lower-Willamette-Fish-Advisory.aspx (last accessed Mar. 6, 2020).
[44] EPA, Portland Harbor, Remedial Investigation ("RI"), at 2-26 (2016).

sets.[45] LWG's analysis showed a pattern of recovery that was consistent with a system approaching, and in many places achieving background.[46] But, Region 10 refused to compare the 2012 dataset to the previous datasets based on purported differences in sampling methodology.

In order to more fully study the changes in Site conditions suggested by the 2012 smallmouth bass data, a group of industry stakeholders conducted a site-wide study of surface sediment PCB concentrations in 2014.[47] The results of the study were consistent with the 2012 smallmouth bass data. The data showed statistically significant declines in PCB concentrations both site-wide and by river mile. But again, Region 10 refused to consider the new data. The Region tied its refusal to consider the new data to its need to issue a ROD by 2017.[48]

Thus, since at least 2012, it has been evident that Site conditions have substantially improved from the 2004 data. But Region 10 has repeatedly ignored the changes in Site conditions. Despite multiple datasets that showed that the 2004 data were no longer representative, Region 10 issued a ROD based on stale data. The ROD RALs were inaccurate at the time the ROD was issued. EPA should fix that mistake by updating the RALs based on the PDI data.

6. *The RALs Should be Updated Prior to Remedial Design*

The outdated RALs in the ROD should be updated now before the remedial design phase commences. As discussed above, RALs are critical for defining the nature and extent of sediment cleanups because they are used to the delineate areas for active remediation. If remedial designs are prepared to specifications set under the outdated RALs, the designs will be flawed since they will not be prepared based on current Site conditions. While EPA has indicated that the PDI data and additional data will be taken into account during the remedial design phase in the various remedial design project areas throughout the Site, the RALs are Site-wide thresholds that are set in the ROD, and that cannot be changed on a piecemeal basis during design. Therefore, even if new data are considered, the remedial action will be designed to an outdated standard that does not reflect current Site conditions unless the ROD RALs are updated prior to the commencement of remedial design work. Failure to update the RALs based on the 2018 PDI data would therefore undermine the remedial process and constitute and an arbitrary and capricious act.

B. Revise Technology Assignment Decision Tree

A combination of remedial technologies is necessary to achieve protection of human health and the environment.[49] Region 10 itself acknowledges that an effective remedy at Portland Harbor will employ a variety of remedial technologies based on site-specific conditions throughout the Site.[50] Yet, while its selected remedy purports to include a range of remedial technologies, the

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[45] LWG, Presentation, Lower Willamette River, Small Mouth Bass Data, Monitored Natural Recovery Analysis (Mar. 18, 2013).
[46] *Id.*
[47] Kleinfelder, Sediment Sampling Data Report Portland Harbor, Oregon (May 11, 2015).
[48] Letter from Cami Grandinetti, EPA, to Schnitzer Steel and Legacy Site Services, LLC, agent for Arkema, Inc., Re: Request for Meeting with EPA to Discuss Sediment Sampling Study (Aug. 5, 2015).
[49] 40 C.F.R. § 300.430(a)(1)(iii)(C) (1990) ("EPA expects to use a combination of methods, as appropriate to achieve protection of human health and the environment."); *Contaminated Sediment Guidance* at 3-2 ("[P]roject managers have found that alternatives that combine a variety of approaches are frequently the most promising.").
[50] *See* FS at 3-1.

Region has adopted a prescriptive technology assignment decision tree which effectively dictates the application of a single technology (dredging) in SMAs.

The PDI data have shown that Site conditions are stable and, accordingly, that remedial technologies, such as capping (without dredging) and enhanced natural recovery are viable in SMAs. EPA should revise the decision tree as recommended by the PDI Evaluation Report to allow greater flexibility to select technologies that are protective and appropriate to site-specific conditions.

1. *Capping Is a Standard and Effective Technology at Sediment Sites*

Selecting appropriate technologies at a sediment site involves a balance of design considerations based on site-specific factors, cost estimates, and the net benefits of the technology.[51] The technology types available at sediment sites include: natural recovery (both monitored and enhanced),[52] containment (capping),[53] and removal (dredging).[54] Both containment and removal encompass a variety of applications, such as different cap designs and processes for dredging or excavation.[55]

EPA guidance states that there is no presumption in favor of any of the technology types and that project managers must evaluate the tradeoffs of each in light of site- and project-specific considerations.[56] The guidance generally indicates that each of the principal technology types has advantages and limitations:

- **Monitored Natural Recovery ("MNR") / Enhanced Natural Recovery ("ENR").** MNR and ENR are non-invasive and cost effective. Because MNR does not involve construction it is less disruptive of communities and the environment. The limitations of MNR are that it leaves contaminants in place and in some circumstances may result in a more gradual risk reduction in comparison to active remedies, although decision

[51] EPA, Assessment and Remediation of Contaminated Sediments Program ["ARCS Guidance"], at Ch. 2 (1994).
[52] Monitored natural recovery (MNR) is a remedy that "uses ongoing, naturally occurring processes to contain, destroy, or reduce the bioavailability of contaminants in sediment." *Contaminated Sediment Guidance* at 4-1. Natural recovery processes include transformation processes such as biodegradation or abiotic transformations that reduce contaminant toxicity; sorption of contaminants to sediments which reduces contaminant mobility and bioavailability; burial or mixing-in-place with cleaner sediment; and dispersion which reduces exposure levels. *Id.* at 4-2. Enhanced natural recovery (ENR) refers to remedies that accelerate natural recovery processes through engineering means such as the placement of a thin layer of clean sediment. *Id.* at 4-11.
[53] Capping refers to remedies that place a "cap of clean material over contaminated sediment that remains in place." *Contaminated Sediment Guidance* at 5-1. Capping reduces risk by (i) physically isolating the contaminated sediment; (ii) stabilizing the contaminated sediment to reduce resuspension and transport; and (iii) chemical isolation of the contaminated sediment. *Id.*
[54] Dredging involves removal of submerged contaminated sediments and typically requires "transporting the sediment to a location for treatment and/or disposal." *Contaminated Sediment Guidance* at 6-1.
[55] *See* ARCS Guidance at Chapters 3 & 4. Caps are generally constructed of clean sediment, sand, or gravel, but more complex designs can be constructed with multiple layers either to reduce the flux of contaminants or reduce erosion. *Contaminated Sediment Guidance* at 5-1.
[56] *See Contaminated Sediment Guidance* at 3-16 to 3-17.

makers must factor in the longer design, implementation, and residual impacts time for active remedies.[57]

- **Capping.** Capping can quickly reduce contaminant concentrations with low risk of residual contamination or resuspension. Because capping involves a single process, it is less costly and less disruptive to the community than removal, which involves multiple steps. The main limitation of capping is that the contaminants remain in the aquatic environment and could become exposed if the cap is significantly disturbed.[58]

- **Dredging.** Dredging may leave greater flexibility for future use of the water body and may achieve sediment remedial action objectives ("RAOs") faster than natural recovery in some circumstances. The major limitation of removal is that it involves a multi-step process including excavation, transport, treatment, and disposal of the dredged sediment, and is more complex, disruptive, and costly than either MNR or capping. The effectiveness of dredging at achieving remedial objectives is also limited by resuspension and release of contaminants during dredging and generation of residual contamination.[59] As discussed *infra*, there is little evidence that dredging is more effective than capping at reducing risks.

The feasibility and effectiveness of a remedial technology are subject to site-specific conditions.[60] Capping, for example, may be affected by factors such as water depth, bathymetry, and flow patterns; sediment characteristics, such as grain size and the presence of other materials (e.g., debris) in the sediment; and existing and future water body uses, such as navigation, recreation, and flood control.[61] Removal technologies may be affected by factors such as the slope of the sediment bed surface; the presence of debris and large rocks; bedrock; the presence of structures; river current and flow patterns; thickness and vertical delineation of contaminated sediment; sediment particle size and distribution.[62] Thus, a decision between capping and dredging will often depend on particular site conditions.

2. *The Portland Harbor Technology Assignment Decision Tree Leads to Dredging under All Scenarios, Regardless of Site Conditions*

Region 10 has expressed an intent to screen and assign technology types based on an evaluation of site-specific conditions. But in practice, the decision tree assigns dredging or dredging plus capping to all remedial action areas without regard to onsite conditions, the net benefit over non-removal technologies, or cost-effectiveness. The decision tree lacks flexibility and should be modified.

The Region divided its approach to technology assignment according to three types of contaminant thresholds. First, the Region identified "principal threat waste" ("PTW") areas, which

[57] *Id.* at 4-3 to 4-4.
[58] *Id.* at 5-2 to 5-3.
[59] *Id.* at 6-3 to 6-4.
[60] *Id.* at 3-16 to 3-17.
[61] *Id.* at 5-3 to 5-5.
[62] *Id.* at 6-5.

require treatment according to the NCP.[63] Second, the Region defined SMAs as areas where COC concentrations exceed levels where natural recovery processes would be expected to meet CULs in a reasonable timeframe. Containment or removal technologies are applied in SMAs.[64] Third, areas of the Site that exceed CULs but are below RALs are monitored for natural recovery effectiveness.[65]

The ROD provides that assignment of capping or dredging for each SMA will be made in accordance with the technology assignment decision tree.[66] Region 10 reportedly revised its decision tree for the ROD in response to requests for greater flexibility and clarity in technology assignment.[67] But the ROD decision tree fails to provide such flexibility: every pathway ends in either dredging or dredging and capping. There is no flexibility to apply, where appropriate, capping without dredging or other non-removal technologies such as ENR.

The decision tree divides the Site into four distinct regions, which are defined by anthropogenic uses or Site characteristics: (i) the navigation channel and future maintenance dredge ("FMD") areas; (ii) the intermediate region; (iii) the shallow region; and (iv) river banks. It includes a separate decision process for when a structure is present. A careful examination of the decision tree and the design considerations in Section 14.2 of the ROD shows that the decision tree always results in the assignment of dredging or dredging plus capping for every region.

Navigation Channel/FMD. The decision tree always assigns dredging in the navigation channel/FMD area. The navigation channel/FMD area path contains a single decision node[68] that asks whether contamination exceeds RAL concentrations below the feasible dredge depth. If the contamination is within the feasible dredge depth, the decision tree assigns dredging. If the contamination exceeds the feasible dredge depth, the decision tree assigns "dredge and cap." The constructed elevation of any cap in the navigation channel/FMD area must be below the authorized depth of the navigation channel or the maintenance dredge depths of the FMD area including an overdredge allowance/buffer zone in each case.[69]

Intermediate Region. In the intermediate region the decision tree appears to allow for capping since the branch ends in "dredge and/or cap." But the apparent availability of capping is illusory due to the ROD's no net rise requirement which prescribes that the constructed elevation

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[63] *See* FS at 3-2 to 3-5. On the Region's PTW approach, see *infra* Section VII.B.

[64] *See* FS at 3-7.

[65] *Id.* at 3-32. Generally natural recovery processes refer to monitored natural recovery (MNR). Region 10, however, assigns enhanced natural recovery (ENR) in areas where "natural recovery processes appear[] to be an appropriate remedy, yet the rate of sedimentation or other natural processes is insufficient to reduce risks within an acceptable time frame." *Id.* at 3-31. ENR involves the placement of a thin layer of clean sediment to accelerate natural recovery processes. *Id.* Region 10 has only assigned ENR to a single area of the Site, Swan Island Lagoon. *Id.*

[66] ROD at 106. The decision tree is Figure 28 in App. I of the ROD.

[67] *Id.* at 85.

[68] There is also a decision node for the presence of PTW. When PTW is present, the decision tree always assigns dredging in all river regions. If the PTW is present below the feasible dredge depth, it is dredged to that depth and then capped.

of any cap "be no higher than the pre-design elevation."[70] Thus, capping without dredging is not permitted in the intermediate region.

Shallow Region. In the shallow region, the decision tree contains a single decision node that asks whether the contamination depth exceeding RAL concentrations is greater than or less than five feet. If it is greater than five feet, the decision tree assigns dredging to the cap thickness and then capping. If it is less than five feet, the decision tree assigns dredging to the depth of the RAL exceedances and then backfilling to the original grade. The constructed elevation of any cap in the shallow region must be "no higher than the pre-design elevation."[71]

Riverbanks. The decision tree is ambiguous with respect to river banks, prescribing "Excavate and/or Cap or Fill and Cap." The ROD text clarifies that rivers banks will be remediated "in conjunction with the in-river actions and to protect the remedy."[72]

Given this unreasonably skewed analysis reflected in the ROD decision tree, dredging is uniformly selected as part of the remedy throughout the river.[73] While capping may also be required in certain circumstances, it never applies without dredging. In the responsiveness summary, the Region represents that there is "flexibility" in the decision tree.[74] While EPA may have intended to include such flexibility, the decision tree and the design constraints in the ROD do not reflect that intent, since they offer no flexibility whatsoever.[75]

Despite EPA's insistence at numerous meetings that the intention is to allow flexibility in technology assignment, the decision tree ignores any Site-specific considerations that might weigh in favor of capping over dredging. The only criteria the decision tree includes to assign capping (after dredging) are (1) the depth of contamination at the RAL and (2) the feasible dredge depth. The ROD includes a number of "design requirements" at Section 14.2.9 that will be considered in remedial design.[76] But these criteria are not connected to the technology *assignment* process and are only considered *after* the decision tree has assigned dredging or dredging and capping. A formal change to the decision tree is necessary to address these deficiencies.

3. *The PDI Data Shows that Capping and Enhanced Natural Recovery Are Viable Technologies for Portland Harbor*

The 2018 PDI data shows that EPA's stated intention to include flexibility in the decision tree was correct and underscores the need to correct the ROD decision tree to bring it in line with EPA's intent. In fact, the new data show that there are various circumstances when capping

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[70] *Id.* at 108.
[71] *Id.* at 109. The basis of this requirement is the Region's mistaken adoption of National Insurance Flood Program (NFIP) rules as ARARs which it interprets to impose a "no net rise" requirement. For the reasons provided in Section IV.B.7 *infra*, petitioners request that EPA waive the NFIP rules application to the Site.
[72] ROD at 109.
[73] As described *supra*, a separate set of rules apply when a structure is present. If the structure is floating or movable or non-functional (e.g., beyond its useful life or in disrepair), then dredging and capping is assigned. The only exception is impossibility: if the structure is functional and neither floating nor movable, then capping is assigned.
[74] *See, e.g.*, ROD, Responsiveness Summary, at 2-87.
[75] ROD at 106.
[76] *Id.* at 113-15.

without dredging is the appropriate remedy. The decision tree should therefore be revised to allow a technology assignment process that addresses Site-specific conditions.

As noted above, the 2018 PDI data provides a sound basis for a meaningful evaluation of long-term processes at the Site. The PDI data shows not only that system recovery is occurring broadly and rapidly, but also that the system and sediment bed are hydrographically and geomorphologically stable. Site stability is a key factor for the long-term effectiveness of *in situ* technologies such as capping or ENR. Stability through normal and high-energy hydrodynamic conditions is evidence that an *in situ* remedy is likely to remain effective over time, minimizing the risk that contaminants might be re-exposed if the cap or covering is disturbed.[77]

Multiple lines of evidence show that the sediment bed has remained consistent throughout decades of regular commercial and industrial harbor activity and episodic natural events.[78] Specifically,

- The locations of erosional/depositional areas are consistent.
- Bathymetry changes indicate that net depositional areas are stable.
- The SMA boundaries remain similar to the FS/ROD areas.
- Grain size distribution has remained stable over time.
- Sediment core patterns show that surface concentrations are lower than subsurface concentrations.
- Contaminant patterns have remained stable through winter high-flow events.

4. *Experience at Other Sediment Sites Demonstrates that Dredging is Often Ineffective at Achieving Remedial Goals*

EPA should also modify the decision tree to allow greater flexibility to select non-dredging technologies based on the evidence from other sediment sites that dredging is often ineffective at achieving remedial goals. While dredging removes contaminant mass, evidence that dredging is effective at reducing risk is lacking.[79]

It is well accepted that dredging has a number of associated impacts that limit its effectiveness at reducing short- and long-term risks. These impacts include:

- **Resuspension and release of contaminated sediments.** Dredging resuspends contaminated sediments by dislodging bedded sediment particles that are not captured by the dredge and dispersing them into the water column.[80] Dredging can also release

[77] Magar V.S., *et al., Technical Guide: Monitored Natural Recovery at Contaminated Sediment Sites*, at 1-17 (2009).
[78] *See* PDI Report at 14-15 (summarizing empirical lines of evidence supporting Site stability).
[79] National Research Council, *Sediment Dredging at Superfund Megasites: Assessing the Effectiveness*, at 90 (2007).
[80] Bridges, *et al., Dredging Processes and Remedy Effectiveness: Relationship to the 4 Rs of Environmental Dredging*, at 4 (2010)

contaminated sediment from pore water and sediment particles into the dissolved phase in the water column.[81] Resuspension and release can cause contaminants to be transported from the dredging area into the surrounding environment.

- **Generation of residual contamination.** Dredging almost always leaves residual contamination.[82] Dredge residuals include contaminated sediments that are uncovered but not removed by dredging as well as sediments that are temporarily suspended by the dredging operation and subsequently redeposited on the bottom of the water body.[83]

The combination of resuspensions, releases, and residuals are known to weigh against the effectiveness of dredging remedies, and in cases, increase site risks due to the increased bioavailability of contaminants.[84] Dredging has been unsuccessful at a number of sites. It has caused "spikes" in fish tissue contaminant concentrations which have persisted for years after project completion. And it has resulted in increases in surface sediment concentrations, or only marginal decreases that fall short of clean-up levels. The following are examples of sites where these effects have been observed.

- **Commencement Bay, Washington.** PCB concentrations in fish tissue increased during dredging and remained elevated for years afterwards.[85]

- **Lauritzen Channel, United Heckathorn, California.** DDT concentrations increased in fish. Anchovy body burdens increased by 76x, speckled sanddab increased 32x, and staghorn sculpin increased 16x.[86]

- **Grasse River, New York.** Caged fish used to monitor bioaccumulation showed that PCB concentrations increased by 50x during dredging operations.[87] PCBs were mobilized and transported downstream, increasing surface water concentrations.[88]

- **Manistique Harbor, Michigan.** Although dredging removed an estimated 82-97% of the PCB mass, post-dredging surface concentrations actually *increased*.[89]

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[81] *Id.* at 14.
[82] *Sediment Dredging at Superfund Megasites*, at 107.
[83] *4 Rs of Environmental Dredging* at 24.
[84] *Sediment Dredging at Superfund Megasites* at 109.
[85] Clay Patmont, *et al.*, *Environmental Dredging Residual Generation and Management* (2018).
[86] Steven C. Nadeau, *SMWG Review and Analysis of Selected Sediment Dredging Projects (Revised),* presentation before the 2nd meeting of the National Research Council Committee on Dredging Effectiveness at Superfund Megasites, at 69 (June 7, 2006), available at https://clu-in.org/download/contaminantfocus/sediments/REVISED_SMWG_Review_and_Analysis_of_Selected_Sediment_Dredging_Projects.pdf.
[87] *Id.* at 11.
[88] *Id.*
[89] *Sediment Dredging at Superfund Megasites*, at 130-31.

- **Fox River, Wisconsin.** Dredging at Deposit 56/57 released 2.2% of the PCB mass to the water column causing dissolved PCB concentrations to increase by 20x downstream.[90]

At Portland Harbor, the ROD remedy would commit EPA and the community to at least 13 years of dredging under EPA's projected schedule. If more realistic construction assumptions are applied, the dredging may take twice as long to complete — that is, as much as 26 years.[91] Experience at other sites shows that fish tissue concentrations will increase, not decrease, during that time. Safe levels of fish consumption will actually be lower during dredging operations. As a result, the overly-disruptive remedy in the ROD may actually cause fish tissue concentrations to **increase** for a period of more than 26 years before returning to pre-construction levels.[92] This course of action will result in measurable effects that will actually increase the risks at the site and reverse the course of significant improvements in fish tissue concentration that have been noted from the PDI data results.

The limited effectiveness of dredging warrants modifying the decision tree to allow greater flexibility to select non-dredging technologies, which will not pose risks from residual contamination and will achieve EPA's remedial goals more rapidly.

5. *Capping Has Greater Net Benefits and Is More Cost-Effective than Dredging*

Revising the decision tree to allow greater flexibility to select capping is also consistent with the need to evaluate the net benefits and cost effectiveness of a technology type.[93]

Unlike dredging, capping leaves "no to very little contaminant residual" and more quickly reduces the exposure of fish to contaminated sediment.[94] Given the favorable Site conditions, the net benefits of capping are likely to be greater than dredging.

Capping is also more cost effective than dredging and less disruptive to the environment and community. For a given area, the cost of capping is about half the cost of dredging.

Capping has been applied successfully at a number of sites in the Pacific Northwest.[95] It has also been successfully applied at a number of locations within and directly upstream of Portland Harbor.

- McCormick and Baxter Superfund Site. The McCormick and Baxter Superfund Site is located at River Mile 7 on the Willamette River within Portland Harbor. Capping was applied to over 15 acres of contaminated sediment in the River with a minimum cap

[90] Nadeau, *Review and Analysis of Selected Sediment Dredging Projects*, at 42.
[91] LWG, Comments on Portland Harbor Proposed Plan, at 53 (Sept. 6, 2016).
[92] *See supra* Section IV.A.4.
[93] ARCS Guidance at Ch. 2.
[94] *Contaminated Sediment Guidance* at 5-3.
[95] *See Contaminated Sediment Guidance* at 5-1.

thickness of 3 feet. There was no requirement in the McCormick and Baxter ROD to dredge before capping.[96]

- River Miles 13.1 and 13.5. Oregon DEQ selected capping, without dredging, as the remedy for contaminated sediments at River Miles 13.1 and 13.5, upstream of the Portland Harbor Site.[97]

- Zidell Waterfront Property. The Zidell waterfront property is a 32 acre property located between River Miles 13 and 15 of the Willamette River. Oregon DEQ's selected remedy for the site included capping of all contaminated sediments (up to 17 acres).[98]

These examples illustrate that capping already has been accepted as an appropriate remedy for areas in and around Portland Harbor by both the Department of Environmental Quality and the public.

6. *EPA Should Update the Technology Assignment Process*

The decision tree should be specifically updated as follows and in accordance with the revised decision tree provided in the PDI Report.[99]

- **Capping** without pre-dredging should be permitted in all river regions where consistent with SMA conditions (e.g., bathymetry, land/vessel use, or habitat considerations).

- **ENR** should be permitted within SMAs that are non-erosional areas where natural recovery is occurring but could be accelerated to reduce risks within an acceptable time frame.

- **Dredging** should be limited to a depth no greater than an appropriate Site-specific cap thickness, except in the limited circumstances where (i) PTW cannot be reliably contained, or (ii) dredging to the RAL depth would be more efficient than placing a cap and the risks to fish from dredging are outweighed by its benefits. Partial dredging and capping is appropriate in all regions and should be considered after review of depths of impact and effective cap designs.

- Site-specific decisions should be made as to whether it is necessary to backfill in dredged areas; amend caps or ENR layers; and to lay post-dredge residual management layers.

[96] EPA, Record of Decision, McCormick and Baxter Creosoting Company (March 1996).
[97] Oregon DEQ, Record of Decision, PGE Willamette River Sediment Sites (Apr. 2015).
[98] Oregon DEQ, Record of Decision, Zidell Waterfront Property (June 2005). The selected remedy does include selective dredging and capping of a barge launchway.
[99] The revised decision tree is Figure 2 to App. L of the PDI Report.

Further, Site-specific conditions should be considered as evaluation criteria informing the suitability of a technology type in remedial design.[100]

7. *EPA Should Remove Flood-Related ARARs*

EPA has inappropriately adopted a flood management ARAR that in effect prevents all capping without dredging. This requirement does not qualify as "applicable" or "relevant and appropriate" and should be removed by EPA in order to allow capping without pre-dredging.

a. The Flood Management ARAR Prevents the Selection of Capping as a Remedial Technology

EPA has identified two sections of FEMA's flood management regulations (44 C.F.R. §§ 60.3(d)(2) & (3)) as "relevant and appropriate" requirements that the remedy must comply with unless a basis exists for a waiver.[101] These regulations are part of the National Flood Insurance Program (NFIP) and establish federal criteria that community flood plain management regulations must meet in order to qualify for flood insurance.[102] Section 60.3(d)(2) requires communities to:

> Select and adopt a regulatory floodway based on the principle that the area chosen for the regulatory floodway must be designed to carry the waters of the base flood, without increasing the water surface elevation of that flood more than one foot at any point.[103]

Section 60.3(d)(3) requires communities to

> Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.[104]

A community may, however, permit encroachments that would increase base flood levels under certain circumstances.[105]

The City of Portland has adopted flood hazard regulations consistent with NFIP requirements. The City's regulations specifically require "balanced cut and fill": "All fill placed at or below the base flood elevation shall be balanced with at least an equal amount of soil material

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[100] *See* PDI Report, App. L at 5-7 (summarizing technology evaluation criteria including, erosion, habitat areas, steep slopes, cobble/gravel/bedrock, modeling for cap design, debris, area access, flooding, depth of impacted sediment).
[101] ROD, Appendix II, Table 25c.
[102] 44 C.F.R. § 60.1(a-b) (1984).
[103] *Id.* § 60.3(d)(2).
[104] *Id.* § 60.3(d)(3).
[105] *Id.* § 60.3(d)(4).

removal."[106] The City's balanced cut and fill approach is consistent with, but not dictated by, the Part 60 rules, which do not require any particular method of flood mitigation.

As applied to Portland Harbor, EPA has interpreted the FEMA regulations to require "no net increase in river stage."[107] EPA has further interpreted this requirement in light of the City's balanced cut and fill regulation.[108] EPA estimated the flood impacts of the remedial alternatives assuming that the remedy will be implemented following a balanced cut and fill approach.[109]

EPA's flood analysis therefore assumes that capping must be balanced by an equal amount of dredging. Although EPA's supporting analysis assumed balanced cut and fill, the text of the ROD does not acknowledge this balancing process. Instead, EPA has applied a requirement that there be no change to the bathymetric surface profile. The practical effect is to require dredging / removal in all active remedial work, and to eliminate capping alone as an available remedial technology

b. The Part 60 Rules Do Not Qualify as ARARs

The ROD contains no analysis or justification of the basis for designating the Part 60 rules as ARARs. EPA should remove the Part 60 rules because they do not qualify as ARARs.

i. The Part 60 rules fail to meet the plain language definition of an ARAR

The NCP defines "relevant and appropriate requirements" as:

> those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that[] … address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.[110]

Accordingly, a relevant and appropriate requirement must: (1) be promulgated under federal or state environmental law or a state facility siting law, (2) address site-specific problems; and (3) be well-suited to the site. The Part 60 rules fail at each step.

First, the Part 60 rules are not substantive environmental laws. Instead, the rules set forth minimum criteria for local jurisdictions to meet in promulgating their own regulations.

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[106] Portland City Code 24.50.060(F)(8)(a) (2019).
[107] *See* FS, Appendix P. Although EPA has an "updated" Appendix P in the ROD, *see* ROD Appendix IV, it also continues to cite to the FS Appendix P. ROD at 126. The apparent reason for the update was to add an evaluation of the flood impacts of Alternative F Mod which was newly developed in the ROD. EPA did not update its evaluation of the other remedial alternatives which had been evaluated in the FS. *Compare* FS Appendix P, Table P-1 *with* ROD, Appendix IV, Appendix P, Table P-1.
[108] *Id.*
[109] *Id.*
[110] 40 C.F.R. § 300.5.

Second, the Part 60 rules also have no relevance to a CERCLA cleanup action. Unlike substantive environmental laws, these regulations do not impose any requirements on the regulated community or federal and state governments. Municipalities are not required to implement these regulations either. At most, the Part 60 rules set forth criteria that municipalities consider in developing their own regulations if they want to qualify for federally-backed flood insurance.

Finally, the regulations do not contain any Site-specific criteria — one must look at the substance of the city ordinance for its interpretation of the federal criteria, which is exactly what EPA did in this case. But, as discussed below, a city ordinance is not an ARAR.

ii. The Part 60 rules do not meet the factors set forth by the NCP

The Part 60 rules also fail to meet the factors set forth in the NCP for determining whether a requirement is relevant and appropriate.[111]

The first NCP factor compares the purpose of the requirement with the purpose of the CERLCA action. The purpose of the Part 60 rules is to ensure that cities follow minimum standards to protect flood plains before receiving federal flood insurance.[112] The purpose of the Portland Harbor CERCLA action, on the other hand, is to remove or treat contaminated sediments from the Site and reduce risks to human health and the environment related to the contaminated sediment.

The next three factors examine the regulated "medium," "substances," and "action." Here, the Part 60 rules apply to the community's actions in promulgating flood protection criteria, whereas the CERCLA action addresses removal, treatment and capping of contaminated soil.

Next, the NCP looks to the availability of any exceptions from the requirement for the CERCLA site. The Part 60 rules provide communities with the ability to approve activities that

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[111] These factors are:

> (i) The purpose of the requirement and the purpose of the CERCLA action;
>
> (ii) The medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site;
>
> (iii) The substances regulated by the requirement and the substances found at the CERCLA site;
>
> (iv) The actions or activities regulated by the requirement and the remedial action contemplated at the CERCLA site;
>
> (v) Any variances, waivers, or exemptions of the requirement and their availability for the circumstances at the CERCLA site;
>
> (vi) The type of place regulated and the type of place affected by the release or CERCLA action;
>
> (vii) The type and size of structure or facility regulated and the type and size of structure or facility affected by the release or contemplated by the CERCLA action;
>
> (viii) Any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resource at the CERCLA site.

40 C.F.R. § 300.400(g)(2).

[112] 44 C.F.R. § 60.1.

increase flood levels.[113] EPA did not include this section of the federal floodplain management rules, but in any event, it applies to the City of Portland, not the CERCLA Site.

Finally, the NCP examines the regulated "place," "structure or facility," and use of the "affected resources." Here, the Part 60 rules do not regulate a place, structure or facility, or resources.

The lack of fit between the Part 60 rules and the NCP criteria shows that they are not relevant or appropriate.

iii. EPA inappropriately treats a local ordinance as an ARAR

EPA's attempt to adopt the substance of the City of Portland's balanced cut and fill regulation through the Part 60 rules is inappropriate. The City's balanced cut and fill regulation does not qualify as an ARAR because it is not federal or state law. Indeed, EPA recognized as much.[114] Yet, EPA has assumed that the remedy will be implemented following the City's balanced cut and fill approach. This interpretation is untethered of the text and purpose of the Part 60 rules, which do not dictate that an equal amount of fill be removed prior to capping.

c. There is No Basis to Require a Balanced Cut and Fill Approach at Portland Harbor

The balanced cut and fill approach not only lacks a legal basis as an ARAR, but it is also unsupported by any analysis of flood risks at Portland Harbor.

EPA admits that it only performed a "simple" and "cursory" analysis of flood levels.[115] It will only fully model flood levels during remedial design.[116] Accordingly, at this time, EPA lacks a basis to conclude that balanced cut and fill approach is necessary.

Moreover, flood management principles do not mandate a net removal of fill to offset capping. Federal projects must comply with Executive Orders 11988 and 11990. These EOs, which EPA cited in the ROD, are not ARARs, but are common "to be considered criteria" at Superfund sites.[117] The EOs require mitigation of adverse impacts and exploration of practicable alternatives when work is performed in a floodplain. They do not, however, require "no net rise" or mandate any particular method of flood mitigation.

The McCormick and Baxter Site further demonstrates that EPA lacks a basis for applying a no net rise requirement at Portland Harbor. Although the McCormick and Baxter Site is within the boundaries of Portland Harbor, the Record of Decision contains no mention of flood risk, nor does it impose any flood mitigation, even though the remedy involved adding a minimum three-foot cap across fifteen acres of riverbed.

* * * * * *

[113] 44 C.F.R. § 60.3(d)(4).
[114] FS, Appendix P at P-2 ("[L]ocal regulations are not considered ARARs under CERCLA.").
[115] ROD at 126.
[116] *Id.*
[117] *See, e.g.*, Record of Decision, McCormick and Baxter Creosoting Company (March 1996).

Given the favorable Site conditions for capping, EPA should adopt the recommended revisions to the decision tree in the PDI Report. It should also remove its incorporation of a no net rise requirement because it is not an ARAR and is not appropriate based on Site conditions.

C. Update Groundwater Cleanup Levels for Arsenic and Manganese

1. *The Importance of Background Data on the Development of Cleanup Levels*

Background conditions are a critical consideration and driver for a range of site investigation and remediation issues. Contamination at a CERCLA site may originate from natural and/or anthropogenic sources that are not attributable to releases at the site under investigation, in addition to the releases attributable to the CERCLA site itself.[118] As EPA states in its guidance, "[b]ackground information is important to risk managers because the CERCLA program, generally, does not clean up to concentrations below natural or anthropogenic background levels."[119] This is common sense, as remediation of areas subject to recontamination from background conditions is not cost-effective, technically practical, or likely to address underlying risks.[120]

The PDI study included a robust background sampling program that provides a basis to update ROD background levels and CULs.

2. *Background Porewater Arsenic and Manganese Concentrations Require Groundwater CUL Updates*

The dataset used in the ROD did not establish background conditions for arsenic and manganese in porewater. As a result, the ROD CULs for these constituents do not reflect naturally occurring concentrations under the reducing conditions that are typical of Site sediment. Given that high levels of arsenic and manganese are naturally present in the volcanic rocks of the Willamette River basin and the geologic weather processes that introduce arsenic and manganese into the river environment, the background concentrations of these constituents must be evaluated to set achievable CULs.[121]

For the 2018 PDI, EPA collaborated on the selection of sampling stations with the goal of measuring concentrations of arsenic and manganese in upstream sediment porewater under natural conditions not influenced by anthropogenic sources.[122] Background porewater concentrations measured during the PDI study are over 85% of transition zone water concentrations measured in impacted areas of the Site during the RI.[123] All concentrations of arsenic and manganese in

[118] EPA, Role of Background in the CERCLA Cleanup Program, at 3 (2002).
[119] *Id.* at 3, 7.
[120] *Id.* at 7.
[121] PDI Rep., App. D-8 at 1-2.
[122] *Id.* at 3.
[123] PDI Rep. at 31.

background porewater were above the ROD groundwater CULs of 0.000018 mg/L for arsenic and 0.43 mg/L for manganese.[124]

The 2018 PDI data shows that ROD CULs for arsenic and manganese in groundwater are not achievable due to these background conditions. CERCLA generally does not require clean up to concentrations below natural or anthropogenic background levels since cleanups to levels below background generally cannot be achieved or maintained over time due to the risk of recontamination. Updated porewater background concentrations for naturally occurring arsenic and manganese based on the PDI data are 0.058 mg/L for arsenic and 32.0 mg/L for manganese.[125] As a result, these concentrations should be adopted as Site porewater background and the ROD CULs for arsenic and manganese should be revised to reflect background concentrations.

D. EPA's Reasons for Dismissing the PDI Report Are Unfounded

In a March 2, 2020 letter to the Pre-Remedial Design ("Pre-RD") Group, EPA addressed certain aspects of the PDI Report.[126] EPA reiterated that the PDI Report was "well-designed and implemented" and provided "comprehensive" data. It also acknowledged that some changes are required to the ROD, purporting to address a few issues through "adjustments" moving forward. However, EPA asserted that "the analysis and adjustments… do not warrant a remedy change at this time." EPA's response did not accurately address the issues raised by the Pre-RD Group, and the "adjustments" are insufficient to correct any of the ROD's defects, which can only be fixed through an ESD or ROD amendment.

First, EPA acknowledged that the PDI data "confirm that natural recovery is occurring." However, EPA contended that "natural recovery is occurring predominantly in areas selected in the ROD for monitored natural recovery." This statement is misleading. What the data actually show is that natural recovery is occurring in areas throughout the Site including within the SMAs. The assertion that natural recovery is occurring "predominantly" in MNR areas is true only insofar as the MNR areas are larger than the SMAs.

EPA also devoted several paragraphs to recap certain data evaluation issues, most of which were already addressed in earlier discussions with the Pre-RD Group. First, EPA noted that the post-construction sitewide SWAC is not the sole consideration or a sufficient rationale for re-evaluating RALs. That is true, which is why the Pre-RD Group also provided SWAC calculations at EPA's request on both the SDU scale and the RRM scale. Second, EPA asserted that the relevant spatial scale for RAO 2 (the remedial action objective for fish consumption) is one river mile. The 2018 fish tracking study, however, demonstrated that one river mile is not the correct spatial scale. Nonetheless, at EPA's request, the Pre-RD Group provided EPA with a table and graphs showing post-construction RRM SWACs to demonstrate that, for PCBs, those SWACS are actually lower overall than the post-construction RRM SWACs estimated in the ROD. EPA ignored that key analysis in its letter.

[124] *Id.*
[125] PDI Rep., Table 3.2.
[126] Letter from S. Bodine and C. Hladick letter, EPA, to The Pre-Remedial Design Group, c/o R. Gold (Mar. 2, 2020).

As a follow-up to the table and graphs showing the post-construction SWACs by RRM using the proposed ESD approach, the Pre-RD Group has also now plotted those values with the post-construction SWACs by RRM for the ROD remedy (Alt. F Mod),[127] which is presented below in Figures 1 and 2.

Figure 1:

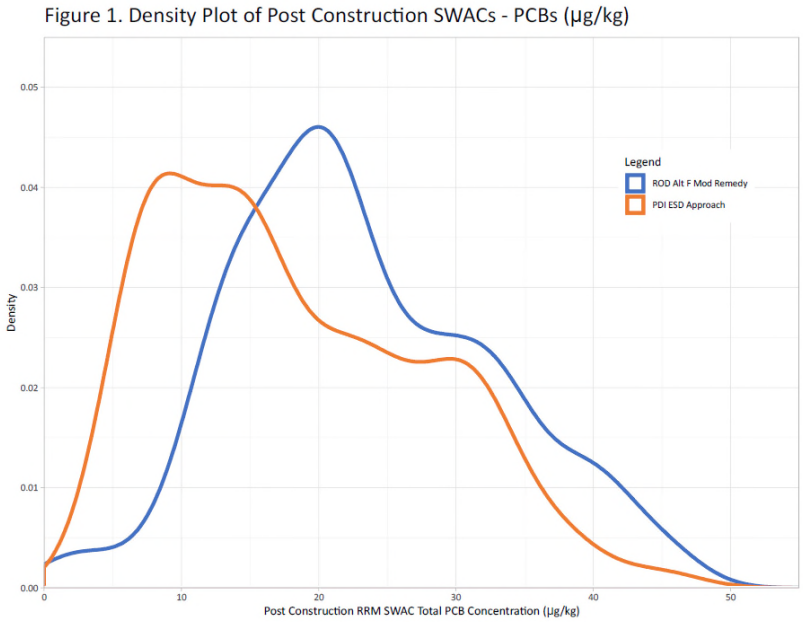
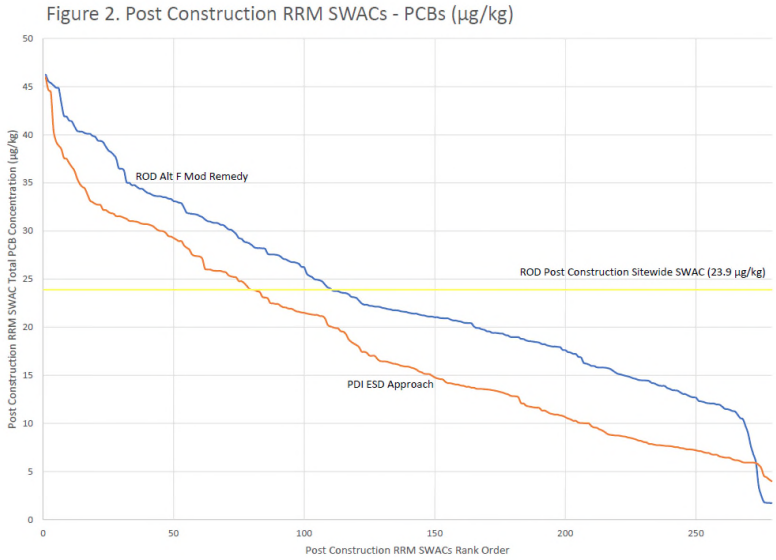


Figure 2:



[127] ROD, App. IV, Table J2.3-7.

Since the Site-wide SWAC is, by definition, a calculation across the entire river, it is not surprising that the ROD calculations on a RRM scale show SWACs that are above and below the post-construction Site-wide SWAC (as did the data on the ESD approach provided earlier). Importantly, looking at the distribution of the variance from the Site-wide SWAC, the ESD approach is actually more protective than the post-construction outcome presented for the ROD remedy. This can be seen from the above graphs comparing the RRM SWAC data both on a distribution curve and rank-order basis. The distribution curve shows that the ESD approach is more protective because the ESD approach RRM distribution curve has shifted to the left (lower PCB concentrations) and does not show any higher or worse distribution than the ROD. Moreover, as indicated by the right tail of the curve, there are fewer RRMs at the higher level. Similarly, the rank-order curves show that the ESD approach results in concentrations consistently below the ROD Alt. F Mod curve.

Further, the raw data shows:

- Under the ROD remedy, 39% (110) of the RRMs exceed the ROD post-construction Site-wide SWAC of 23.9 ppb PCBs; while under the ESD approach only 30% (83) exceed that amount;
- Under the ROD remedy, 11% (31) of the RRMs exceed 1.5 times the ROD post-construction Site-wide SWAC; while under the ESD approach only 4% (12) exceed that level; and
- Neither the ROD remedy nor the ESD approach results in any RRMs exceeding two times the ROD target Site-wide SWAC.

Based on the nature of the analysis, calculations at the RRM scale will vary from the Site-wide average. However, the key conclusion from the analysis is that, at the smaller spatial scale (RRM), the ESD approach is actually more protective than the post-construction outcome presented for the ROD remedy.

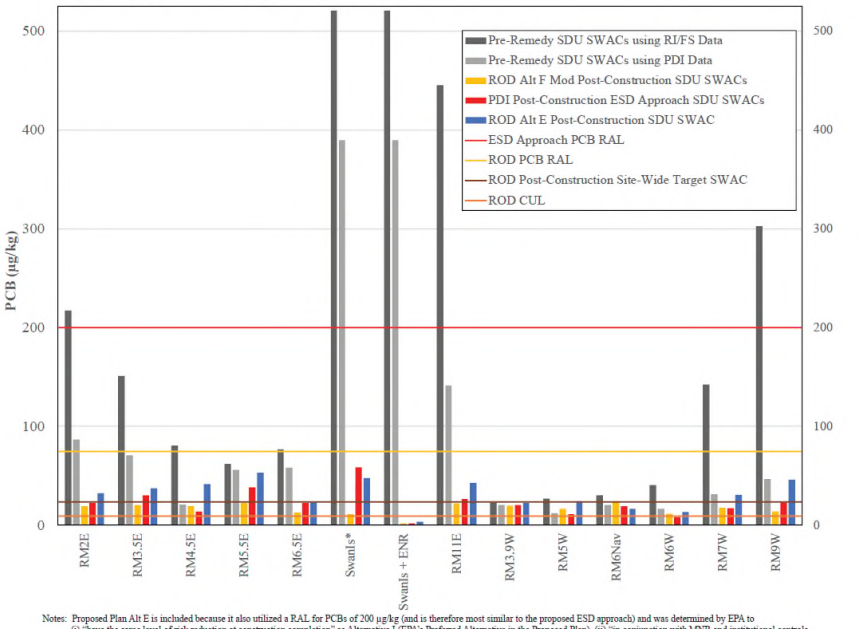
EPA also asserted that the Pre-RD Group's analyses show higher post-construction SDU SWACs for the focused COCs. This assertion grossly misstates the significance of these results. EPA contends that post-construction SWACs for seven of the eight PCB SDUs were higher than ROD estimates if the ESD approach RAL was applied, but EPA fails to acknowledge that the differences in concentrations are wholly insignificant relative to the RALs (both ROD and ESD) and pre-construction SWACs. In addition, EPA in an accompanying bar chart shows PCB concentrations for the Swan Island SDU absent ENR, but the ROD required use of ENR for Swan Island. Accordingly, the proper comparison for the Swan Island SDU is the post-construction SWACs with ENR. With ENR, the ESD approach post-construction SWAC for PCBs for the Swan Island SDU is below the ROD post-construction SDU SWAC. EPA also disregarded the data and analysis that were provided demonstrating that the proposed ESD approach resulted in consistently lower post-construction SWACs for PCBs at the SDU scale in comparison to EPA's Alt E. The Pre-RD Group had provided the Alt E data from the ROD because Alt E also utilized a RAL for PCBs of 200 μg/kg (and is therefore most similar to the proposed ESD approach) and was determined by EPA to be protective of human health and the environment and to have the same level of risk reduction at construction completion as Alternative I (EPA's Preferred

Alternative in the Proposed Plan). The ESD approach also provides post-construction risks and hazard indices within each SDU that meet the interim targets identified in ROD Table 22, thus the PDI ESD approach RALs are protective. Moreover, EPA also ignores the fact that the ROD's approach nearly doubles the cost of the remedy while delaying its completion, increasing its duration and causing substantially more disruption to the community.

EPA's distortion of the data is shown in Figure 3 below which shows EPA's bar chart in an appropriate scale and includes the Alt E comparison. Importantly, Figure 3 below also shows the significant recovery that has occurred in the SDU areas.

Figure 3:

Figure 3. PCB SDU Comparison



Notes: Proposed Plan Alt E is included because it also utilized a RAL for PCBs of 200 µg/kg (and is therefore most similar to the proposed ESD approach) and was determined by EPA to (i) "have the same level of risk reduction at construction completion" as Alternative I (EPA's Preferred Alternative in the Proposed Plan), (ii) "in conjunction with MNR and institutional controls, [is] expected to be protective of human health, and (iii) "in conjunction with MNR, [is] expected to be protective of the environment" (Portland Harbor Superfund Proposed Plan – June 2016)

EPA's bar chart shows concentrations for the Swan Island SDU absent enhanced monitored natural recovery (ENR), but the ROD required use of ENR for Swan Island. Accordingly, the proper comparison for the Swan Island SDU is the post-construction SWACs with ENR. With ENR, the ESD approach post-construction SWAC for the Swan Island SDU of 1.5 µg/kg PCBs is below the ROD Alt F Mod post-construction SDU SWAC of 1.6 µg/kg, as shown in this bar chart.

EPA further asserted that leaving higher concentrations of contamination in place would result in longer periods of sediment recovery and fish exposure. As noted above, however, the post-construction differences are not significant. Moreover, under the ESD approach, the Pre-RD Group adopted the same conservative assumption in preparing its analyses that EPA used in the ROD, *i.e.*, that no recovery would occur prior to remedy completion. As discussed above, however, the 2018 PDI data shows that significant recovery has already occurred and is likely to continue through remedy completion absent significant dredging. While recovery rates may diminish during construction, given design time frames and construction sequencing recovery will continue through remedy completion. Therefore, post-construction levels can be expected to be even lower than this analysis shows, and the post-construction recovery period would be no longer than the recovery expected under the ROD. Also, as discussed above, the construction period under a modified remedy would be considerably shorter than the period required by the ROD and

the reduced amount of dredging would result in reduced fish exposure as compared to the fish exposure due to increased levels of contaminants from the dredging activities required by the ROD. As a result, the cleanup levels in the ROD can be expected to be achieved in an overall time period that is shorter under a modified remedy, not longer.

EPA next noted that DDx is a predominant contaminant of concern at three SDUs and, if the DDx RALs proposed in the PDI Report were applied in the RM 7W SDU, the estimated post-construction SWAC increases nearly seven-fold. The Petitioners acknowledge this issue and agree that a lower DDx RAL should be assigned in the RM 7W area, similar to the approach EPA recommended in the June 2016 Proposed Plan.[128] This adjustment, however, does not affect the proposed updates for any of the other RALs in any other areas.

Regarding the ROD decision tree's requirement that all areas to be capped must also be dredged, EPA argued that the ROD includes "inconsistent statements" in this regard. EPA stated that it has sought to "clarify" this issue in a revised draft Remedial Design Statement of Work ("RD SOW") attached to its letter. In that draft SOW, EPA purports to give itself flexibility -- apparently at the discretion of agency staff -- to allow capping without dredging in some areas if evaluations show that "no adverse impacts to habitat and the floodway due to capping in the shallow and intermediate regions, or if encroachments due to capping can be mitigated." *See* EPA's March 2, 2020 Draft RD SOW, Section 1.3. The ROD, however, is not ambiguous in requiring dredging in all areas to be capped; therefore, it is unclear if or how agency staff could apply any such discretion without an ESD or ROD amendment.

EPA next agreed that dioxin/furan data in the ROD were limited, but it refused to accept the PDI data upriver from the Site as sufficient to make any changes. This position is wholly untenable. In approving the sampling plans for the 2018 PDI, EPA signed off on the sampling locations and methodology for the collection of data representative of upriver (background) sediments that would likely be transported into the Site. EPA's assertion that still more sampling is needed before the ROD RALs can be updated merely delays the decision.

EPA's March 2, 2020 letter therefore failed to address the vast majority of issues raised by the 2018 PDI data or to explain how the agency can proceed to remedial design with a ROD based on significantly outdated data. For the reasons discussed in this Petition, failure to update the ROD based on the 2018 PDI data would constitute an arbitrary and capricious act.

V. EPA'S SELECTED REMEDY IS ARBITRARY AND CAPRICIOUS

EPA should modify the Portland Harbor selected remedy to take account of the PDI Data because the ROD is arbitrary and capricious. The arbitrary and capricious standard requires an agency decision to be "the product of reasoned decision-making." *Motor Vehicles Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983). A CERCLA response action

[128] This petition includes a revised ESD approach with respect to DDx. DDx concentrations above the RAL and the areas of higher risk are primarily focused in one area, RM7W. The PDI Report DDx RAL of 578 µg/kg, the goal for ROD RAO 5, results in a lower Site-wide SWAC than achieved by ROD Alt F mod. However, on the river mile scale, SWACs are higher in the RM7W area. Given the spatial limits of this higher concentration area, and the unique properties of DDx, the revised ESD approach proposes a lower RAL of 160 µg/kg in the SDU RM7W. This approach is consistent with the EPA Proposed Plan, which had a RAL of 160 µg/kg in the SDU RM7W.

that does not reflect reasoned decision-making is arbitrary and capricious. *See, e.g.*, *State of Minn. v. Kalman W. Abrams Metals, Inc.*, 155 F.3d 1019, 1024–25 (8th Cir. 1998); *Wash. State Dep't of Transp. v. Wash. Natural Gas Co., Pacificorp*, 59 F.3d 793, 802-05 (9th Cir. 1995); *In re Bell Petroleum Services, Inc.*, 3 F.3d 889, 905-06 (5th Cir. 1993); *Emhart Indus., Inc. v. New England Container Co.*, 274 F. Supp. 3d 30, 78 (D.R.I. 2017).

The record documenting the technical and scientific flaws, unsupported assumptions, and arbitrary conclusions in the ROD is extensive.[129] The technical and scientific flaws in the ROD are attributable to an arbitrary, results-driven decision-making process. The record illustrates that Region 10 committed to issuing a ROD during the Obama Administration, and made ad hoc decisions and took procedural shortcuts to meet its schedule. Critically, the Region repeatedly ignored evidence that the RI/FS sediment data, 90% of which was collected from 1997 to 2007, no longer accurately reflected Site conditions in 2017.

The record also demonstrates that the Region's decision-making was driven not by sound science and technical analysis, but by pre-determined conclusions. Faced with evidence that all alternatives were equally protective of human health and the environment, the Region nonetheless selected a $2.5-3 billion remedy that will take at least 13 years to construct and does not provide any additional risk reduction over less costly and disruptive alternatives.

While the NCP contemplates that data collection activities will inform remedy development and assessment and vice versa, Region 10 took 16 years to issue a RI and FS and repeatedly changed its mind about key pieces of the remedial approach. The rationale for the Region's changes of approach lacked transparency and the Region often did not acknowledge that it was changing approach and consistently ignored contrary evidence.

The Portland Harbor ROD is a deeply flawed document and the product of a flawed decision-making process. EPA should correct its mistakes and modify its remedy based on the PDI data in accordance with CERCLA, the NCP, and sound science.

A. Region 10's Decision-Making Process Was Driven by Impermissible Considerations

An agency decision that is driven by irrelevant factors is arbitrary and capricious. *Latecoere Int'l, Inc. v. U.S. Dep't of Navy*, 19 F.3d 1342, 1357-64 (11th Cir. 1994); *D.C. Fed. of Civic Ass'n v. Volpe*, 459 F.2d 1231, 1249 (D.C. Cir. 1971); *Tummino v. Torti*, 603 F. Supp. 2d 519, 544-49 (E.D.N.Y. 2009). This has recently been forcefully confirmed by the Supreme Court which stated that "the reasoned explanation requirement of administrative law . . . is meant to ensure that agencies offer genuine justifications for important decisions." *Dep't of Commerce v. New York*, 139 S. Ct. 2551, 2575 (2019). A "contrived" rationale "that is incongruent with what the record reveals about the agency's priorities and decisionmaking process" is legally insufficient to justify a decision. *Id.*

[129] *See, e.g.,* LWG Comments on Portland Harbor Proposed Plan (Sept. 6, 2016); Portland Harbor Participation and Common Interest Group, Comments on The United States Environmental Protection Agency's Superfund Proposed Plan (Sept. 6, 2016).

Region 10's decision-making at Portland Harbor was driven not by the controlling statute, regulations, and guidance, but by impermissible political considerations. The record shows that the Region:

- Committed to issuing a ROD during the Obama Administration;
- Ignored more recent datasets and selected a remedy based on stale data; and
- Repeatedly changed its mind about the remedial approach in the RI/FS in order to develop the post-hoc justification for selecting a costly and unnecessary remedy.

1. *EPA Rushed to Issue the ROD before the Change of Administrations*

The ROD was signed on January 3, 2017 — just 17 days before the change of administration. This timing was no accident. In the words of then-Regional Administrator Dennis McLerran, Region 10 was "very motivated to get a decision on the site during this Administration."[130] Similarly, at a September 2015 meeting, then-EPA Administrator Gina McCarthy reportedly told Mr. McLerran that they could not "afford to wait much longer."[131]

The evidence of Region 10's commitment to issuing a ROD before the change of administrations and the shortcuts it had to take to do so is not based on isolated statements. The record shows that the Region rushed to reach last-minute decisions on key pieces of its remedial approach. And after having dragged the group of PRPs who voluntarily stepped forward to perform the RI/FS through an arbitrary process containing a long series of inconsistent decisions, the Region elected to take over the FS for the sole reason of meeting its political deadline.

a. The Lower Willamette Group, at Substantial Cost and Effort, Completed an RI/FS that Was Consistent with CERCLA and the NCP

Portland Harbor was listed on the National Priorities List in 2000. In 2001, EPA entered into an Administrative Order on Consent ("AOC") with ten potentially responsible parties ("PRPs"), which became known as the Lower Willamette Group to conduct the remedial investigation ("RI") and feasibility study ("FS") for the Site.[132] Under the AOC, LWG submitted drafts of the RI, the FS, and other work product for EPA approval. LWG would then revise its work based on the Region's comments and directions. The AOC also created a dispute resolution process, whereby LWG could object to any notice of disapproval and the matter would be ultimately resolved by a hearing officer, EPA's Environmental Office Cleanup Director.

LWG collected Site data in four major rounds of field investigations from 2001 to 2008. The study phase was completed at a substantial cost — costs are reported to have exceeded $115

[130] Email from Dennis McLerran, EPA, to Travis Williams, Willamette Riverkeeper, Re: Comment Period (June 23, 2016) (FOIA, R10-100032070).
[131] Email from James Woolford, EPA, Re: PH update (Sept. 18, 2015) (FOIA, SEMS_295593).
[132] Portland Harbor, Administrative Order on Consent for Remedial Investigation/Feasibility Study (Sept. 28, 2001).

million.[133] A significant part of these costs, and the associated delay, is attributable to the ad hoc manner in which EPA managed, and made decisions regarding, the project.

After complying with EPA's requests and directions on data collection at enormous effort and expense, LWG submitted the draft risk assessments in September 2009, the draft RI in October 2009, and its draft FS in March 2012. The LWG draft risk assessments, RI, and FS were substantial bodies of work, and were consistent with the NCP, EPA guidance, and the Site Work Plan. They had also been prepared with substantial input from Region 10.

Region 10, however, disagreed with the conclusions in LWG's drafts and ultimately made such extensive modifications to the documents that LWG's consultants did not sign the final versions. Whereas LWG's drafts were prepared in accordance with the Work Plan, Region 10 revised its remedial approach without any sort of plan or method. This ad hoc approach to revising the remedial documents delayed the project by several years and resulted in a remedy that is poorly supported.

b. Region 10's Decision to Change Course on the Baseline Human Health Risk Assessment Delayed Progress on the RI/FS and Proposed Plan

LWG submitted its draft FS in March 2012.[134] Region 10 planned to review the draft FS for 4 to 6 months and issue a proposed plan for public comment by late 2013.[135] But progress on the FS and Proposed Plan was delayed by EPA's take-over of the BHHRA.

The BHHRA was a heavily negotiated document. But by 2011, it appeared that agreement had been reached on most issues. LWG submitted its draft final BHHRA on May 2, 2011, after meeting and conferring with EPA over the 2009 draft. In July 2011, Region 10 requested the original document file for the BHHRA because it would be "most efficient" for Region 10 to modify the document directly; Region 10 assured LWG that it was not taking over the BHHRA from LWG.[136]

Almost a year later, in June 2012, Region 10 returned the document with extensive redline comments and threatened LWG with stipulated penalties if it did not accept the edits. The comments fundamentally departed from the Work Plan and the parties' long-standing agreement that fish consumption rates would not be designated as "reasonable maximum exposure" ("RME") scenarios in the BHHRA. Region 10 changed its mind and now determined that RME scenarios needed to be designated.

[133] Letter from LWG to EPA, Re: December 21, 2010 EPA Letter on the Status of the Portland Harbor Feasibility Study (Jan. 12, 2011).
[134] EPA, "Learn more about the Portland Harbor Superfund Site Cleanup" (Apr. 2012).
[135] *Id.*
[136] Email, Chip Humphrey, EPA, to LWG, Re: EPA request for human (July 22, 2011).

LWG accordingly invoked its dispute rights on September 21, 2012.[137] In its dispute brief, Region 10 explained the change in approach was "a correction in course [that] was needed."[138] It further argued that its assumptions regarding fish consumption from Portland Harbor were "plausible" and that "further re-evaluations and calculations would only yield similar results." Citing the large amount of time that had already elapsed, the EPA hearing officer agreed with EPA, stating in his December 6, 2012 decision: "[g]iven that this has already been a lengthy process, I believe it advisable for me to make decisions regarding fish consumption scenarios rather than allowing more time for the parties to work toward resolution."[139]

c. Region 10's Unjustified Changes of Approach in Revising the RI and FS Delayed the Project Timeline

Region 10's "course correction" on the BHHRA not only delayed its progress finalizing the RI and FS, but also signaled how the Region would approach revising those documents. Region 10 and LWG agreed to chapter-by-chapter review processes for both the draft LWG RI and FS that were intended to expedite issuance of the RI/FS and enable sharing of technical expertise. But, as with the BHHRA, the Region repeatedly changed its mind on long-negotiated pieces of the remedial approach. The changes increased the amount of work to complete the RI and FS and impeded collaboration with LWG.

Region 10 and LWG agreed that Region 10 would directly modify LWG's draft RI and FS and provide comments chapter-by-chapter. LWG would then have an opportunity to review the Region's modifications and seek to informally resolve any disputes first at the staff/management level and then at the senior management level. Once this process was complete for all chapters, Region 10 would provide a direction to incorporate all modifications and comments and LWG would have the opportunity to file a formal dispute.

From the very start, however, the review processes went slower than expected. When Region 10 first negotiated the RI revision process agreement in April 2013 it had aimed to complete the RI by July 2013. It soon fell behind that schedule and by the end of 2013 was aiming to complete the RI by July 2014.[140] With respect to the draft LWG FS, the Region did not develop a formal process for revising the document until June 2014, more than two years after LWG had submitted it.

The Region's review fell further behind schedule in summer 2014 when it changed its mind on long-agreed-to elements of the RI leading to more disputes with LWG. First, the Region determined that its own prior directions on background calculations and identification of outliers — RI Section 7 — were not consistent with guidance, and it therefore was changing its approach.

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[137] Letter, LWG to Daniel Opalski, EPA, Re: Formal Dispute of EPA Notice of Non-compliance and Directed Revisions to the Portland Harbor Draft Final Baseline Human Health Risk Assessment and Request for Dispute Resolution (Sept. 21, 2012).

[138] EPA, Response to Lower Willamette Group Opening Submission, at 22 (Sept. 21, 2012).

[139] Memorandum, Daniel Opalski, EPA, Re: Formal Dispute of EPA Notice of Non-compliance and Directed Revisions to the Portland Harbor Draft Final Baseline Human Health Risk Assessment and Request for Dispute Resolution, at 5-8 (Dec. 6, 2012). For the recreational fish consumption scenario, the Hearing Officer selected an arbitrary midpoint between the consumption rates proposed by Region 10 and LWG. The Hearing officer selected 48.9 g/day, where Region 10 had proposed 73 g/day and LWG had proposed 29 g/day.

[140] EPA and LWG Senior Managers' Meeting Notes, December 10, 2013 (notes finalized Mar. 24, 2014).

The Region admitted that its prior interpretation of guidance, under which work had been performed for the past five years, was wrong.[141] In August 2014, LWG exercised its formal dispute rights regarding Section 7.[142] That same month, LWG initiated an informal dispute to the Region's senior managers regarding the deletion of much of the conceptual site model developed by LWG and Region 10 under the Work Plan.[143] Region 10 acknowledged that the complexity of these disputes would again impact its schedule for completing the RI/FS.[144]

In September 2014, the Director of the Oregon Department of Environmental Quality ("DEQ") expressed frustration with the slow pace of the project.[145] DEQ attributed the delays in the project to the "turnover of multiple project managers" and urged "EPA to reexamine its current project team to determine whether a change would result in a more positive dynamic with all those engaged in the project."[146]

In spite of the significant outstanding work to complete the RI/FS, in November 2014, Region 10 committed to present its FS and proposed remedy to the National Remedy Review Board by November 16, 2015.[147] If the remedy was not presented to NRRB by that date, it would have to be submitted the following year, which would delay the schedule for issuing a ROD.

At the same time, Region 10 was concerned that further disputes would interfere with its ability to meet its increasingly tight project schedule. In December 2014, Region 10 modified the FS Revision Process Agreement to eliminate the ability of LWG to dispute issues on a section-by-section basis and replace it with a single opportunity to dispute all FS issues at once.

Subsequently released sections of the Region's draft FS showed that it was not just revising, but completely re-writing LWG's draft. Moreover, the Region's draft sections showed that major pieces of the FS were still unsettled.[148]

In FS Section 2, released to LWG and other stakeholders in February 2015, the Region was still struggling to decide which contaminants the remedy would address. In April 2010, Region 10 had presented LWG with a list of 46 preliminary remediation goals ("PRGs") for the FS.[149] By August 2014, Region 10 proposed a list of 192 PRGs for 46 contaminants of concern ("COC"). In the February 2015, the PRG table contained 196 PRGs, 80 of which had different values than the August 2014 version. Region 10 also changed previously agreed upon language of the remedial action objectives ("RAO"), and for the first time added an RAO for riverbanks. The revised Section 2 also showed that Region 10 was still developing its approach to various COCs such as dioxin/furans and manganese, as well as its approach to benthic risk.[150]

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[141] The Region's change of approach on background is discussed *infra* in Section V.B.2.

[142] Email, Jessica Hamilton, LWG, to EPA, Re: Response to Background Issue Raised During the EPA/LWG Senior Managers' Call (Aug. 27, 2014).

[143] Letter, LWG to EPA, Re: LWG Unresolved Comments on RI Sections 5 and 10 (Aug. 29, 2014).

[144] EPA, Key Messages re State role at the site (Sept. 15, 2014) (FOIA, SEMS_296057).

[145] Letter, Dick Pedersen, DEQ, to Dennis McLerran, EPA (Sept. 10, 2014).

[146]

[147] EPA, Technical Coordinating Team (TCT) Conference Call Meeting Notes, November 26, 2014.
LWG Comments on EPA's Feasibility Study Revised Draft Section 2 Text (Mar. 25, 2015). A key piece that remained unsettled included the approach to background. The dispute decision was not released until March 24, 2015.

[149] Letter, EPA to LWG (Apr. 21, 2010).

[150] These changes of approach are discussed *infra* in Section V.C.

Drafts of FS Sections 3 and 4, released in July and August 2015, demonstrated that Region 10 was reversing many of the long-negotiated approaches at the Site.[151] The Region's changes of approach all favored the selection of a more intensive remedial alternative.

Surprisingly, Region 10 decided to forego all reliance on quantitative fate-and-transport models — even though Region 10 and LWG had worked on developing such a model for more than 10 years, and in July 2010, Region 10 had authorized LWG to use its model for the draft LWG FS. The decision not to use a quantitative model meant that Region 10's comparison of the remedial alternatives was almost entirely *qualitative*.[152]

A number of other changes favored alternatives with larger active remedial footprints. Region 10 designated low-level contaminated sediments as PTW, requiring dredging. Region 10's new benthic risk approach increased the area of the site found to pose unacceptable risks from 7%, which was the conclusion of the Baseline Ecological Risk Assessment ("BERA"), to 59%. The analysis of monitored natural recovery did not include all lines of evidence showing that the Site was recovering. Unrealistic assumptions about construction and cost minimized the impacts of the more intensive alternatives.

Throughout this process, LWG continued to cooperate in good faith by timely delivering its comments in accordance with the tight schedule that Region 10 had set. By this point, however, the Agency's priority was not correcting any flaws identified by LWG but issuing a ROD by the end of 2016. In September 2015, the Oregon Congressional delegation met with Regional Administrator Dennis McLerran and agreed "that if at all possible, they wanted the ROD by the end of 2016."[153] That same month, EPA Administrator Gina McCarthy told Mr. McLerran that they could not "afford to wait much longer."[154]

d. Region 10 Decided to Take Over the FS in Order to Issue a ROD During the Obama Administration

The commitment to issue a ROD before the change of administrations left the Region with little flexibility to correct mistakes and ensure the selection of a sound remedy. Based on this artificial deadline, the Region looked to shorten CERCLA's review and comment procedures and circumvent the process it had agreed to with LWG.

As an instance of this, Portland Harbor's NRRB review was far shorter than what would be expected. NRRB review is intended to ensure consistent and cost-effective remedy decisions at high cost cleanup sites. Generally, the review process is expected to take two months, and includes a comprehensive review of comments from the agency and other stakeholders.[155] At Portland Harbor, one of the largest sediment cleanup sites in the country, the NRRB review took

[151] *See* Letter, LWG to EPA, Re: List of Significant Comments on EPA Feasibility Study Sections 3 and 4 (Sept. 8, 2015).
[152] Region 10's decision to abandon all quantitative fate-and-transport models is discussed *infra* in Section V.B.6.
[153] Email, James Woolford, EPA, (Sept. 18, 2015) (FOIA, SEMS_295593).
[154] Email, James Woolford, EPA, Re: PH update (Sept. 18, 2015) (FOIA, SEMS_295593).
[155] https://www.epa.gov/superfund/national-remedy-review-board-nrrb (Frequent Questions, No. 8 "How long does a typical Board review take?").

just over one month, with a deadline set on December 31, 2015.[156] On this expedited schedule, the NRRB did not meaningfully consider contrary evidence in forming its recommendations and entirely disregarded comments from a group of PRPs providing more recent datasets that showed that site conditions had dramatically improved.[157] LWG's comments largely went unaddressed.[158]

In the same time frame, the Region also began to consider ways to cut short the process it had agreed to with LWG. In October 2015, Kevin Parrett, Manager of the NW Region Cleanup Section of DEQ, stated:

> In reviewing the LWG's new comments on the FS it is inevitable that they will dispute an EPA directive to finalize the FS. I'd like to discuss how an LWG dispute would impact the schedule. Also let's discuss whether EPA can bypass the LWG in finalizing the FS and other options for keeping the project on schedule in face of a hostile LWG.[159]

By November 2015, Region 10 was evaluating how it might resolve an FS dispute while sticking to its schedule.[160] The aim was a ROD by the end of 2016 with a proposed plan being issued in the spring.

On December 16, 2015, Region 10 requested a meeting with Gina McCarthy to discuss options for finalizing the FS "in light of the goal to sign the Record of Decision (ROD) in 2016."[161] In order to stay on project schedule, Region 10 had determined that the FS needed to be issued "no later than mid-February, 2016."[162] The purpose of the meeting was to discuss the "political and legal risks" of various enforcement options under the AOC with respect to LWG to complete the FS.[163] In an email dated December 23, 2015, Regional Administrator McLerran stated:

> I have revised the options document into a single recommendation to the Administrator based on Cyndy [Mackey's] final suggestions. I would like to send this to the Administrator tomorrow so she has an opportunity to review it over the weekend prior to our Monday call with her. . . . I believe this option creates a process that we can manage and still maintain the current schedule. The option is consistent with the terms of the AOC but we would remain in charge of the scope of the response to a dispute under this option while also giving LWG the necessary

[156] Email, James Woolford, EPA, (Dec. 31, 2015); Email, Steve Ells, EPA (Nov. 24, 2015) ("Amy and I have committed to get the final out to R.10 before the holidays.").
[157] Email, Amy Legare, EPA, Re: "Portland Harbor comments from Sarah Goodling may be disregarded" (Nov. 16, 2015). The Region's decision to disregard these comments is discussed *infra* in Section V.A.2.b.
[158] Letter, LWG to NRRB, Re: LWG's Concerns with the National Remedy Review Board and Contaminated Sediments Technical Advisory Group Recommendations for the Portland Harbor Superfund Site (Apr. 1, 2016).
[159] Email from Kevin Parrett, DEQ, to EPA, (Oct. 12, 2015).
[160] EPA Notes, Portland Harbor Directors' Meeting, November 10, 2015.
[161] EPA, Internal Meeting/Briefing Request Form for Administrator Gina McCarthy, Re: Portland Harbor Superfund Site Cleanup (Dec. 16, 2015) (FOIA, SEMS_296321).
[162] *Id.*
[163] *Id.*

due process and ability to make a record as we proceed to a Proposed Plan and ROD.[164]

The meeting with Administrator McCarthy occurred on December 28, 2015.[165]

One week later, on January 4, 2016, Region 10 informed LWG that it was taking over the FS and would finalize the document itself.[166] It explained that as it understood the AOC, it could complete the FS because the 2012 draft LWG FS had been disapproved as deficient — notwithstanding that Region 10 had spent the past four years working to collaboratively revise the FS with LWG. Region 10 also explained that — despite the preceding four years in which LWG attempted to work together with Region 10 to revise the FS — its position was that LWG's opportunity to dispute Region 10's disapproval of the LWG's 2012 draft FS had "technically passed." In December 2012, however, EPA had expressly told LWG that its disapproval was *not* intended to trigger LWG's dispute rights.

LWG filed a formal dispute of the decision to take-over the FS on January 19, 2016.[167] The dispute letter explained that Region 10 was alleging, for the first time, that LWG failed to comply with the AOC with respect to the 2012 FS. LWG expressed that it was ready and willing to work with Region 10 to meet its schedule for completing the ROD.

Region 10 and LWG settled the dispute on February 4, 2016.[168] Under the settlement, Region 10 would finalize the FS "[t]o keep the remedy selection process moving forward and publish a Proposed Plan by March 2016." LWG preserved its dispute resolution rights with respect to the final FS. But the dispute decision would be made "simultaneously with the agency's remedy decision" in order to "streamline" the process, and accordingly, would be nothing more than a formality.

The RI was finalized on February 8, 2016. The RI, FS, and Proposed Plan were released to the public on June 8, 2016. Region 10 received significant pressure to extend the default 30-day public comment period given the importance of the site and level of public interest. Community members noted that other Superfund sites had received significantly longer comment periods.[169] Although Region 10 extended the comment period to 90-days through September 6, 2016, the utility of the extension was hamstrung by Region 10's artificial deadline for publishing the ROD. Dennis McLerran stated that "[w]e don't have much, if any flexibility on that if we are to get to a ROD by year end."[170] Again, Region 10's politically driven schedule reduced the meaningfulness of CERCLA's processes. An email from May 6, 2016, shows that Region 10

[164] Email from Dennis McLerran, EPA, (Dec. 23, 2015) (FOIA, SEMS_296449).
[165] EPA, Portland Harbor Superfund Site, FS Completion Decision (Dec. 28, 2015).
[166] Letter from EPA to LWG, Re: EPA Decision to Complete the Portland Harbor Superfund Site Feasibility Study (Jan. 4, 2016).
[167] Letter from LWG, to EPA, Re: Request for Dispute Resolution on EPA January 4, 2016 Decision to Take Over the Portland Harbor Feasibility Study (Jan. 19, 2016).
[168] Letter from EPA to LWG, Re: Completion of the Portland Harbor Superfund Site Feasibility Study (Feb. 4, 2016).
[169] Email from Dennis McLerran, EPA, to Travis Williams, Willamette Riverkeeper, (June 23, 2016) (FOIA, R10-100032070).
[170] Email from Dennis McLerran, EPA, to Dick Pedersen, DEQ, Re: The Oregonian (June 12, 2016) (FOIA, R10-100033305).

began drafting the responsiveness summary based on the Lower Duwamish ROD before the Proposed Plan was released and the public comment period opened.[171]

LWG disputed the FS on June 22, 2016.[172] PRPs submitted extensive comments documenting the fundamental flaws in the Proposed Plan. In total, the Region received more than 5,000 comment submissions. Yet, on January 3, 2017, approximately 4 months after the close of the public comment period on the Proposed Plan, Region 10 issued its ROD. In the ROD, Region 10 selected Alternative F (Modified), which had not been presented to the public, and included approximately twice as much dredging acreage as the Preferred Alternative in the Proposed Plan. Region 10's rationale for the change in remedies was the "new information that EPA received during the public comment period," which consisted of pre-printed post card comments from certain members of the public that the Proposed Plan "was not protective enough of human health and the environment and relied too heavily on MNR."[173]

2. *Region 10 Ignored Evidence that Site Conditions Were Improving*

Region 10's commitment to issuing a ROD during the Obama Administration caused it to take a number of shortcuts to issue a decision on the Site. As discussed above, Region 10 decided key elements of the remedial approach for the Site at the last minute and it conducted CERCLA's review processes in a perfunctory manner. The most significant shortcut taken by Region 10 was the decision to issue a ROD based on 10-year old data and, in so doing, ignore more recent data showing that Site conditions were improving dramatically.

Surface sediment sampling at Portland Harbor was largely completed in 2004. As the Project fell behind schedule, this data became less and less representative of Site conditions. First, DEQ began controlling sources of contamination from upland sites pursuant to the 2005 Portland Harbor Joint Source Control Strategy. By 2014, DEQ had completed source control activities at 119 of the 168 uplands sites that were screened as potential sources of contaminants to the River. Second, it is uncontroverted that natural recovery processes are occurring at the Site.

In 2014, DEQ expressed concerns that as EPA fell behind its project schedule it would have to conduct extensive re-sampling of the Site due to source control and natural recovery processes:

> A key concern is the pace of the project. A project with an original timeline of 8 years is now in its 14th and is unlikely to achieve a ROD for several more years. . . . Due to these expanded timelines, substantial re-sampling of sediment will likely be required after the ROD is issued to re-evaluate cleanup areas given the age of the data and the dynamics of the river system.[174]

[171] Email from Scott Coffey, CDM Smith, to EPA, Re: Responsiveness Summary Discussion (May 6, 2016) (FOIA, SEMS_295229).
[172] Letter from LWG, to EPA, Re: "Request for Dispute Resolution on EPA June 2016 Feasibility Study" (June 22, 2016).
[173] ROD at 85.
[174] Letter from Dick Pedersen, DEQ, to Dennis McLerran, EPA (Sept. 10, 2014).

That is exactly what happened. Fish tissue samples in 2012 showed a significant reduction in contaminant concentrations from earlier sampling events. Comprehensive sediment sampling in 2014 similarly showed significant reductions from the 2004 dataset.

An agency is obligated to review current data, and the failure to do so is arbitrary and capricious. *See Sierra Club v. EPA*, 671 F.3d 955, 968 (9th Cir. 2012) ("[W]e should not silently rubber stamp agency action that is arbitrary and capricious in its reliance on old data without meaningful comment on the significance of more current compiled data. We hold that EPA's failure to even consider the new data and to provide an explanation for its choice rooted in the data presented was arbitrary and capricious."); *see also Dist. Hosp. Partners, L.P. v. Burwell*, 786 F.3d 46, 56-57 (D.C. Cir. 2015) ("To be clear, agencies do *not* have free rein to use inaccurate data. . . These requirements underscore that an agency cannot *ignore* new and better data."); *Northern Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1086 (9th Cir. 2011) ("Reliance on data that is too stale to carry the weight assigned to it may be arbitrary and capricious."); *Catawba Cty. v. EPA*, 571 F.3d 20, 46 (D.C. Cir. 2009) (stating that agencies "have an obligation to deal with newly acquired evidence in some reasonable fashion"). The 2012 fish tissue sampling and 2014 sediment sampling was exactly the type of new information that an agency must consider *before* making a decision. Region 10 decided only to evaluate the change in Site conditions *after* rather than before it selected a remedy. This decision was arbitrary and unjustified given the availability of compelling new information that the Site had changed.

a. Region 10 Directed Additional Fish Tissue Sampling and Then Ignored the Results

In July 2012, at the direction of EPA Headquarters, Region 10 requested that the LWG collect additional smallmouth bass tissue data.[175] The purpose of the additional data would be to evaluate current Site conditions. As set forth in the Region's memorandum:

> Our current understanding of fish tissue concentrations is outdated. These are the primary exposure pathway [*sic*] responsible for driving risk. We do not have a clear understanding of the current magnitude and location of elevated fish tissue concentrations posing unacceptable risk.

Region 10 itself conducted a fish tissue collection effort with similar objectives in 2011, but due to a laboratory error, the majority of samples were mishandled and could not be used.

LWG agreed to collect the additional data and prepared a field sampling plan modeled after Region 10's 2011 field sampling plan.[176] During August and September of 2012, LWG collected a total of 92 smallmouth bass from within and upstream of the Study Area, under EPA's direct oversight.

LWG's analysis of the data concluded that the 2011 and 2012 data showed statistically significant reductions from the 2007 and 2002 datasets.[177] On a study-wide area, total PCB congener concentrations in whole body smallmouth bass tissue showed a statistically significant

[175] Memorandum from EPA, Re: Portland Harbor Supplemental Fish Tissue Collection (2012).
[176] LWG, 2012 Modifications to the Field Sampling Plan for Bass Tissue (Aug. 15, 2012).
[177] Memorandum from LWG Re: Statistical Comparison of Historical and 2012 Smallmouth Bass Data (Mar. 6, 2013).

(p<0.05) decrease from the combined 2002 and 2007 historical data and from the 2007 data alone. On a river-mile scale, means, maximums, and minimum total PCB congener concentrations were generally lower in 2012 smallmouth bass than in previously collected samples. A second analysis by LWG's consultants concluded that average PCB concentrations in nearly all of the study area lay within the range of upstream background.[178] The pattern of recovery was consistent with a system approaching, and in many places at, background. Further, a comparison of the measured tissue reductions and the estimated reductions predicted by LWG's model found that the actual rate of recovery either exceeded or overlapped with the estimated rate of recovery. LWG presented its analyses to Region 10 in March 2013 and EPA Headquarters in June 2013.[179]

Region 10 minimized any conclusions that might be drawn from the 2012 smallmouth bass dataset. It agreed that there "appears to be a general trend of lower concentrations . . . but it's premature to view it as a reliable trend."[180] On July 10, 2013, Lori Cohen, Region 10's senior project manager, stated that while the Region "appreciated that LWG collected the data, however, EPA was concerned that the data was not adequate to present a 'downward' trend in fish tissue contamination as presented by the LWG and that the data was not adequate to support the LWG conclusion that the observed reductions in PCBs in fish tissue [were] due to natural recovery."[181] In spite of its oversight of the sampling, Region 10 concluded that "the small sample size, limited number of time points, and inconsistency in sampling methodology preclude a meaningful, statistically-valid determination of a trend."[182]

b. Because of Its Project Schedule, Region 10 Ignored 2014 Sediment Data Showing Site Conditions Had Dramatically Improved

In December 2014, an industry group of several PRPs conducted a comprehensive study ("Kleinfelder study") of PCB concentrations in surface sediments in order to address some of the questions Region 10 raised about the 2012 smallmouth bass data.[183] The objective of the study was to assess the current concentrations of PCBs in surface sediments. The results of the study were completely consistent with the 2012 smallmouth bass data. But again, Region 10 refused to

[178] LWG, Presentation, Lower Willamette River, Small Mouth Bass Data, Monitored Natural Recovery Analysis (Mar. 18, 2013).
[179] An analysis completed by Legacy Site Services, LLC ("LSS"), agent for Arkema, Inc., later in 2013 concluded that from 2002 to 2012 the mean smallmouth bass total PCB concentrations had decreased by more than 40%. Legacy Site Services, LLC, An Assessment of Coupled Sediment Recovery and Dynamic Food Web Model: Predicting the Concentrations of Total PCBs in Lower Willamette Fish Tissue Based on the 2002 to 2012 Sampling Data (Aug.2015). Applying the mechanistic foodweb model which relates the concentration of total PCBs in smallmouth bass to the concentration present in sediment, LSS calculated the concentration of total PCBs in sediment based on the 2012 smallmouth bass data to be in the range of 37 ppb. In 2002, by contrast, the concentration of total PCBs in sediment was 81 ppb.
[180] Email from Chip Humphrey, EPA, to Deb Yamamoto, EPA, Re: PH Hot issues (June 17, 2013) (FOIA, SEMS_298527).
[181] Email from Lori Cohen, EPA, to LWG, Re; Portland Harbor: Followup to June 26 meeting (July 10, 2013).
[182] LWG provided comments that critique Region 10's model and conclusions. LWG, Comments on EPA MNR Evaluation Using Fish Contaminant Concentrations (Sept. 6, 2016) (Attachment to LWG Comments on Proposed Plan).
[183] *See* Kleinfelder, Sediment Sampling Data Report Portland Harbor, Oregon (May 11, 2015) (Attachment to LWG Comment on Proposed Plan).

consider the new data. The Region explicitly tied its decision to ignore more recent datasets to its need to stay on its project schedule and thus, issue a ROD during the Obama Administration.

To assess natural recovery, the 2014 surface sediment results were compared to the 2004 surface sediment results. The comparison showed substantial and statistically significant ($p<0.01$) Sitewide declines in total PCB concentrations, whether the data were evaluated as mean concentrations or surface-weighted average concentrations.[184] Additionally, median total PCB concentrations declined when plotted by river mile with statistical significance ($p<0.05$) at river miles 2, 3, 4, 5, 7, and 9. Overall, the Kleinfelder study demonstrated natural recovery was occurring to a significant extent. The concentration reductions were consistent with the predictions of LWG's model.

A group of industry stakeholders requested a meeting with EPA to discuss the Kleinfelder study and other recent data supporting significant natural recovery processes on July 9, 2015.[185] EPA responded by letter on August 5 and explained that it would not consider the new data until the remedial design phase. EPA explicitly connected its response to the need to stay on project schedule:

> As you are aware, EPA's modifications to the Feasibility Study are well underway and are nearly complete. The conceptual cleanup plan will be peer reviewed by both the National Remedy Review Board and the Contaminated Sediments Technical Advisory Group this November and we are on track to have a Proposed Plan for public review and comment in the spring of 2016. There has been a significant amount of data gathered over the past fifteen years, such that a remedy can be selected for the site. The data you collected in the recent effort may be helpful as we move into design and construction.[186]

The Region nonetheless met with industry stakeholders on September 10, 2015. Internal emails show that the Region had already decided that the amount of natural recovery supported by the new data was "unrealistic."[187]

The industry stakeholders sent the information regarding evidence of changed Site conditions to the NRRB on October 19, 2015.[188] But the NRRB refused to consider the new information. The only justification EPA gave for ignoring the new information was an Office of

[184] Kleinfelder, Portland Harbor: The State of the River in 2014.
[185] In addition to the 2012 smallmouth bass tissue data and 2014 sediment data, the letter also cited a 2013 Sediment Profile Imagery (SPI) study that showed dramatic improvement in the health of benthic organism colonies at the Site. *See* Letter, Schnitzer Steel and Legacy Site Services, LLC, agent for Arkema, Inc., to James Woolford and Cami Grandinetti, EPA, (July 9, 2015).
[186] *See* letter from Cami Grandinetti, EPA to Schnitzer Steel and Legacy Site Services, LLC, agent for Arkema, Inc., Re: Request for Meeting with EPA To Discuss Sediment Sampling Study (Aug. 5, 2015).
[187] Email from Kevin Parrett, DEQ, to Kristine Koch, EPA, Re: LWG Model Predictions for Fish Tissue (Sept. 10, 2015).
[188] Letter from Air Liquide USA LLC, *et al.*, to National Remedy Review Board, Re: Portland Harbor Superfund Site – PRP Comments (Nov. 13, 2015).

Solid Waste and Emergency Response memorandum stating that NRRB had "discretion" to consider information from PRPs who are not conducting the RI/FS.[189]

It is apparent that the Agency ignored the new information concerning natural recovery in order to stay on its project schedule. Indeed, as early as Fall 2014, Region 10 had indicated that it would not consider new data until after the ROD had been completed. For example, Region 10 had stated that "we would likely not slow the schedule for finalizing the RI/FS unless there was compelling evidence demonstrating a data gap that fundamentally affects alternative development and/or evaluation."[190] The Region further connected this directly to its schedule for a ROD: "In order to meet that schedule, EPA's staff and resources are focused on a Proposed Plan in late 2015/early 2016 and a 2017 ROD. Sufficient data exists now to make a remedy decision . . . and it is reasonable for EPA not to jeopardize the ROD schedule with unnecessary data gathering."[191] Similarly, Region 10 refused to include datasets collected by the RM 11E early action group because "a lot of FS work already started would need to be redone that would further impact the schedule."[192]

c. Region 10 Issued the ROD Without Considering the More Recent Datasets

LWG submitted the new evidence regarding natural recovery during the comment period on the Proposed Plan. Region 10 offered a number of rationales for not considering the new data. First, it discounted any conclusions drawn from the data based on certain variations in study design. The Kleinfelder study (i) was not conducted under an EPA-approved work plan; (ii) included "merely 98 samples;" and (iii) the data "do not appear comparable to previously collected remedial investigation data."[193] The 2012 smallmouth bass study was conducted under an approved EPA work plan, but was not "directly comparable" to the earlier data, according to Region 10.[194] Region 10 further noted that "temporal changes in contaminant concentrations were not an objective of the data collection efforts."[195]

All of Region 10's arguments focus on perceived limitations in the data but ignore the significant utility of the data and what it tells us about the Site. The case for considering the 2014 and 2012 data was simple: it was more recent and, consistent with the conceptual site model, the most representative data available at that time regarding current Site conditions. EPA does not have discretion to ignore such data. *See, e.g.*, *Sierra Club*, 671 F.3d at 968; *Catawba Cty.*, 571 F.3d at 46.

Region 10 also stressed that the RI dataset (largely consisting of samples collected from 2001 to 2008) was an adequate baseline that included thousands of surface and subsurface

[189] Email from Amy Legare, EPA, Re: Reconsideration Request for Submission of Portland Harbor Remedial Comments to National Remedy Review Board (Nov. 2, 2015) (FOIA, SEMS_296907).
[190] Letter from EPA to Legacy Site Services, LLC, Re: Dispute of EPA Letter dated June 6, 2014, Arkema Inc. Portland Facility (Sept. 5, 2014).
[191] Letter from EPA to Richard Albright, Re: EPA Response to Legacy Site Services' September 12, 2014 Notice Seeking Formal Dispute Decision (Oct. 1, 2014).
[192] TCT Meeting Notes, November 12, 2014.
[193] ROD, Responsiveness Summary, App. A at I-138; I-129.
[194] *Id.* at I-139.
[195] *Id.* at I-139.

sediment samples.[196] The Region argued that LWG itself relied on the dataset for its draft FS. LWG's FS, however, was prepared nearly five years before EPA's. That the RI dataset may have been representative of Site conditions at one point does not mean that it would always remain so.

Region 10's final response was to acknowledge that natural recovery was occurring and would be evaluated in remedial design sampling.[197] The Region noted that "[a] decision-making process cannot undergo constant modifications when data are collected at various times and locations throughout the Site." This statement is not persuasive where the project at issue lasted twice as long as expected and the available evidence showed that the original dataset was no longer representative. *See Zen Magnets, LLC v. Consumer Prod. Safety Comm'n*, 841 F.3d 1141, 1150 n.10 (10th Cir. 2016) ("In general, where there is a known and significant change or trend in the data underlying an agency decision, the agency must either take that change or trend into account, or explain why it relied solely on data pre-dating that change or trend.").

The responses offered by the Region in the ROD are also belied by its attempts to discount the 2018-19 PDI data. Whereas the Region repeatedly promised to re-evaluate Site conditions after the ROD, it has now given the same disingenuous arguments for disregarding more recent data based on purported methodological inconsistencies and vague promises to re-evaluate Site conditions at a later time.

3. *Region 10's Remedy Selection was Arbitrary*

a. LWG's 2012 Draft FS Concluded that All of the Remedial Alternatives Were Equally Effective

LWG and Region 10 developed various remedial alternatives that employ dredging, capping, and MNR to varying degrees. These remedial alternatives included Alternative A (no action) and Alternatives B through G, which provide progressively larger construction footprints for capping and dredging.[198]

LWG's 2012 draft FS conducted a thorough evaluation of the effectiveness of MNR at the Site based on empirical data and predictive sediment transport modeling.[199] LWG concluded that MNR is effective on a Site-wide basis, although the rates of natural recovery will vary depending on the location within the Site.

The Site-wide effectiveness of MNR, as well as quantitative modeling of Site-wide fate-and-transport processes, led LWG to conclude that all the alternatives would "achieve relatively similar Site-wide surface sediment COC concentrations over the long term."[200] "[T]he primary differences in overall protectiveness achieved by the comprehensive alternatives are related to the extent and duration of shorter term changes in risks that occur during remedy implementation."[201]

[196] ROD, Responsiveness Summary at 2-74 & 2-76.
[197] *Id.* at 2-52.
[198] EPA's final FS also included an Alternative H, which meets all CULs at the end of construction, and Alternative I, which applies different CULs throughout the Site.
[199] LWG, Draft Feasibility Study, at 6-21 (Mar. 30, 2012).
[200] *Id.* at 9-14.
[201] *Id.* at 9-6.

Dredging was "projected to result in elevated tissue PCB concentrations during and immediately following dredging operations due to unavoidable PCB releases to the water column."[202] Accordingly, alternatives with more dredging were unlikely to achieve remedial action objectives ("RAOs") any sooner than the less intensive alternatives.

LWG determined that an action within the range of its Alternatives B-i (49 acres capping & dredging / 2 years construction duration / $169-250 million estimated cost), C-i (76 acres capping & dredging / 3 years construction duration / $228-345 million estimated cost), and D-i (95 acres capping & dredging / 3 years construction duration / $266-398 estimated cost) would provide the best set of tradeoffs for meeting the RAOs following the NCP remedy selection criteria.

b. Region 10 Disagreed with LWG's Conclusions and Reversed Many of Its Own Previous Positions in Order to Select a More Intensive Remedy

Region 10 acknowledged that the draft FS provided a sound technical evaluation but disagreed with LWG's conclusions, especially regarding the effectiveness of MNR versus dredging. Notes from Region 10's review of the draft FS suggest that the Region deemed unacceptable LWG's conclusions that the various alternatives were equally protective and that remedial alternatives that remove more material or are longer in duration are less effective.[203] The draft LWG FS, the Region suggested, was "biased" against dredging remedies. A memorandum prepared by CDM Smith, the Region's main consultant, stated that LWG's evaluation of alternatives was "flawed primarily due to an underestimation of the effectiveness of dredging based remedies and an overestimation of the effectiveness of monitored natural recovery."[204]

Comments from the Region's partners (the tribes, the National Oceanic and Atmospheric Administration, the U.S. Army Corps of Engineers, and DEQ) indicate that the Region was internally deliberating about how it might modify LWG's assumptions to favor dredging remedies, such as:

- A "recalibration" of LWG's assumptions that "would introduce reasonable, cost-effective and practicable alternatives that would allow for the removal of larger volumes of more contaminated sediments;"[205] and

- "[U]sing higher estimates of production rates and longer work windows, based on the assumption that the Services will allow work to proceed more rapidly to achieve the benefit of removing contaminants from the river."[206]

[202] *Id.* at 9-5.
[203] EPA, FS Review Team Comments on PH FS Report, (July 24, 2012) (FOIA, SEMS_0323512).
[204] Memorandum from CDM Smith re Approach for Developing Proposed Plan Based on Draft FS (Aug. 31, 2012) (FOIA, SEMS_298264).
[205] *Id.*
[206] *Id.*

The comments also show how results-driven the Region's decision-making was. DEQ specifically suggested "recalculat[ing] volumes and costs as appropriate, and consider changing some of the 'rules' for dredging, capping, etc."[207]

The comments also show that the Region was facing pressures to select a remedy that removed most, if not all, Site contaminants by dredging — even if natural recovery processes were just as effective at reducing Site risks.

Over the next three years, Region 10 re-wrote LWG's draft RI and FS in order to create the foundation for Region 10 to select a more intensive, invasive, and expensive remedial option. In doing so, the Region repeatedly reversed course from long-standing approaches that it had negotiated and developed with LWG since work had started on the Site.[208] The Region's arbitrary changes left it without a reasoned basis to conclude that any of the remedial alternatives will achieve the objectives of the cleanup. In turn, the Region gained the flexibility to justify the selection of whichever alternative it deemed politically expedient. The lack of basis for the Region's remedial approach is illustrated in how the Region bounced between preferred alternatives, before ultimately settling on a remedy in the ROD that had never been presented to the public.

c. In Just a Matter of Months, the Region Switched Its Preferred Remedy for Presentation to the National Remedy Review Board

Leading-up to its presentation to the NRRB, Region 10 planned to release a "conceptual" remedy. The conceptual remedy would be released to a limited set of stakeholders — LWG, the tribes, and the community advisory group ("CAG") — that would have an opportunity to comment and present their recommended approaches for the cleanup.[209] The conceptual remedy was intended to be a "point of departure" for all interested stakeholders to focus their comments.[210] Region 10 intended to release the conceptual remedy by September 18, 2015.[211]

Region 10's own modeling was consistent with LWG's conclusion that all of the remedial alternatives would achieve similar surface sediment COC concentrations in the long-term. On July 31, 2015, Region 10 held a "rollout" for Sections 3 and 4 of the revised FS. The Region's presentation included a series of recovery curves that were generated with its SEDCAM model.[212] The curves showed that each of the alternatives reduced concentrations to the same levels in approximately 30 years. The main difference between the alternatives was how quickly they reduced contaminant concentrations. But, even then, the more intensive alternatives have longer construction durations limiting their ability to achieve CULs any faster.

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[207] *Id*.
[208] *See* Sections V.B and V.C *infra* for detail on the substantive flaws in the Region's remedial approach.
[209] Meeting Notes, EPA and LWG Senior Managers' Meeting, December 10, 2013 (finalized Mar. 24, 2014) (FOIA, SEMS_299433).
[210] Email from James Woolford, EPA, Re: PH update (Sept. 18, 2015) (FOIA, SEMS_295593).
[211] Email from Kristine Koch, EPA, to LWG (July 16, 2015) (FOIA, SEMS_297220).
[212] EPA, Portland Harbor FS Sections 3 & 4, Presentation to the Lower Willamette Group, (July 31, 2015) (graphs produced through FOIA).

Yet, internal records from September 2015 show that Region 10 was planning to present Alternative E (204 acres dredging / 83 acres capping / 7 years construction / $1.5 billion (discounted)) as its conceptual remedy.[213] Alternative E involved significantly more dredging and was longer and more expensive than the alternatives that LWG determined presented the best tradeoff of costs and benefits.

On September 16, 2015, two days before the Region planned to release its conceptual remedy, members of Oregon's congressional delegation met with Dennis McLerran, Dick Pedersen, the director of DEQ, and Jim Woolford, EPA's Office of Land and Emergency Management, and urged them not to release the conceptual remedy.[214] As recounted by Jim Woolford, the congressional delegation's view was that the "concept plan . . . would be viewed and portrayed as an EPA decision and we would be forced into a defensive posture."

Thus, at the last minute, the Region elected not to release its conceptual remedy and the NRRB package to stakeholders, and instead directed their attention back to the alternatives in the draft revised FS.[215] On September 18, the Region sent an email to stakeholders containing a general statement of issues on which they should focus their comments.[216] The Region had to quickly pivot its messaging; it was now "talking about options" and had "not landed anywhere."[217]

While the Region backpedaled, the record is clear that by the time it presented to the NRRB in November 2015 it had already settled on a remedy. Thus, by the time the Region went to the NRRB in November, it had decided that an "optimized" version of Alternative E (167 acres / 83 acres capping / 7 years construction / $1.4 billion (discounted)) presented the best balance of risk reduction, cost-effectiveness, and expediency. This "optimized" version of Alternative E was identical to the preferred remedy it presented in its Proposed Plan seven months later, which it then called Alternative I. Alternative I — the former optimized Alternative E — applied different RALs in different areas of the Site because "some areas of the Site could use a less aggressive alternative . . . while other areas needed a more aggressive alternative." Alternative I "achieved a consistent level of risk reduction."

d. Region 10 Favored More Intensive Alternatives in the Proposed Plan Without Any Quantitative Analysis

Region 10 released its Proposed Plan on June 8, 2016. Its preferred remedy, Alternative I, was the same remedy it presented to the NRRB seven months earlier. The only significant difference was that the Region had cut its cost estimate for the remedy in half from $1.4 billion to $750 million (discounted cost estimates). The $650 million price drop, without any significant changes in the remedy, was so remarkable that some Headquarters staff questioned internally how

[213] EPA, September 8, 2015 Briefing for Administrator – Talking Points to Accompany Slides (Sept. 3, 2015) (FOIA, SEMS_296347).
[214] Email from James Woolford, EPA, Re: PH update (Sept. 18, 2015) (FOIA, SEMS_295593).
[215] Email from Amy Legare, EPA, Re: "NRRB/CSTAG – status of Portland Harbor review package" (Sept. 21, 2015) (FOIA, R10-100026870).
[216] Email from Kristine Koch, EPA, to LWG, Re: Portland Harbor Updated (Sept. 18, 2015).
[217] Meeting Notes, Portland Harbor Directors' Meeting, November 10, 2015 (FOIA, SEMS_296891).

it was even possible, writing via email, "I wonder how they cut the cost in half," and in response, "Yeah, me too! Pretty big change with no change in remedy selection; spread sheet error?"[218]

Region 10's protectiveness evaluation was not supported by any quantitative analysis due to the Region's decision to abandon attempts to model fate-and-transport processes at the Site. Instead the Region established "interim targets" for risk levels at the end of construction that were considered to be sufficient such that, with natural recovery, the Site would meet the CULs within 30 years. The interim targets and 30 year natural recovery period were not supported by any analysis and were arbitrary and unjustified; the Region provided no reason why its selected interim targets were reasonable, or why it expected that natural recovery would be effective in 30 years.[219]

Nonetheless, the Region's protectiveness evaluation showed that there was little difference in protectiveness between the more and less intensive remedial alternatives. For human health, the Region determined that each of the alternatives would be protective. For ecological risk, there was minimal difference between the less intensive Alternatives B & D and the more intensive alternatives E and I. Alternative B addressed 48% of the benthic risk area and only missed Region 10's arbitrary interim target of 50% by 2%. Alternatives B, D, E, and I all missed Region 10's interim target for ecological bioaccumulation risk. Yet the Region did not comment on the failure of Alternatives E and I to meet the interim target for ecological bioaccumulation risk, and screened out Alternative B[220] and stated that there was "more uncertainty" with Alternative D.[221]

The Region's estimate of the number of "acceptable fish meals" at the completion of construction also showed that the differences between the alternatives as far as protectiveness were small. Alternatives E and I would allow consumption of 5 fish meals a year for most populations and 0.5 fish meals per year for breastfeeding women. Alternative D would allow 3 fish meals per year for most populations and 0.4 fish meals per year for breastfeeding women. Alternative F would allow 7.5 fish meals per year and Alternative G would allow 10 fish meals per year. The number of acceptable fish meals, however, was significantly limited during the construction periods for all alternatives; during construction, the recommended number of fish meals was 0.6 per year, and 0.1 for breastfeeding women. Region 10 also acknowledged that fish advisories will still remain in place due to "broader watershed risks."

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[218] Email chain between S. Ells, R. Sturgeon, A. Hitner, et al., EPA, Re: "Portland Harbor Proposed Plan" (June 9, 2016) (FOIA, R10-100033927).

[219] The arbitrary nature of the Region's interim targets is discussed *infra* in Section V.B.6.

[220] Region 10 also concluded that Alternative B would not comply with chemical specific ARARs in a reasonable time frame. FS at 4-20. It found that exceedances of water quality criteria would continue to PCBs, cPAHs, and 2, 3, 7, 8-TCDD at the end of construction. This conclusion was based on questionable assumptions regarding the ability of the Site to achieve surface water CULs. For one, the Region did not include upstream contaminant contributions in its evaluation because it expected that source control actions would reduce contaminant loading. ROD, Responsiveness Summary at 2-41. The Willamette River is 303(d) impaired for a number of contaminants including arsenic, DDT, DDE, dieldrin, PCBs, PAHs, and hexochlorobenzene and the LWG calculated that the concentrations of those contaminants entering the Site exceeded both state and federal fish consumption values. The Region also did not consider the contribution of contaminants from stormwater, again based on the assumption that the contribution from stormwater will decrease due to source control activities.

[221] The Region also found that Alternative D would not address all PTW. As discussed *supra* at Section VII.B, the Region's designation of PTW is arbitrary and unnecessary.

With minimal differences in the protectiveness of the alternatives, the Region's remedy preference comparison came down to a balance between the level of risk achieved at the completion of construction against the duration and impacts of construction activities on the environment and the community. Making a wholly qualitative judgment, the Region determined that Alternatives E and I achieved the best balance of risk reduction and long-term effectiveness against cost and construction impacts. It is obvious that this reasoning could have been equally used to justify any of the other alternatives.

e. Public Comments Documented that More Intensive Remedial Alternatives Were No More Effective than the Less Intensive Alternatives

The Proposed Plan received approximately 5,500 public comments. Industry stakeholders identified a long list of technical flaws and errors in the Proposed Plan.[222] Notably, the comments showed that the Proposed Plan did not support the conclusion that Alternatives E, I, F, and G were any more effective than Alternatives B and D. Considering the different construction periods, the number of average fish meals during the 30-year period for each alternative would be approximately the same.[223] Similarly, accepting EPA's assumption that natural recovery would be effective to achieve its PCB CUL within 30 years, Alternatives B and D would be near to the post-construction SWAC for Alternatives E and I just four to six years after EPA estimates of construction for Alternatives E and I would be complete. If more realistic construction assumptions were applied, Alternatives B and D would be near to the post-construction SWAC for Alternatives E and I at approximately the same time that E and I would complete construction.

Several thousand other comments were form emails or preprinted postcards that urged EPA to select a more intensive alternative and ensure unlimited fish consumption for all groups, without substantive evaluation or support. But as noted above, unlimited fish consumption is not an achievable goal due to watershed contamination (e.g., mercury).

f. Region 10 Selected a Never-Before-Seen Remedy in the ROD

Region 10 issued its ROD approximately seven months after its Proposed Plan. EPA invoked its ability to select a different alternative than presented in the Proposed Plan and selected a never-before-seen remedy, a modified version of Alternative F ("F Mod"). Alternative F Mod was a newly developed Alternative and had not been presented in the Proposed Plan. Alternative F Mod has a total constructed area of 394 acres of sediment, including 215 acres of dredging, 117 acres of capping, 32 acres of capping and/or dredging assigned according to a revised decision

[222] LWG, Comments on the Portland Harbor Proposed Plan, at 5; Portland Harbor Participation and Common Interest Group, Comments on the United States Environmental Protection Agency's Superfund Proposed Plan for the Portland Harbor Superfund Site (Sept. 6, 2016).

[223] Alternative B – 5.6 fish meals per year
Alternative D – 5.9 fish meals per year
Alternatives E and I – 6.6 fish meals per year
Alternative F – 5.7 fish meals per year
Alternative G – 4.1 fish meals per year

tree,[224] and 28 acres of enhanced natural recovery. By the Region's low estimates, the construction period for Alternative F Mod was 13 years and EPA's estimated cost for the selected remedy was $1.7 billion (undiscounted). As compared to the Region's preferred Alternative in the Proposed Plan (Alternative I) the selected remedy (Alternative F Mod) consistently applied the more aggressive Alternative F RALs site wide, whereas Alternative I applied different RALs to different areas.[225] Notably, in the Proposed Plan the Region had determined that Alternative F presented a worse balance of tradeoffs relative to Alternatives E or I.

Region 10's decision to select Alternative F Mod over Alternative I was primarily driven by public and Tribal comments that Alternative I was not protective enough and relied too heavily on MNR. The Region noted that "[o]f the general public comments received, approximately 88% expressed concern that the Preferred Alternative (Alternative I) did not go far enough to address contamination at the Site."[226]

But the Region's citation to the public comments, which were largely form emails and preprinted postcards, is disingenuous. The Region referred to the public comments as "new information,"[227] but the submissions contained nothing new. The Tribes and CAG both had long pressured Region 10 to prioritize removing contaminated materials regardless of the extent to which doing so actually reduced risk. Internal Region 10 records prior to issuance of the Proposed Plan indicate that the Region saw the public comment period as an opportunity to build the administrative record to support the remedy they wanted. Meeting notes from November 10, 2015 suggest that the Region saw public engagement as a means of counter-acting messaging from the LWG and other industry stakeholders.[228] The Region and DEQ "[n]eed[ed] to facilitate input to EPA on [the Proposed Plan]. FOCUS on what you need from the public in order to get to ROD and get comments." EPA "[n]eed[ed] ways to get things properly into the record." Thus, well before the Proposed Plan, Region 10 was planning for public comments to provide a key piece of support for its pre-selected remedy.

Moreover, the rationale the Region offered for Alternative F Mod was a complete reversal from how the Region weighed the balance of risk reduction versus construction impacts and cost in the Proposed Plan. In the Proposed Plan the Region had determined that while Alternative F would achieve greater risk reduction than E and I, it would also impose "significantly greater impacts to the environment and community and have much greater costs . . . that are not commensurate with the additional risk reduction relative to Alternatives E and I."[229] In the ROD, by contrast, the Region had reversed the relative weight it assigned to the risk reduction and construction impacts. The Region stated that selected remedy F Mod "presents greater short-term impacts to the community and habitat than Alternatives D, E, and I but achieves higher post-

[224] Region 10 revised the technology assignment decision tree for the ROD, purportedly to provide more flexibility for the assignment of dredging or capping. As discussed *supra* in Section IV.B, the decision tree does not in fact provide such flexibility and results in the assignment of dredging under nearly all scenarios.
[225] Both Alternatives F Mod and I apply Alternative B RALs in the Navigation Channel.
[226] ROD at 97.
[227] ROD at 85.
[228] Meeting Notes, Portland Harbor Directors' Meeting, November 10, 2015, at 3 (FOIA, SEMS_296891).
[229] Proposed Plan at 60.

construction risk reduction."[230] Again, the Region's wholly qualitative analysis could equally be used to justify the selection of any of the remedial alternatives.

g. Region 10 Improved the Appearance of Its Selected Remedy by Dramatically Understating its Cost and Construction Duration

Region 10 improved the appearance of Alternative F Mod by conducting a cost analysis that (1) omitted key costs and (2) drew grossly flawed assumptions. The Region's resulting cost estimate for Alternative F Mod is $1.7 billion (undiscounted); however, independent analyses conducted in accordance with standard practice at other Superfund sites have determined that the cost of Alternative F Mod is likely to be on the order of $2.5 billion to $3 billion with a likely construction duration of 20 years. When the cost of Alternative F Mod is properly accounted for, it is evident that it fails to meet CERCLA and the NCP's requirement that every remedy selected must be "cost-effective."[231]

To arrive at its undervalued cost estimate, Region 10 arbitrarily omitted the following standard Superfund cost categories:

- Pre-design activities, such as additional data collection and engineering investigations, which will be required to support the remedial design;
- Federal and State agency oversight and participation costs, which have represented more than 27% of the RI/FS costs at the Portland Harbor site;
- Oregon Department of State Lands fees and costs for access, leases and easements, which will be required for investigation, dredging, capping, and monitoring activities;.
- Permitting costs, which usually are around 1% of direct capital costs;[232]
- Easements on private property, which are necessary to conduct pre-design and construction activities and whose acquisition requires additional time in the schedule;
- Contractor Work Plans & Submittals, a standard cost category for remediation projects;
- Contractor Payment and Performance Bonds, a standard cost category for remediation projects;
- Environmental Monitoring (e.g., water quality, air, noise);

[230] ROD at 103. The Region might argue that its decision to select Alternative F Mod was consistent with its approach to weighing the risk reduction, construction impact, and cost factors in the Proposed Plan because it did not consider Alternative F Mod in that Proposed Plan. But Alternative F Mod has the same construction duration as Alternative F (13 years). Thus, if the longer construction duration and impacts of Alternative F weighed *against* it in the Proposed Plan, they must also weigh against Alternative F Mod, with an identical construction duration, in the ROD.

[231] *See* 42 U.S.C. § 9621(b)(1) (EPA "shall select a remedial action . . . that is cost-effective); 40 C.F.R. § 300.430(f)(1)(ii)(D) ("Each remedial action selected shall be cost-effective . . .").

[232] EPA's cost analysis wrongly assumes that permitting costs will only be associated with the construction of the Transloading Facility (for dredge spoils), and ignores other potential permitting costs that arise during Superfund remedies. *See* PCI Group Proposed Plan Comments, dated Sept. 6, 2016, at 109.

- Protection of Critical Structures and Utilities, which will likely be necessary when dredging or excavating next to such structures.[233]

Further, the Region's cost analysis includes the following flaws:

- Unrealistically High Dredging Rates – Region 10's cost estimates for dredging rely on unrealistic and, in some cases, impossible assumptions regarding the dredging rate, which defy real-world examples at other similar dredging sites.[234] The Region's inflated dredging rate, in turn, produces unrealistically short schedules and low cost estimates for seasonal mobilization and demobilization, material processing, dredging and capping, and project management. For instance, the Region's assumed rate of 90% efficiency is far outside U.S. Army Corps of Engineering guidance, which estimates 55% to 70% efficiency rates for environmental remediation dredging.[235] The Region also used other unrealistically optimistic dredging parameters, contrary to Army Corps guidance (e.g., volume of each bucket, time to remove one bucket).[236] Realistic dredging rates produce cost estimates for dredging and dredge water quality controls that are over 300% higher than the Region's estimates.[237]

  Further, the Region's analysis does not account for the time required for key dredging-related activities and transition time between each, such as preparation of dredging areas (e.g., installation and removal of sheet pile wall and placement and removal of silt curtains), moving operations from one dredge area to another, debris management, implementation of construction-related best management practices, placement of capping materials, and siting and development of sediment treatment areas. Nor does the Region account for process bottlenecks and other likely delays (e.g., capacity reached at sediment transloading and water treatment facility; equipment standby to allow harbor traffic; roundtrip delays in disposing of sediment).[238]

- Unrealistically Low Mobilization Costs – Realistic mobilization costs are over 400% higher than the Region's estimate.[239]

- Omitted Transloading Facility Costs – The Region's cost estimates do not include costs for developing the facility, leasing the facility beyond year 1, or remediating the property upon project completion. The cost estimates also grossly underestimate the permitting fees associated with operating such a facility.[240]

- Unrealistically Low Professional Fees – EPA costing guidance recommends the following percentages of total construction costs to estimate professional fees: project management (5%); remedial design (6%); construction management (6%).[241]

[233] *See id.* at 109–10.
[234] *See id.* at 102–06 (detailing flaws in EPA's dredging cost analysis).
[235] U.S. Army Corps of Engineers, Technical Guideline for Environmental Dredging of Contaminated Sediments, ERDC/EL TR-08-29 (Sept. 2008), at 132.
[236] PCI Group Proposed Plan Comments, at 102–06.
[237] LWG Proposed Plan Comments, at 49, 51.
[238] PCI Group Proposed Plan Comments, at 105–06.
[239] LWG Proposed Plan Comments at 51.
[240] PCI Group Proposed Plan Comments at 110.
[241] EPA, A Guide to Developing and Documenting Cost Estimates during the Feasibility Study, EPA 540-R-00-002, OSWER 9355.0-75 (July 2000), at 5-13.

However, without any factual basis (only the bald assumption that the high costs of the Portland Harbor project justify lower percentages), the Region's cost analysis uses much smaller percentages: project management (2%); remedial design (2%); construction management (3%).[242]

- Inflated Discount Rate – To minimize the cost, the Region cites the discounted cost which is based on an inflated discount rate. The Region's use of an outdated 7% discount rate arbitrarily skews cost estimates low and makes dredging-intensive remedies appear more cost-effective relative to other alternatives. EPA's standard 7% discount rate (established in 1992) is no longer realistic. The Securities & Exchange Commission and the Financial Accounting Standards Board state that the discount rate for reporting environmental liabilities should not exceed the 20-year U.S. Treasury Bond Rate, which has trended downward well below 7% over the past 30 years and was 1.46% as of February 28, 2020.[243] Consistent with the lower Treasury bond rates, in 2014, EPA Region 10 used a discount rate of 2.3% at the Lower Duwamish Superfund Site.[244]

Each of the listed omissions and erroneous assumptions distort the analysis by reducing the cost estimate of Alternative F Mod to make it appear far more cost-effective than it is.

B. The ROD Fails to Provide a Reasoned Basis for the Selected Remedy

In making a reasoned decision, an agency cannot hide behind a lack of data or analysis where the lack of data prevents a reasoned conclusion that the order will achieve its stated objective. *See Corrosion Proof Fittings v. EPA*, 947 F.2d 1201, 1221 (5th Cir. 1991) ("EPA cannot say with any assurance that its regulation will increase workplace safety when it refuses to evaluate the harm that will result from the increased use of substitute products."). Agencies should make decisions "on the basis of knowledge rather than the unknown." *Id.*

Although Site characterization and investigation at Portland Harbor took 16 years and cost more than $100 million, Region 10 decided key pieces of its remedial approach at the last minute. The resulting ROD fails to provide a reasoned basis to conclude that the selected remedy will achieve its objectives. The Region's fundamental errors include, but are not limited to,

- Exaggerating human health risks;
- Underestimating background contamination and risks;
- Applying drinking water quality standards to a River that the State has no intention of using for drinking water;

[242] Comments of PCI Group on Proposed Plan, at 111.
[243] *See* Staff Accounting Bulletin 5.Y, FASB ASC410-30-S30, ¶ 450-20-S99-1; U.S. Dep't of the Treasury, Daily Treasury Yield Curve Rates, https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yield (last accessed on Mar. 2, 2020).
[244] Region X, Record of Decision, Lower Duwamish Waterway, USEPA Nov. 2014, p. 112.

- Ignoring the dynamic character of the Site in the CSM and natural recovery demonstrated in the RI/FS and subsequent data sets;

- Relying on a food web model that inaccurately represents the relationship between sediment and fish tissue concentrations; and

- Abandoning any attempt to quantitatively model Site fate-and-transport processes despite available methods to do so.

Each of these deficient elements independently undermines the ROD and the Region's support for its selected remedy.

1. *Region 10's Conclusions Regarding Human Health Risks Lack an Adequate Foundation*

CERCLA is a risk-reduction cleanup program, not a risk elimination program. Thus, the public and risk managers need an accurate assessment of the human health risks from exposure to hazardous contaminants at a site. Risk estimates inform decisions about which remedial options are most effective at reducing risks. A risk assessment that overstates the degree of risk will exaggerate the need for remediation.

Portland Harbor is an industrialized setting where much of the shoreline is steeply sloped or covered with riprap or man-made structures such as piers and wharves, and is accordingly largely inaccessible to the public. The evidence regarding populations that consume fish at Portland Harbor is limited and anecdotal. Nevertheless, Region 10 posited extreme fish consumption scenarios: it assumed tribal fishers would consume 281 fish meals per year (or nearly 24 meals per month) from the Site and a population of subsistence fishers that would consume 228 meals per year (or 19 meals per month) of resident fish from the Site for 30 years. The Region's scenarios are not based on Site-specific data, but irrelevant area studies and national default data.

Under CERCLA, risk is evaluated using a reasonable maximum exposure (RME) scenario. RME scenarios are the "the highest exposure that is reasonably expected to occur at a site."[245] Although an RME should be conservative, it should only include "potential exposures that are likely to occur." 55 Fed. Reg. 8666, 8710 (Mar. 8, 1990).

At Portland Harbor, Region 10 evaluated fish consumption risks for three populations: "recreational" (fishers who "fish on a more-or-less regular basis"); subsistence ("populations with high fish consumption rates"); and tribal fishers. The RME fish consumption rates evaluated for each population were 49 g/day for recreational fishers, 142 g/day for subsistence fishers, and 175 g/day for tribal fishers. Region 10 separately evaluated a shellfish consumption scenario for the subsistence population, for which the designated RME consumption rate was 18 g/day. Region 10's RME scenarios are not supported by an adequate foundation and are not *reasonable* estimates of the risk that is likely to be present at the Site.

[245] EPA, *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A)* ("RAGS Vol. 1") (1989) at 6-5.

a. Region 10 Failed to Adequately Characterize the Site by Conducting a Site-Specific Study of Fishing Practices

Region 10 acted arbitrarily and capriciously by not conducting the necessary site-specific study of fishing practices. The NCP requires EPA "to collect data necessary to adequately characterize the site." 40 C.F.R. § 300.430(d)(1). EPA should collect data that is accurate and sufficient to (1) assess the risks to human health and the environment and (2) develop and evaluate appropriate remedial alternatives. *Id.* "The scope and timing" of data collection "should be tailored to the nature and complexity of the problem." *Id.* § 300.430(a)(2).

The studies relied upon by Region 10 are inadequate to characterize fish consumption practices at a site as complex as Portland Harbor and do not support reasoned conclusions regarding actual consumption practices at the Site. Region 10 did not conduct a Site-specific study of fish consumption at Portland Harbor. For the recreational fisher scenario, the Region relied on a 1995 creel study in the Columbia Slough, a small waterbody that drains into the Willamette downstream of the Site boundary. For the subsistence fisher scenario, the Region relied on the 1994-1996 data from the United States Department of Agriculture's Continuing Survey of Food Intake by Individuals ("CSFII"), a nationwide survey of food intake. The tribal fisher scenario was based on the Columbia River Inter-Tribal Fish Consumption ("CRITFC") survey that included personal interviews with members of four tribes that have treaty fishing rights in the Willamette River.

The data from the Columbia Slough creel survey reflect a small sample size (21 data points) and short sample times (only 21 survey days). With respect to the CSFII survey, EPA guidance expresses a strong preference for site-specific data to characterize local fish consumption practices because of the high potential for "errors inherent in extrapolating from standard values for the U.S. population to distinct subpopulations."[246] It is out-of-step with EPA practice at comparable sediment sites to rely solely on national default values.[247] And while the CRITFC is a robust regional study, it reported that none of the respondents fished the Willamette River for resident fish and approximately 4 percent fished for anadromous fish.[248]

Region 10's reasons for not conducting a fish consumption survey do not stand up under scrutiny. In the BHHRA itself, the Region stated that a fish consumption survey was not conducted because it would not be representative of historical baseline consumption patterns due to fish advisories and efforts to limit fish consumption from the harbor.[249] This rationale is belied by the

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[246] Even the guidance that the Region derived its default subsistence fish consumption rate from states that EPAs' default intake rates are the least preferred method for estimating local fish consumption. EPA, *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*, at 4-25 (2000).

[247] *See* LWG, Formal Dispute of EPA Notice of Non-Compliance and Directed Revisions to the Portland Harbor BHHRA (Sept. 21, 2012), Table 4, Summary of Risk Assessments from Other Freshwater Sediment Superfund Sites. It is not uncommon for EPA to rely on published studies. However, those studies are generally regionally focused: (1) Housatonic – Maine angler survey, which was determined to accurately reflect the demographics of fishers at the Housatonic; (2) Passaic – New Jersey/New York estuary study and New York statewide angler survey; (3) Kalamazoo/Fox River – Great Lakes fisher surveys; (4) Hudson River – New York statewide angler survey; (5) Duwamish – Pacific Northwest Tribal studies and King County Asian-American/Pacific Islander study; (6) Grand Calumet – Indiana statewide angler survey.

[248] EPA, Portland Harbor Baseline Human Health Risk Assessment ("BHHRA"), at 51.

[249] *Id.* at 48.

Region's reliance on the Columbia Slough creel survey, which was conducted while fish advisories were in place.

Early in the project, Region 10 rejected proposals to conduct a fish consumption survey because it would take too long:

> EPA's position is that a well done fish consumption study that provides usable quantitative data, whether for risk characterization or for comparison with existing studies, would require at least two to three years to complete and cost several hundred thousand dollars. This is based on our experience with several fish consumption surveys in the Region, including those conducted for several tribes (Columbia River Tribes (CRITFC), Suquamish Tribe, and Tulalip/Squaxin Island Tribes) and Asian Pacific Islanders. We strongly discourage the Respondents from conducting any fish consumption studies or surveys that are less rigorous than these tribal and API studies. EPA will not accept the data from them for use in the risk assessments nor for comparison with existing well done studies.[250]

Again, the Region's actions are belied by its reliance on a study that was conducted over a single month and included only 21 data points. Further, the Region's claims about a prohibitive level of effort to conduct a fish consumption survey appear disingenuous in light of the time and money that were spent to complete the RI/FS. Those claims also ignore the NCP's requirement that the scope of data collection "should be tailored to the nature and complexity of the problem."

Region 10 drew a number of unrealistic assumptions as a result of its decision not to study Site fish consumption practices.

b. Region 10's Recreational Fisher Scenario Is Unreasonable and Not Based on Adequate Evidence

Region 10's recreational fisher scenario is arbitrary and capricious. In short, the Region assumed a population of recreational fishers who only fish for residential fish species in the same one-river mile section of the river for thirty years and who consume fish at an upper-bound rate (6.5 meals per month). There is no evidence that any such population of fishers exists, and the available evidence strongly suggests that the Region's assumptions are unfounded.

First, while the Region assumed a diet consisting of only resident fish species, interviews with recreational fishers indicated that they preferred anadromous species — which bioaccumulate lower concentrations of contaminants than resident fish species because they are migratory — such as Chinook salmon, steelhead, Coho salmon, shad, and white sturgeon.[251]

Second, there is no evidence that any recreational fishers actually fish in the same location for 30-years. Indeed, interviews with local anglers indicated that they "tend to fish the entire river area, moving up and down the river as appropriate."[252] The Region suggests that the

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[250] EPA, Comments on Portland Harbor RI/FS Programmatic Work Plan (Revised Mar. 31, 2003), (July 25, 2003).
[251] *Id.*
[252] Bud Hartman (President of Pan Fish Association, Portland OR), Personal Communication with Bill Williams, Senior Scientist, Kennedy/Jenks Consultants, March 19, 2002; Ralph Steele, (Owner of Lure-em Tackle Shop,

one-river mile exposure scale is appropriate because it corresponds to the presumed home range of smallmouth bass.[253] Yet, smallmouth bass are only one quarter of the assumed multi-species resident fish diet. The other three species, black crappie, carp, and brown bullhead, all have home ranges that are presumed to be three to four miles.[254] Thus, even granting Region 10's assumption about smallmouth bass[255] that still does not support evaluation of risks on a river mile scale because the other three species are *not* exposed to localized contamination on that scale.

The lack of support for the Region's recreational fisher RME scenario is evident in the arbitrary process that it used to identify the scenario. In the BHHRA dispute, the Region essentially argued that an accurate estimate of fish consumption at the Site was impossible and that approximate or "plausible" figures should be acceptable.[256] Evidencing its results-driven approach, the Region argued that because its value was within a factor of 2 of the value proposed by LWG, any revisions "would have a minimal effect on the corresponding risk estimates."[257] The Region stated that further analysis "would only delay progress." The hearing officer agreed and directed key components of the exposure scenario.[258] Significantly, the hearing officer selected an arbitrary midpoint between the recreational fish consumption rates proposed by Region 10 and LWG, asserting without support that: "this midpoint value strikes a reasonable balance."

The AOC's dispute resolution procedures do not substitute for the requirement that agency's decision-making be "reasoned." *See State Farm*, 463 U.S. at 52. Yet, Region 10 repeatedly cited to the dispute resolution process as sufficient evidence that its decisions were reasonable.

c. Region 10's Subsistence Fisher Scenario Is Unreasonable and Not Based on Adequate Evidence

Region 10's subsistence fisher scenario assumes a population of fishers who consume 228 meals of resident fish from Portland Harbor every year for thirty years. Again, there is no evidence that such a population exists at Portland Harbor. While an Oregonian newspaper investigation found that immigrants from Eastern Europe and Asia, African-Americans, Hispanics, and transients are likely to use fish from the Site as either a supplemental or primary protein source, these populations were not studied in any systematic way. Further, Region 10's description of this category as "subsistence fishers" is misleading because it only designates populations "with high fish consumption rates," not populations for whom fish are an "exclusive source of protein in their

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Portland, OR), Personal Communication with Bill Williams, Senior Scientist, Kennedy/Jenks Consultants, Portland, OR, April, 8, 2002.

[253] The results of the 12-month fish tracking study conducted as part of the PDI program indicate that some smallmouth bass are highly mobile and travel without and outside the Site. PDI Report, Appendix D.7.

[254] BHHRA at 13.

[255] This is not a viable assumption, as the PDI data demonstrates that the range is considerably more variable. PDI Rep., Appendix D.7.

[256] EPA, Response to Lower Willamette Group Opening Submission, Portland Harbor BHHRA Dispute, at 14.

[257] A consumption rate that was off by a factor of 2 would be significant for calculating cleanup-levels and would exaggerate the need for cleanup.

[258] Formal Dispute on the EPA Notice of No-Compliance and Directed Revisions to the Portland Harbor BHHRA and Request for Dispute Resolution – Final Resolution, at 6 (Dec. 6, 2012).

diet."[259] The use of the term "subsistence" was only introduced in Region 10's June 2012 redlines; in the 2004 Work Plan, this scenario had been referred to as the "non-tribal high consumption fisher."[260]

Despite the thin record regarding these populations, Region 10 selected a consumption rate of 142 g/day, which is a recommended default value for subsistence fishers in EPA guidance. That same guidance, however, also recommends that local data from similar geography or populations, and data from national surveys were all preferred over the default values.[261] Fish consumption may vary substantially due to factors such as "water body, climate, fishing regulations, availability of alternate fishable water bodies, and water body productivity."[262] Region 10 did not conduct any analysis of whether the default consumption rates were appropriate to Portland Harbor and ignores the statements in guidance that reliance on default rates is discouraged.

The default consumption rate overestimates consumption at Portland Harbor for a number of reasons. First, the default rate is based on a survey of consumption from all sources and covers fish that are self-caught, purchased from a store, and eaten in restaurants. A rate based on consumption from all sources cannot be reasonably applied to consumption from a single fishing site. Second, the consumption rate is inflated because the default rate is based on consumption of fish and shellfish but Region 10 use it as the basis to estimate fish consumption only. Third, as with recreational fishers, Region 10 speculates that subsistence fishers only consume resident fish species. These assumptions are manifestly unreasonable.

d. Region 10's Shellfish Consumption Scenario Is Unreasonable and Not Based on Adequate Evidence

Region 10's shellfish exposure scenario arbitrarily assumes a population that consumes approximately 900 meals of unpurged Asian clams (a species that usually grows no larger than the size of a nickel) over 30 years. There is no evidence that anyone is consuming such large quantities of clams at Portland Harbor, nor would it even be possible to do so.

There is little evidence that shellfish consumption is a complete exposure pathway. Region 10 relies primarily on notes from a series of interviews conducted in 2004 with a population of transients at the Site.[263] Out of 23 individuals who were interviewed, three said that they eat clams and two individuals said they eat crayfish. It was also noted that the population was "very transient." Region 10 also considered a possible crayfish fishery in the Lower Willamette. The Oregon Department of Fish and Wildlife ("ODFW") has records for crayfish collection in the

[259] BHHRA at 49.
[260] Programmatic Work Plan at Appendix C: Human Health Risk Assessment Approach.
[261] EPA, *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*, at 4-25 (2000); *see also*, EPA, *Assessing Human Health Risks from Chemically Contaminated Fish and Shellfish*, at 54 (1989) ("It is recommended . . . that local or regional assessments of fishery consumption be performed *whenever* possible to avoid possible errors inherent in extrapolating standard values for the U.S. population to distinct subpopulations." (emphasis added)).
[262] EPA, *Exposure Factors Handbook*, at 10-5 (2011).
[263] Oregon Department of Health Services, Linnton Community Center Report – Portland Harbor (June 13, 2007).

Columbia and Lower Willamette, but there is no evidence of crayfish being collected within the Site.[264] An ODFW representative stated that it is "not a large fishery."[265]

Additional facts cast doubt on the shellfish exposure scenario. The predominant species of clam is *Corbicula fluminea*, also known as Asian clam, an invasive, non-native species.[266] Oregon law prohibits the collection of Asian clams.[267] Asian clams are small, generally less than 25 mm in diameter. During Round 1 sampling, "after considerable total effort," LWG collected the minimum amount of clam biomass required to conduct analysis through more than 500 van Veen casts.[268] During Round 3 sampling, LWG collected clams with a benthic sledge and completed 178 tows to collect 613 clams.[269]

Region 10 nonetheless evaluated shellfish consumption as an exposure pathway for the subsistence fisher scenario.[270] Without site-specific evidence of consumption rates, Region 10 again drew on nationwide data regarding shellfish consumption and selected 18 g/day as the consumption rate for the RME scenario.[271] As explained above, the national data applies to consumption from all sources and will not be representative of local consumption practices. Moreover, the national data reflects consumption of different shellfish species than those present at Portland Harbor. "In the nationwide survey, shrimp accounted for more than 80 percent of the shellfish consumed, crayfish accounted for less than one percent of the diet, and freshwater clams were not included in the nationwide survey."[272] Region 10 assumes that individuals substitute consumption of one shellfish species for another, but the record contains no evidence to support this assumption.

Applying the nationwide consumption rate to Portland Harbor leads to the unlikely scenario that certain individuals consume 26 to 36 clams per day or 780 to 1,080 clams per month (assuming the typical wet weight in Asian clams of 0.5 to 0.7 grams). This consumption level is contrary to the thin evidence of shellfish consumption at the Site, the apparent resource limitations, and common sense.

e. Region 10's Novel Breast Milk Scenario Is Unrealistic

Region 10 also developed a novel method for estimating risks to infants from exposure to PCBs and other lipophilic chemicals in breast milk. The Region assumes a population of breast-feeding mothers who have been consuming about 20 meals of resident fish taken monthly from the same river mile, for the 30 years prior to and during breastfeeding. The non-cancer risks associated with this pathway are an order of magnitude higher than the risks associated with other pathways. The estimated harbor-wide risks for recreational and subsistence fishers are 300 and

[264] BHHRA at 29.
[265] Email from Michelle Grooms, Oregon Department of Fish and Wildlife, Re: "Crayfish catch reports 2005-2007" (Feb. 12, 2008).
[266] BHHRA at 29.
[267] OAR 635-056-0050 (2014).
[268] Programmatic Work Plan, App. F, at 12.
[269] LWG, Round 3B Fish and Invertebrate Tissue and Collocated Surface Sediment Field Sampling Report, Table 3-8 (Feb. 15, 2008).
[270] BHHRA at 30.
[271] *Id.* at 50.
[272] *Id.* at 87.

1,000 respectively; for breastfeeding infants of recreational and subsistence fishers the harbor-wide risks are *4,000* and *10,000*. Infant breast-feeding risk is calculated through a series of equations that relate the mother's exposure to contaminants with the exposure of the breast-feeding infant; these equations are adapted from EPA's Methodology for Assessing Health Risks Associated with Multiple Pathways of Exposure to Combuster Emissions (EPA 1998), which addresses pollution from stationary combusters.

Region 10 cited the GE/Housatonic River Superfund site as an example of a site where EPA previously evaluated the breast-feeding infant exposure pathway. But, EPA did not quantify infant breast-feeding risks at the Housatonic. Rather it stated "[r]isks to nursing infants cannot be quantified at this time."[273]

It appears that Portland Harbor is the first Superfund site where EPA has attempted to quantify risks to breast-feeding infants. The uncertainty of Region 10's approach is shown by comparison of predicted concentrations of PCBs in breast milk to concentrations reported in the literature. The concentrations predicted by Region 10's approach are approximately 50 times higher than any of the mean concentrations reported world-wide and more than 25 times higher than mean concentrations measured in studies of highly exposed populations.[274] The NRRB advised Region 10 to include a "detailed discussion of the uncertainties associated with this pathway (such as exposure assumptions, toxicity information associated with this health endpoint, and properties, including partitioning and biological half-life)."[275] Region 10, however, did not include any discussion of the uncertainty of this pathway.[276]

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Portland Harbor is one of the largest sediment cleanup sites in the Country. Yet, in violation of the NCP's requirement to adequately characterize the Site, Region 10 elected not to conduct any type of study of fishing practices at the Site itself. Instead, the Region evaluated risks on the basis of numerous implausible assumptions, and inapplicable default values. The lack of basis for the Region's human health risk assessment prevents reasoned analysis of whether a cleanup at Portland Harbor will achieve its stated objectives. *See In re Bell Petroleum Services, Inc.*, 3 F.3d 889, 905-06 (5th Cir. 1993) (holding that a remedy requiring alternative water supply was arbitrary where there was not "a shred of evidence that anyone served by it had been drinking contaminated water); *Emhart Indus., Inc. v. New England Container Co.*, 274 F. Supp. 3d 30, 78 (D.R.I. 2017) (holding that EPA drew arbitrary assumptions in its human health risk assessment where it relied on sampling that it knew was non-representative of the species present at the site and extrapolated from a study that represented consumption from multiple sites). Further, the NCP requires a remedy that is tailored to the *Site*, and failing to base a remedy on site specific information when that information was attainable and rejected by EPA in favor of generic information is textbook arbitrary and capricious decision-making.

[273] GE/Housatonic River Site, Rest of River, Human Health Risk Assessment, Vol. I, Appendix C, at 4-20 (2005).
[274] Letter from LWG to NRRB, Re: "LWG Recommended Approach to Portland Harbor Cleanup" (Oct. 19, 2015).
[275] Memorandum from NRRB re Portland Harbor Recommendations (Dec. 31, 2015).
[276] BHHRA at 73-100; ROD at 43.

2. *Region 10's Assessment of Background Contamination and Risks is Flawed and Incomplete*

Background contamination that is due to natural and/or anthropogenic sources that are not related to the site under investigation should be considered in risk assessment and risk management.[277] The contribution of background to site risks "should be distinguished."[278] "Where background concentrations are high relative to the concentrations of released hazardous substances, pollutants, and contaminants, a comparison of site and background concentrations may help risk managers make decisions regarding appropriate remedial actions."[279] "Generally, under CERCLA, cleanup levels are not set at concentrations below natural or anthropogenic background levels."[280] Background is especially important at sediment sites "located in watersheds with a large number of historical and ongoing point and non-point sources."[281] "[P]roject managers should understand the role of the contaminated water body in the watershed, including . . . the presence of non-site related contaminant sources in the watershed."[282]

Upstream contamination continuously flows into Portland Harbor and imposes a significant limitation on what a cleanup at the Site can achieve. As EPA found in the RI, "[t]he study area is at the downstream end of a large basin with a long history of industrial, municipal and agricultural inputs. Significant agricultural runoff persists upriver, and together with inputs from industries and cities upstream, as well as atmospheric deposition in the watershed, the river's chemical burden is elevated."[283] Immediately upstream of the Site the River passes through downtown Portland, a highly-urbanized and industrialized area. Upstream of the Willamette Falls (River Mile 26) there are more than 750 permitted discharges to the River, including those from 10 municipal sewage treatment plants and several pulp, paper, lumber, and fiberboard manufacturers.[284] Agricultural and forested land produces non-point source pollution throughout the Willamette River Basin. The Lower Willamette is listed as impaired under Clean Water Act Section 303(d) for a number of pollutants, including aldrin, DDT, DDE, dieldrin, iron, manganese, mercury, and PCBs.[285] The entire main stem of the Willamette is subject to a fish advisory for mercury pollution which is caused by natural volcanic sources, past mining activities, and atmospheric deposition.[286]

CERCLA does not require response actions to address regional background pollution. At sites with ongoing sources that cannot be substantially controlled, it is important to evaluate "what sediment actions may or may not be appropriate and what RAOs are achievable for the site."[287] "A critical question often is whether an action in one part of the watershed is likely to result in significant and lasting risk reduction, given the probable timetable for other actions in the

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[277] EPA, *Role of Background in the CERCLA Cleanup Program*, at 6-7 (2002).
[278] *Id.* at 6.
[279] *Id.* at 7.
[280] *Contaminated Sediment Guidance for Hazardous Waste Sites*, at 2-6.
[281] *Id.* at 2-18.
[282] *Id.* at 2-18.
[283] *See* RI at 4-37.
[284] *Id.* at 4-39.
[285] *Id.* at 4-39 to 4-40.
[286] *Id.* at 4-40.
[287] *Contaminated Sediment Guidance*, at 2-21.

watershed."[288] Given the substantial evidence of ongoing pollution throughout the Willamette watershed, it was critical to conduct a realistic evaluation of background conditions and determine what a remedial action at Portland Harbor can achieve and sustain.

Region 10's evaluation of background falls well-short of the analysis needed to characterize a Site as complex as Portland Harbor. In spite of evidence regarding pollution throughout the watershed, the Region, solely based on a statistical test, eliminated data points from its sediment dataset resulting in unreasonably low background levels. The Region acknowledged that upstream sources would affect the ability of the Site to equilibrate to background conditions, but elected not to evaluate equilibrium conditions. Plus, while data was collected to characterize background surface water concentrations, Region 10 elected not to calculate background using that data. In addition, background fish tissue concentrations were not considered in setting cleanup targets. Region 10's incomplete evaluation of background prevents EPA from choosing a reasoned, well-supported remedial action that is achievable, as required by administrative law and CERCLA.

a. Region 10 Inappropriately Removed the Highest PCB Data Points from Its Sediment Background Data Set

Region 10's calculated background levels are unrepresentative of the contamination that exists throughout the Willamette watershed because the Region, without any evidence other than questionable statistics, eliminated the highest PCB data points. The Region took this action even after it had previously agreed with LWG to include those data points in its background calculations. *See infra*. Region 10's approach results in erroneously low background values. The difference in calculated background value for PCBs with Region 10's rejected data points included is 16.2 µg/kg versus 9 µg/kg.

Region 10 and LWG had a long-standing disagreement over the method of identifying outliers — that is, data points that are not representative of background conditions. In brief, Region 10's position was that outliers could be identified with "[c]lassical statistical tests . . . in conjunction with visual and graphical evaluations."[289] LWG disagreed that outliers identified by statistical tests should be discarded without site-specific evidence supporting removal of the data such as a local point source. Under LWG's approach, statistical outliers would only be excluded if located near a known or potential point source (e.g., an outfall or other source of contamination). LWG proposed several lines of evidence to evaluate statistical outliers that could not be tied to a known or suspected source.

In the lead up to the 2009 draft RI, Region 10 and LWG met and conferred regarding their respective approaches. After extensive negotiation over the disposition of potential outliers for total PCB Aroclors and DDx, Region 10 and LWG agreed that the draft RI would present background estimates both with and without the potential outliers retained in the data set.[290] Region 10 indicated that "[c]lustered outliers should be eliminated from the background data set.

[288] *Id.* at 2-20.
[289] *Id.* at 7-6.
[290] Letter from LWG to EPA Re: Documented Corrections to Incorrect Factual Assertions in EPA's October 3, 2014, Response to LWG's Request for Dispute Resolution Concerning Background in Section 7 of the Draft Remedial Investigation (Nov. 7, 2014).

Potential outliers that are distributed geographically should be retained."[291] These agreements were confirmed in Region 10's 2010 comments on the draft RI. LWG's 2011 draft final RI included both sets of background calculations for the two chemical groups.[292]

In reviewing the draft final RI, Region 10 decided that it no longer agreed with the approach it had negotiated in 2008. In 2013, the Region hired a statistician "to determine how best to deal with 'outliers' at the site."[293] The Region took the position that the prior agreement for the draft RI was only "so that EPA could evaluate both methodologies."[294] In November 2013 revisions, Region 10 replaced its original approach to identifying outliers and deleted LWG's approach altogether.[295] The Region explained "[*o*]*ur prior conclusion that removing outliers based on clusters and distributed outliers was consistent with guidance is not true*."[296] "EPA changed its prior direction that statistical outliers that are distributed throughout the upriver reference area may be retained in the background data set because it is inconsistent with guidance."[297]

LWG advised Region 10 that it would dispute the change of approach if an informal resolution could not be reached. As documented in the meeting notes from a December 10, 2013 meeting between the Region and LWG's senior managers, an agreement was reached that the RI "would include four sets of background calculations (i.e., preserving a range of background values), including two with the full data set and two with outliers removed."[298]

By July 2014, however, the Region had decided that the background data set would not present a range of values.[299] In a July 28 email, remedial project manager Kristine Koch stated that "EPA considers only the data set with outliers removed as descriptive of upstream bedded sediment concentrations."[300] Ms. Koch denied that that there had ever been any other agreement. She also acknowledged that there were "limitations of the use of this data set" and agreed that there would be "ongoing discussions regarding how to determine equilibrium at the site."

On August 26, 2014, LWG disputed EPA's decisions on background, arguing that Region 10 was discarding analytically valid data without investigating whether there was any evidence to justify doing so. [301] LWG noted that EPA's ProUCL statistics guidance stated that "[s]ince the treatment and handling of outliers in environmental applications is a subjective and controversial topic, it is also suggested that the outliers be treated on a site-specific basis using all existing knowledge about the site and reference areas under investigation."[302] LWG further argued that the excluded data points *were* representative of the widespread background contamination in the Willamette watershed. "Understanding the size of the Willamette River watershed and the inputs

[291] Letter from EPA, to LWG, Re: Background Data Processing and Outlier Identification (July 24, 2008).
[292] LWG, Draft Final RI at 7-15 (Aug. 29, 2011).
[293] Email from Lori Cohen, EPA, to LWG Re: Follow-up to June 26 meeting (July 10, 2013)
[294] *Id.*
[295] Draft Meeting Minutes, EPA and LWG Senior Managers' Meeting, December 10, 2013.
[296] Email from Lori Cohen, EPA, to LWG, Re: December 10 meeting summary (Jan. 16, 2014).
[297] *Id.*
[298] Meeting Minutes, EPA and LWG Senior Managers' Meeting, December 10, 2013 (draft Mar. 5, 2014).
[299] Email from Kristine Koch, EPA, to LWG Re: LWG Comments on Revised FS Section 2 (July 28, 2014).
[300] *Id.*
[301] Letter from LWG, to Richard Albright, Request for Dispute Resolution of EPA's Notice of Decisions on Background Regarding Section 7 of the Remedial Investigation" (Aug. 26, 2014).
[302] EPA, *ProUCL Version 5.0.00 Technical Guide*, at 85 (Sept. 2013).

from its large, highly developed basin, it is not unreasonable to expect a wide range of concentrations of persistent bioaccumulative contaminants (e.g., PCBs) in the background area."[303] The excluded data points, even if elevated, had potential to be transported downstream to the Site.[304] In fact, the exclusion of outliers removed all the finer grained sediments that are more typical of sediment grain sizes within the site from the analysis, leaving a data set not truly representative of Site background conditions.

The Region 10 hearing officer Richard Albright upheld the Region's approach.[305] Mr. Albright concluded that nothing required EPA to actually investigate whether a statistical outlier was attributable to localized source since that would require a "high level of knowledge."[306]

Region 10's decision to discard analytically valid data points is contrary to the evidence of widespread pollution throughout the Willamette watershed. The AOC's dispute resolution procedures again do not substitute for the requirement that agency's decision-making be "reasoned." *See State Farm*, 463 U.S. at 52. Mr. Albright's decision is due little, if any, deference due to records that show he had *ex parte* contacts with James Woolford, EPA Office of Land and Emergency Management, who was working closely with the Regional staff and was heavily involved in the politics and strategy for finalizing a decision for the Site. After the decision came out, Mr. Woolford stated in an email, "Rick Albright provided me with an earlier version of the decision and I provided him with comments/input. I think he made the correct call and certainly one within EPA's discretion."[307] Mr. Albright, on the other hand, denied LWG's request to present its position orally.[308]

b. Region 10 Arbitrarily Decided Not to Evaluate Equilibrium Concentrations for the Site

"Equilibrium" is a different concept than background. "Background" refers to upstream bedded sediment concentrations. "Equilibrium" refers to "potential future [Site] bedded sediment concentrations."[309] "Equilibrium is the result of incoming settling sediment input to the sediment bed, which is controlled by the concentrations of contaminants in the incoming sediments from upstream."[310] It represents the "best estimate of the lowest contaminant of concern (COC) concentrations that can be achieved by remediation in the Study Area."[311]

Region 10 repeatedly indicated that it would conduct an evaluation of equilibrium in the FS. On July 28, 2014, Kristine Koch stated that there would be "ongoing discussions regarding

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[303] Letter from LWG, to Richard Albright, Reply in Support of Request for Dispute Resolution of EPA's Notice of Decisions on Background Regarding Section 7 of the Remedial Investigation (Oct. 14, 2014).
[304] LWG also argued that Region 10's statistical analysis included a number of flaws. *See* LWG, Request for Dispute Resolution re EPA Decisions on Background.
[305] Memorandum from Richard Albright, EPA, Re: Dispute Decision Regarding Lower Willamette Group Dispute dated August 26, 2014, Portland Harbor Superfund Site (Mar. 24, 2015).
[306] *Id.* at 11.
[307] Email from James Woolford, EPA, Re: Portland Harbor Background Dispute Decision – Region 10 Decision (Mar. 24, 2015) (FOIA, SEMS_298006).
[308] Letter from Richard Albright, EPA, to LWG, Re: Request for Dispute Resolution, (Sept., 18, 2014).
[309] Memorandum, LWG, Sediment Equilibrium Estimates for the Revised Feasibility Study (Aug. 7, 2014).
[310] *Id.*
[311] *Id.*

how to determine equilibrium at the site."[312] In its October 3, 2014, response to LWG's background dispute, Region 10 acknowledged that "sources in the upriver area and downtown corridor . . . will affect the ability of the Study Area to *equilibrate* to background concentrations. . . . The FS will evaluate this appropriately in the evaluation of long-term effectiveness and will discuss the uncertainty in the ability of the site to reach the background levels in the long-term."[313] On April 10, 2015, Region 10 stated that it would "conduct an equilibrium evaluation in Section 4 of the FS."[314]

LWG prepared an analysis of equilibrium and provided it to Region 10 on August 7, 2014.[315] LWG's estimates were based on empirical sediment lines of evidence (deposited surface sediment data, sediment traps, and suspended sediment), and corroborated by empirical fish tissue data as well as model predictions using the fate-and-transport and foodweb models. LWG estimated that the equilibrium concentration for total PCBs was 20 µg/kg.

Region 10, however, never responded to LWG's equilibrium analysis, nor did it conduct any evaluation of its own. Instead, despite the Region's statements that it would conduct an equilibrium evaluation in the final FS, it did not do so and the only discussion of equilibrium in the ROD appears in the responsiveness summary and the Region's response to LWG's FS dispute.

The Region's stated reasons for reversing course on whether it would conduct an equilibrium analysis are contrived. First, the Region states that EPA guidance "does not require an evaluation of equilibrium."[316] But, guidance does require an analysis of whether CULs will be "achievable."[317] The Region's Conceptual Site Model ("CSM") indicates that a large volume of suspended sediments enter the Site from upstream.[318] The Site's equilibrium concentrations therefore bear closely on whether CULs are "achievable."

The Region further suggests that its calculated background concentrations are sufficient to predict "achievable cleanup goals for the Site."[319] Yet, the Region had previously stated that there were "limitations" to the bedded sediment levels for predicting future Site conditions.[320] Equilibrium is the best estimate of future Site conditions because it evaluates the contaminant concentrations in sediment that is deposited into Portland Harbor.

The Region discounts LWG's analysis because parts of the Site are at or below the PCB background level of 9 µg/kg, which it states would not be "possible" if LWG's theory were true.[321] This logic assumes that sediment in all areas of the Site are expected to have the same concentration of a given COC, which is not the case in any water body. The Region's other reasons

[312] Email from Kristine Koch, EPA to LWG, Re: LWG Comments on Revised FS Section 2 (July 28, 2014).
[313] Letter from EPA, to Richard Albright, Re: EPA Response to LWG August 26, 2014 Request for Dispute Resolution, at 24 (emphasis added).
[314] LWG, Responses to EPA's Responses to LWG comments on Feasibility Study Revised Draft Section 2 Text (Apr. 23, 2015).
[315] Memorandum, LWG, Sediment Equilibrium Estimates for the Revised Feasibility Study.
[316] ROD, Responsiveness Summary, App. A at I-47.
[317] *Contaminated Sediment Guidance*, at 2-15 to 2-17.
[318] RI at 10-10.
[319] ROD, Responsiveness Summary, at 2-31.
[320] Email from Kristine Koch, EPA, to LWG, Re: LWG Comments on Revised FS Section 2 (July 28, 2014).
[321] ROD, Responsiveness Summary at 2-31.

for ignoring LWG's analysis are that the "necessary information" is not available and LWG's analysis included sources "that are being controlled under DEQ authority."[322] Region 10 did not offer any analysis to support any of these conclusions.

Region 10's suggestion that source control efforts in the Downtown Reach makes LWG's equilibrium analysis irrelevant bears note. As the ROD acknowledges, Portland Harbor is "a small part of the 187-mile long river which in its entirety drains 11,460 square miles or 12% of the State of Oregon."[323] Source control efforts at Portland Harbor and in the Downtown Reach will *not* stop contaminant loading from the broader watershed. The Region's statements about source control within the larger watershed are vague: "EPA and the state will coordinate actions under other authorities within the larger watershed that focus on reducing contaminant loading to the watershed as well as improving overall environmental conditions."[324] The Region assumes, without any basis, that actions will be "taken within the broader Willamette River watershed to reduce contaminant loading."[325] This unsupported assumption is arbitrary and capricious. Region 10 "entirely failed to consider an important aspect of the problem." *State Farm*, 463 U.S. at 52. The Region cannot ignore contaminant loads that are influenced by the broader watershed.

c. Region 10 Failed to Evaluate Background Concentrations for Surface Water and Fish Tissue

Region 10's analysis of background is incomplete because it failed to calculate background concentrations for surface water. Similarly, the Region did not evaluate background risks associated with consumption of fish not impacted by Portland Harbor. CERCLA does not require cleanups to concentrations below background levels. Region 10 cannot hide behind a lack of data. *See Corrosion Proof Fittings*, 947 F.2d at 1221.

As discussed above, the Willamette River is impaired under the CWA for numerous contaminants. Region 10 identified the surface water background as a data need.[326] In its Round 3 Data Gaps memorandum, the Region stated that additional surface water data "should be collected upstream of RM 14 to help estimate background concentrations upstream of the Portland Harbor site."[327] LWG collected surface water data from transects at RM 11 and RM 16 during the three sampling events during Round 2A and four sampling events during Round 3A.[328] These data sets were used by LWG to calculate surface water background in the 2009 Draft RI and the 2011 Draft Final RI. LWG's analysis showed that "the upstream background surface water 95th percentile UPL concentrations of arsenic, total PCBs, total PAHs, dieldrin, 4'4-DDT, sum DDT, and 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin (TCDD) entering the Site exceeded the respective fish consumption values for these contaminants."[329]

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[322] ROD, Responsiveness Summary, App. A at I-47.
[323] ROD at 119.
[324] ROD at 119-20.
[325] ROD, Responsiveness Summary, at 2-41.
[326] Letter from EPA to LWG, Re: Technical Memorandum: Approach to Determining Background, at 8-9 (June 5, 2006) ("Understanding surface water background will be part of understanding surface water in the Site.").
[327] Memorandum, EPA, Identification of Round 3 Data Gaps, at 5.
[328] LWG, Draft Final RI, at 7-7 (Aug. 29, 2011).
[329] LWG, Draft FS, at 3-10.

However, in 2013, Region 10 decided to delete the surface water background values from the final RI. In an email dated December 12, 2013, Kristine Koch explained that "[w]e don't need water background values since we have ARARs for water quality."[330] This statement is directly contrary to EPA guidance stating that cleanup levels should not be set below background concentrations.[331] In the FS, the Region determined that there was "insufficient data to calculate defensible background concentrations" for surface water[332] — notwithstanding that the surface water background data set was collected under Region 10 direction and approved field sampling plans. The Region's conclusion that the data set was insufficient was driven by its desire not to waive surface water ARARs. In its decision on LWG's FS dispute, the Region explains, without support, that "significant information would be needed to show that achieving the ARAR is technically impracticable."[333] The Region's unsupported view of the high level of evidence needed to waive water quality ARARs is an arbitrary reason for disregarding the data that Region 10 directed LWG to collect for that purpose.

The Region's evaluation of background risks from fish tissue is similarly incomplete. EPA guidance recommends that "the contribution of background to site concentrations should be distinguished" in a risk assessment.[334] An evaluation of background risks "may help risk managers make decisions concerning appropriate remedial actions."[335] The Region did not evaluate background fish tissue concentrations or the contribution of background sediment and surface water concentrations fish tissue and therefore, Site risks. Region 10 set unrealistic expectations for fish consumption from Portland Harbor.

The RI documents that PCBs and dioxin/furans have been detected in fish tissue throughout the Willamette and Columbia Rivers at concentrations that may exceed Region 10's target risk levels.[336] Samples of smallmouth bass collected from upstream during the RI had whole-body PCB concentrations ranging from 123 to 317 µg/kg with a mean of 238 µg/kg, which corresponds to a mean fillet concentration of 38 µg/kg. Region 10, by contrast, set a fish tissue PCB "target" of 0.25 µg/kg, two orders of magnitude less than the measured upstream concentrations. The Region admits that its PCB targets are "likely lower than background."[337]

The Region's assumptions about the level of risk associated with future fish consumption at Portland Harbor are also belied by background concentrations of mercury present throughout the Willamette watershed. The Oregon Health Authority's ("OHA") fish advisory states the following with respect to mercury:

> [M]ercury comes from a combination of sources, some natural, some from deposition of atmospherically transported global mercury emissions, and some from upstream industrial or past mining operations. Because of these sources of mercury that are unrelated to

[330] Email from Kristine Koch to LWG, Re: Final Draft Email to Kristine (Dec. 12, 2013).
[331] *Contaminated Sediment Guidance*, at 2-6.
[332] FS at 2-12.
[333] ROD, Responsiveness Summary, App. A at I-33.
[334] *Role of Background in the CERCLA Cleanup Program*, at 6.
[335] *Role of Background in the CERCLA Cleanup Program*, at 7.
[336] RI at 8-14.
[337] ROD at 56.

Portland Harbor contamination, it is unlikely that the number of recommended fish meals in Portland Harbor will ever be unlimited.[338]

The OHA's fish advisory for the Willamette River currently advises that vulnerable populations not consume more than one resident fish meal per month and that everyone else not consume more than four resident fish meals per month.[339] The fish advisory for mercury will remain in place after the Portland Harbor cleanup and will continue to prevent fish consumption at the subsistence rates that Region 10 hypothesizes.

3. *Region 10 Lacks a Reasonable Basis for Its Use of Water Quality Standards*

Region 10 arbitrarily imposed unreasonable water quality standards for surface and groundwater based on the unlikely use of Portland Harbor water as drinking water.[340] Specifically, EPA applies Federal Water Quality Act criteria (FWQC) for a particular constituent if the FWQC is *more stringent* than the Oregon numeric standard. EPA also applies Safe Drinking Water Act (SDWA) for certain COC's. EPA's justification for the FWQC and the SDWA is Oregon's designation of the Willamette as a "potential" source of drinking water.[341] There are three main problems with the FWQC and the SDWA requirements. First, Portland Harbor is not a likely source of drinking water, and Oregon's water quality standards reflect that. Second, state water quality standards trump federal standards under CERCLA because they amount to a site specific decision by the state about what is necessary for the particular water body. Finally, by applying standards more stringent than the state standards, EPA has created potential for recontamination.

Portland Harbor is not a reasonably likely source of drinking water. Portland already has a robust water delivery system that is served by the Bull Run Watershed, with supplemental water sourced from the Columbia South Shore Well Field. This system provides 35 billion gallons of drinking water to almost a quarter of Oregon's population.[342] The State has indicated that it has no intention to use Portland Harbor for drinking water, yet Region 10 insists on applying water quality standards that are based on the "potential" use of Portland Harbor as drinking water .[343]

a. Oregon Does Not Apply Drinking Water Criteria to Portland Harbor

CERCLA requires that selected remedies comply with any federal or state environmental standards that are deemed "applicable" or "relevant and appropriate" requirements (ARARs). Under Section 121(d) of CERCLA, and 40 C.F.R. § 300.5 "relevant and appropriate requirements are those cleanup standards … that … address problems sufficiently similar that their use is *well*

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[338] Oregon Health Authority, Updated Fish Advisory for Resident Fish and Shellfish, Lower Willamette River at 14 (2017-2018)

[339] *See* https://www.oregon.gov/oha/ph/HealthyEnvironments/Recreation/FishConsumption/Pages/fishadvisories.aspx#fish

[340] EPA applied Federal Water Quality Criteria to surface water and groundwater discharging to surface water and Safe Drinking Water Act standards to surface and groundwater.

[341] OAR 340-041-0340 Table 340A, but qualifying use of Willamette "only with adequate pretreatment and natural quality" that meets such standards.

[342] *See* https://www.portlandoregon.gov/water/48904, last accessed October 10, 2019.

[343] ROD at 124; *see also* ROD Table 25(a).

suited to the particular site." Once identified, ARARs are binding requirements that must be achieved.[344]

CERCLA explains,

> In determining whether or not any water quality criteria under the Clean Water Act [33 U.S.C.A. § 1251 et seq.] is relevant and appropriate under the circumstances of the release or threatened release, the President *shall consider the designated or potential use of the surface or groundwater, the environmental media affected, the purposes for which such criteria were developed, and the latest information available.*[345]

Thus, whether a particular FWQC gets applied as an ARAR in Portland Harbor requires consideration of the designated uses of the Willamette River, the media affected, the particular purposes for which that criteria was developed, and the latest information. Under the NCP, state water quality standards trump federal standards:

> [i]f a State has promulgated a numerical WQS [water quality standard] that applies to the contaminant and the designated use of the surface water at a site, the WQS will generally be applicable or relevant and appropriate for determining cleanup levels, rather than an FWQC. A WQS *represents a determination by the State,* based on the FWQC, *of the level of contaminant which is protective in that surface water body*, a determination subject to EPA approval.[346]

The state promulgated criteria based on its site-specific determination that Portland Harbor is not a likely source of drinking water. EPA approved Oregon's surface water quality standards on February 18, 2011 after it had been entrenched in Portland Harbor cleanup activities for ten years.[347]

Oregon objected to Region 10's reliance on the "potential" for the Harbor to be used as drinking water stating, "we would argue that drinking water is not a reasonably likely beneficial use of the Portland Harbor reach of the Willamette River."[348] Region 10 itself admitted in the ROD that "[t]here are no known current or anticipated future uses of this part of the lower Willamette River within Portland Harbor as a private or public domestic water supply."[349] Yet the Region insists that beneficial uses mandate more stringent standards,[350] while flouting the full scope of the beneficial use designation — which requires "adequate pretreatment and natural quality that meets drinking water standards" before any part of the Willamette could be used as drinking water.[351]

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[344] 40 C.F.R. § 300.430(f)(1)(ii)(B).
[345] 42 U.S.C. § 9621(d)(2)(I3)(i) (emphasis added); *see also* 40 C.F.R. § 300.5.
[346] 53 F.R. 51394, 51442 (Dec. 21, 1988).
[347] *See* https://www.epa.gov/wqs-tech/water-quality-standards-regulations-oregon, last accessed October 28, 2019.
[348] Email from Tom Gainer, to Oregon DEQ staff dated February 3, 2014 (FOIA, SEMS_296659).
[349] ROD at 29.
[350] ROD, Responsiveness Summary, at 2-25.
[351] OAR 340-041-0340 at Table 340A

At the McCormick and Baxter cleanup site, which is within the boundaries of Portland Harbor, EPA stated that groundwater and surface water in the Willamette is not used or likely to be used for drinking water.[352] Region 10's decision to use water quality criteria on the basis that Portland Harbor may be a drinking water source was arbitrary and capricious, unsupported by the facts, and inconsistent with previous decisions.

b. EPA Relies on Upland Source Controls to Meet In-Water Standards that Are More Stringent than Applicable Upland Source Control Standards

The NCP requires EPA to design remedies that achieve the clean-up levels in the ROD, or provide grounds for a waiver.[353] Region 10 designed a remedy that will not achieve ROD water quality cleanup levels and it refused to provide grounds for a waiver. In addition to improperly applying Safe Drinking Water Act Standards to surface and groundwater that will not be used for drinking water, the Region explicitly states that it will apply federal water quality criteria when those criteria are *more stringent* than the state criteria.[354] (The more stringent federal criteria reflect numeric levels protective of drinking water.) The Region then admits that the Selected Remedy alone cannot achieve its selected water quality cleanup levels. The Region's "fix" to this is to rely on DEQ's upland source control efforts to help achieve the "cleanup levels identified in the Selected Remedy[.]"[355]

Cooperating with state officials to cleanup hazardous sites is an acceptable approach, so long as the cleanup standards are consistently applied. Here, however, Region 10 has set in-water standards below those used by DEQ in its source control program. This is highly problematic. First, there are hundreds of sources discharging to the river under permit standards that are less stringent than the Region's cleanup standards.[356] Thus, the selected remedy has a built-in recontamination problem. Second, Oregon is not legally bound to achieve the cleanup standards vis-à-vis source controls, but participants are. Consequently, participants are handcuffed to a remedy they cannot fully control. (Oregon implemented the source control program long before the final ROD was issued and — sensibly — applied Oregon state law as cleanup standards.)[357] Finally, Oregon does not have legal authority to apply surface water standards to groundwater, therefore it cannot require upland sites to meet the groundwater cleanup standards set by Region 10, creating another re-contamination issue.

Under its CWA authority, Oregon issues hundreds of National Pollutant Discharge Elimination System (NDPES) discharge permits with technology or effluent limits that are based on *Oregon's* EPA-approved, water quality standards. Permitted discharges under the NPDES program include industrial waste, stormwater runoff, and combined sewer overflows (CSOs).[358] Oregon does not apply SDWA or FWQC standards under its NPDES program (because it does not

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[352] Record of Decision, McCormick and Baxter Creosoting Company (March 1996). Portland's water supply approach has not since the McCormick and Baxter ROD in 1996.
[353] 40 C.F.R. § 300.430(f)(1)(ii)(B).
[354] ROD, Table 25a.
[355] ROD at 9, *see also* ROD at 123.
[356] ROD at 16; OAR 340-041-0001 *et seq.*
[357] 2005 Joint Source Control Strategy at 2-2.
[358] *See* ROD at 16.

assume the water will be used for drinking.) Thus, no Oregon-issued permit will contain limits designed to meet those standards. With 300 identified outfalls in the bounds of the Site,[359] and more identified in DEQ's source control program,[360] Region 10 arbitrarily and capriciously imposes unattainable cleanup levels on PRPs.

In addition to the NPDES discharges, DEQ evaluates its source control actions based on the potential for "recontamination" of *sediment cleanup levels.*[361] This is not the same as evaluating source controls based on whether they will meet EPA's water quality cleanup levels. Rather, DEQ explains that "water column specific remediation goals are most appropriately applied as measures of progress towards meeting sediment remedial actions.[362] DEQ used water quality criteria as "screening level values" as a way to prioritize which sites were most contaminated.[363] DEQ explains that for low-priority sites, concentrations in stormwater "may exceed the risk-based screening level values," but they are still "within the range found in stormwater from active industrial sites in Portland Harbor."[364]

Predictably, despite Oregon's effective source control program, analysis of the PDI data shows Downtown/Upriver (D/U) Reach surface water concentrations for various ROD COCs are consistently above EPA's CULs. For example, total PCB concentrations are 14 to 32 times the CUL and TCDD-TEQ concentrations are 44 to 131 times the CUL. Concentrations of arsenic, BEHP, DDE, and cPAHs all exceed the CUL for all sampling events. The D/U Reach also contains concentrations of aldrin, DDD, DDT, and benzo(a)pyrene over the CUL. This is most likely because there are other sources that DEQ cannot fully control, like atmospheric deposition and agricultural runoff, and because DEQ applied a different set of standards in implementing its source control program.

Region 10's response to this is to speculate on the impact of sediment removal and its remedial qualities for surface water. That is, Region 10 assumes, in spite of contrary scientific evidence, removing sediments will bring water quality levels to the standards it set. The Region is wrong. There is no amount of sediment removal that will allow surface water to meet water quality standards if surface water upstream continues to re-contaminate the Site, as it is currently doing.

Finally, Oregon does not apply numeric surface water quality criteria to groundwater. None of the water quality standards in division 041 refer to groundwater. Second, division 041 implements the CWA and ORS 468B.048. The CWA does not protect groundwater,[365] and ORS 468B.048 is contained within an ORS subchapter labeled "Surface Water." Finally, Oregon has adopted separate groundwater regulations in OAR chapter 340, division 040, pursuant to its separate groundwater authority under ORS 468B.150-190. Oregon, therefore, has no legal authority to impose FWQC and SDWA criteria to groundwater. Region 10's reliance on DEQ's

[359] ROD at 16.
[360] Portland Harbor Upland Source Control Summary Report Nov. 21. 2014 – updated March 25, 2016 at 11.
[361] *Id.* at 9.
[362] *Id.* at 10.
[363] *Id.* at 3.
[364] *Id.* at 4.
[365] See *Exxon Corp. v. Train*, 554 F.2d 1310, 1317-31 (5th Cir. 1977); *Umatilla Waterquality Protective Ass 'n v. Smith Frozen Foods, Inc.*, 962 F. Supp. 1312, 1316-20 (D. Or. 1997).

source control activities is similarly misguided to the extent it seeks to rely on those activities to meet the ROD's groundwater cleanup levels.

DEQ requested a sediment-only remedy because surface water, groundwater and fish tissue PRGs cannot be achieved with a sediment-only remedy and "have potential to cause significant confusion or uncertainty[366]

4. *Region 10's Conceptual Site Model Prevents an Accurate Understanding of Site Processes*

The CSM "should capture in one place" the relationships between contaminant sources, environmental fate and transport processes, exposure pathways, and receptors.[367] "The site investigation is, in essence, a group of studies conducted to test the hypotheses forming the conceptual site model and turning qualitative descriptions into quantitative descriptions."[368] "A good CSM can be a valuable tool in evaluating the potential effectiveness of remedial alternatives."[369] Region 10's CSM fails to adequately represent the dynamic character of the Site — that is, that contaminant concentrations in surface sediment, surface water, and biota tissue change over time as a function of complex processes. The Region's failure to account for the Site's dynamic processes caused it to underestimate the effectiveness of natural recovery processes. The fundamental flaws in the Region's theory of the Site undermine the basis for its selected remedy.

The CSM should be developed iteratively and "modified to document additional source, pathway, and contaminant information that is collected through the site investigation."[370] Contrary to that direction, Region 10 arbitrarily removed detail from its CSM as it revised the RI. The Region's decisions to delete detail from the CSM ultimately led LWG to disclaim authorship of the final RI.[371] In the FS, the CSM is reduced to three simplified figures,[372] and in the ROD, it is reduced to a half page of text and four figures.[373]

A preliminary CSM was presented in the 2004 Work Plan.[374] The Work Plan CSM was updated later in 2004 and an interim CSM was presented in the 2007 Round 2 sampling Report. The October 2009 LWG draft RI presented an updated CSM that integrated all data available through the final round of RI sampling.[375] Region 10 provided a number of comments relative to the CSM, including an outline that it directed LWG to follow for the chemical-specific CSMs.[376]

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[366] Oregon Department of Environmental Quality Comments on Proposed Plan (Sept. 6, 2016).
[367] *Contaminated Sediment Guidance*, at 2-7.
[368] *Id*.
[369] *Id*.
[370] *Id*.
[371] Letter from LWG, to EPA, (June 12, 2015).
[372] FS, Figs. 1.2-16, 1.2-27, 1.2-28.
[373] ROD at 10-11.
[374] Programmatic Work Plan, at 81-99.
[375] LWG, Draft Remedial Investigation Report, at 7-1 to 7-21 (Oct. 27, 2009).
[376] Letter from EPA, to LWG, Attachment 1, Response to Non-Directed Comment Resolution Tables, Appendix A, "CSM Outline" (Dec. 8, 2010).

LWG addressed the Region's comments in the August 2011 draft final RI. Addressing the Region's comments expanded the scope of the CSM section from 73 to 125 pages.

Notwithstanding its earlier comments, in 2014, the Region dramatically cut the CSM, deleting 82 pages of analysis.[377] The Region's purported reasons for deleting material from the CSM were not to do with the accuracy or relevance of the material, but merely to improve how the document read. The Region's view was that "more information isn't always better."[378] The Region added some of the deleted material back in after LWG informally disputed the deletions, but the final CSM is 52 pages — more than twenty pages less than the CSM LWG originally submitted in 2009. The final CSM removes or reduces information relative to:

- The site's regional setting;
- The overall depositional and stable nature of the sediment bed in much of the Study Area;
- Important fate and transport processes, particularly the quantified external loading terms and their relative importance; and
- Background conditions or values and the empirical lines of evidence on the quality of sediments entering and being deposited in the site.[379]

The final CSM does not present an integrated picture of sources, fate and transport processes, exposure pathways, and receptors.

Most significantly, the Region overlooked the dynamic character of the Site. Surface sediment concentrations at the Site are changing over time due to a variety of factors. Region 10, however, aggregated datasets collected over a fifteen-year period, without regard to sampling year, obscuring any variation over time. The Region also ignored the most recent datasets, which best represented Site conditions at the time of remedy selection. The aggregation of data treats the Site as if it is in a steady state; in other words, that the Site in 2017 was the same as it was in 2004. This is confirmed by the Region's assessment of natural recovery processes. While the Region acknowledged that natural recovery is occurring, it also concluded that most of the Site is in "dynamic equilibrium,"[380] and scored the entire Site "neutral" or "unfavorable" for natural recovery.[381] The Region's view that natural recovery processes are neutral led it to conclude that remedies that rely more on dredging and capping are more protective, despite overwhelming evidence to the contrary.

The Region ignored the substantial evidence that natural recovery processes, promoted by source control activities reducing inputs of contaminants to the Site, are *not* neutral: the Site is recovering broadly and rapidly. It is expected that deposition of cleaner material and dispersion

[377] Letter from LWG, to EPA, Re LWG Unresolved Comments on RI Sections 5 and 10, (Aug. 29, 2014).
[378] Meeting Notes, EPA and LWG Senior Managers' Meeting (Oct. 23, 2014).
[379] Letter from LWG, to EPA, (June 12, 2015).
[380] FS at 3-34.
[381] FS, App. D, at D-27

and mixing are the primary mechanism of natural recovery at the Site.[382] Multiple lines of evidence indicate that the majority of the Site surface area is depositional and that incoming sediment is cleaner than current bedded sediment. Bathymetry data collected from 2002 to 2009 indicated that 63% of the Site is depositional and an additional 25% is stable (i.e., there is no substantial bed elevation change). Thus, approximately 88% of the Site is either stable or depositional. Region 10, however, determined that the majority of the Site is neutral between deposition and erosion. The Region's conclusion is based on an extremely conservative analysis of the bathymetry data.[383] The Region's conclusion is also belied by evidence that the majority of the Site is comprised of relatively fine-grained sediments, which are typically indicative of depositional environments.[384]

Sediment trap data from the RI shows that the contaminant concentrations of incoming sediment particles are considerably lower than current bedded sediment concentrations. Similarly, the ratio of surface to subsurface sediment concentrations indicates that more recently deposited sediments contain lower concentrations than older deeper sediments. The combination of a depositional environment and cleaner incoming sediments will cause surface sediment concentrations to decrease over time.

Other processes will cause sediment concentrations to vary over time. For example, it is well-established that chlorinated compounds will degrade in the environment over time through a variety of biotic and abiotic processes.[385] The Region did not evaluate these degradation processes in its analysis of natural recovery.[386]

There is direct evidence that the Site is broadly and rapidly recovering through these natural recovery processes, supported by source control efforts. While the Region refused to consider trends in the sediment data,[387] multiple analyses evidence that surface sediment concentrations are decreasing over time.[388] Smallmouth bass tissue samples collected in 2002, 2007, and 2012 also showed a statistically significant decline. Region 10 only evaluated the 2007 and 2012 data and concluded that the trend was "not statistically distinguishable from zero" at most points of the river.[389] The trends in sediment and fish tissue data have been confirmed by the PDI dataset.[390]

The empirical lines of evidence of natural recovery are consistent with the predictions of the models developed for the Site. Both LWG's hydrodynamic fate-and-transport QEAFATE model and EPA's SEDCAM model generally predicted that surface sediments would recover over a reasonable timeframe.[391] As discussed below, Region 10 elected not to use either of the quantitative models.

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[382] *See* Feasibility Study at 3-33.
[383] LWG, List of Significant Issues with EPA's Revised FS Sections 3 and 4, at 21 (Sept. 8, 2015)
[384] LWG, Draft FS, at 6-15 to 6-16.
[385] RI at 10-11.
[386] FS at 3-32 to 3-35.
[387] ROD, Responsiveness Summary, App. A at I-66.
[388] LWG, Draft FS, at 6-20; See Kleinfelder, Portland Harbor: The State of the River in 2014.
[389] FS at 3-34 to 3-35.
[390] PDI Rep., at 7-13.
[391] LWG, Draft FS, at 9-14 to 9-15; EPA, Portland Harbor FS Sections 3 & 4, Presentation to the Lower Willamette Group, (July 31, 2015) (graphs produced through FOIA).

In sum, surface sediments at the Site are changing over time. Trends in surface sediment and fish tissue data are direct proof that the Site is not neutral, but is rapidly recovering naturally. Multiple lines of evidence show that natural recovery is occurring. The Region's assumption that the Site is in a steady state — that conditions did not change from 2004 to 2017 — is demonstrably incorrect. The Region's CSM presents a deficient understanding of Site processes and is insufficient to support the Region's conclusion that more intensive alternatives are more protective.

5. *Region 10 Relied on an Unrepresentative Food Web Model to Set Cleanup Levels*

The central assumption of Region 10's remedial approach for Portland Harbor is that cleaning up contaminated sediments will reduce human health and ecological risks and achieve all of the RAOs. The empirical evidence, however, fails to support the Region's assumption that sediment concentrations dictate fish tissue concentrations. Rather, the evidence shows that surface water has a significant role in contributing to fish tissue concentrations. Region 10, however, glossed over these complexities and adopted a mechanistic food web model for calculating CULs that, as applied, ignores surface water contributions. Multiple studies have shown that the food web model has poor predictive power. In other words, the Region's method for calculating CULs is arbitrary and capricious.

Region 10 and LWG evaluated several types of models, including statistical models (biota-sediment accumulation factors) and several mechanistic food web models, to predict the relationship between chemical concentrations in sediments, surface water, and fish tissue. The goal was to develop a model that would enable the Region to derive sediment CULs that correspond tissue concentrations that are considered safe for people to consume.[392] After several years of discussion, Region 10 and LWG reached an agreement on June 6, 2006 to use the Arnot and Gobas mechanistic bioaccumulation model for PCBs, DDT, and dioxin-like compounds.[393] "The Arnot and Gobas mechanistic model was designed around the premise that a single equation may be used to represent the exchange of non-ionic organic chemicals between an organism and its environment."[394] The Arnot and Gobas model is a "steady-state" model, which means that "relationships between variables in model compartments are constant."[395] However, the Region and LWG agreed that the food web model would be linked to the contaminant fate-and-transport model which would model the dynamic features of the Site.[396]

LWG presented the initial draft Bioaccumulation Modeling Report on July 21, 2009.[397] An EPA reviewer commented on an earlier version of the draft in July 2008, and stated that it appeared over-calibrated to Site data and therefore had uncertain predictive power.[398] The comments noted

[392] LWG, Technical Memorandum: Evaluating Steady-State Aquatic Food Web Models for the Portland Harbor Superfund Site, Draft, at 1 (July 28, 2004).
[393] LWG, Bioaccumulation Modeling Report, Revised Draft, at i (June 19, 2015).
[394] FS, App. B at B-7.
[395] LWG, Technical Memorandum: Evaluating Steady-State Aquatic Food Web Models for the Portland Harbor Superfund Site, Draft, at 5.
[396] Letter from EPA, to LWG, Re: Food Web Modeling Report: Evaluating Tropic Trace and Arnot and Gobas Models for Application to the Portland Harbor Superfund Site, (Mar. 10, 2006).
[397] LWG, Bioaccumulation Modeling Report, Draft, (July 21, 2009).
[398] EPA, Review Portland Food Web Modeling Effort.

that model performance was poorer at smaller scales. In 2012, a PRP submitted a technical review of the Report to Region 10.[399] The critique also concluded that the model performed poorly on smaller scales and raised questions about its calibration.

Region 10 never formally approved the Report. The Region did not discover that the Report was unapproved until late 2014.[400] Meeting notes from October 30, 2014 show that Region 10 deliberating about whether to proceed with the model from LWG's 2009 Report or change approach to a simpler statistical model. The notes document that the Region had significant concerns about the calibration of the model. However, its schedule was also a concern because "moving to a different approach will take a lot of time" and raised the possibility of a dispute with LWG.

The Region ultimately decided to direct LWG to revise the 2009 Report. A revised Report was prepared and submitted to Region 10 on June 19, 2015.[401] Region 10 did not approve the revised Report, although it "summarized the information presented in that report" in Appendix B of the FS.[402]

Region 10's food web model has a number of serious flaws that prevent it from being a reliable tool for calculating CULs.[403] The Region has brushed off any criticisms of the model based on LWG's role in developing it.[404] Under the arbitrary and capricious standard, that argument is insufficient to establish that the Region's reliance on the food web model is reasonable.

It is well-understood that biological organisms take up chemicals such as total PCBs and DDx from the environment. But the relative contribution of various environmental media — for example, chemical bound to sediment versus chemical dissolved in water — is uncertain.[405] Region 10 nevertheless assumes that there is a direct relationship between sediment contaminant concentrations and fish tissue, such that cleaning up sediment will necessarily achieve risk-based fish tissue targets.

Statistical analysis has repeatedly demonstrated that the relationship that the Region assumes to exist does not actually exist for the contaminants that are the focus of the remedial action. Region 10 only examined the relationship between sediment and tissue concentrations for dioxin/furan TEQ. It concluded that "there is no relationship between tissue and sediment concentrations."[406] Although unexamined by Region 10, DDx, total PCBs, and the individual

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[399] Email from David Heineck, to EPA, Re: Report evaluating LWG PCB sediment bioaccumulation model (Apr. 15, 2012).
[400] TCT Food Web Model Meeting Notes, October 30, 2014 (draft notes Oct. 31, 2014). LWG prepared and submitted an updated version of the Report with the March 2012 Draft FS. LWG, Draft FS, Appendix Hb (Mar. 30, 2012). The 2012 Report discussed the connection of the foodweb model to the hydrodynamic, sediment transport, and contaminant fate-and-transport models.
[401] LWG, Bioaccumulation Modeling Report, Revised Draft, (June 19, 2015).
[402] FS, App. B at B-5.
[403] PDI Rep., App. H (June 17, 2019); Integral, Review of EPA's Food Web Model (Aug. 30, 2016).
[404] ROD, Responsiveness Summary, App. A at I-38.
[405] LWG, Bioaccumulation Modeling Report, at xc (rev. June 19, 2015) ("[I]t is possible for the model to predict a relationship between sediment and tissue concentrations even if no such relationship is apparent in the empirical data.").
[406] FS, App. B at B-27.

dioxin/furan congeners also lack a discernable relationship between sediment and tissue concentrations. A 2016 statistical analysis of co-located tissue and sediment samples concluded that Site sediment concentrations only explained 33% of the variation in of DDx in fish tissue.[407] The Pre-RD Group performed a series of linear regressions on the 2018 PDI dataset that showed "little-to-no evidence to support a functional relationship between collocated sediment and fish tissue concentrations for either" total PCBs or DDx.[408] The Pre-RD Group similarly found "no discernable relationship in the RI dataset between sediment and smallmouth bass tissue for individual [dioxin/furan] congeners."[409]

The Region recognized that a weak relationship between sediment and tissue concentrations indicates the importance of other factors contributing to tissue concentrations:

> The lack of a relationship between sediment and tissue concentrations might indicate that chemicals released from sediment are transported into the water column, a medium other than sediment is the source of the tissue residue, organisms are bioregulating or metabolizing the sediment, or the exposure area or use of the exposure area by organisms was not described well enough to define a relationship.[410]

Surface water in particular appears to be a significant exposure pathway at Portland Harbor. For PCBs and certain dioxin/furan congeners, "dissolved water concentrations alone are predicted to result in estimated tissue concentrations greater than the risk-based target."[411] In those cases, the inclusion of surface water resulted in the calculation of a "negative" sediment CUL. Region 10 accordingly defaulted to background levels for sediment CULs — effectively ignoring the contribution of surface water. Yet, surface water will be a significant component of whether the Region's fish tissue targets are achieved.

The Pre-RD Group calculated that when sediment concentrations are set to zero in the foodweb model, the surface water concentrations required to meet the Region's fish tissue targets are below detection levels for PCBs and below background for DDx.[412] In other words, even if every molecule of contaminated sediment was removed from the Site, fish would not be safe to eat at the rates the Region is targeting. Given the ongoing input of surface water concentrations exceeding fish consumption values entering the Site from the watershed, the Region's decision to ignore surface water contributions in setting sediment CULs was arbitrary.

The foodweb model has also proved to be inaccurate at predicting tissue concentrations. A corroboration exercise performed with the 2018 PDI dataset showed that the foodweb model over-predicts tissue concentrations both Site-wide and by river segment.[413] Despite the downward trend in smallmouth bass tissue concentrations observed since 2002, the foodweb model erroneously predicts an upwards trend for 2018. It follows that the model would calculate sediment

[407] Integral Consulting, Inc., Review of EPA's Food Web Model, at 5 (Aug. 30, 2016).
[408] PDI Rep., App. H at 9-10.
[409] PDI Rep., App. E, Ex. B at 3.
[410] FS, App. B at B-4.
[411] *Id.* at B-37.
[412] PDI Rep., App. H at 12.
[413] *Id.* at 5.

CULs that are lower than necessary to achieve target risk levels. The model's inaccurate predictions, however, are actually consistent with the performance metrics that the Region set for it. The Region set a "species predictive accuracy factor" ("SPAF") — the ratio of predicted to empirical tissue concentrations — target of 3; within a factor of 10 was considered acceptable.[414] A model that calculates CULs within a factor of 3, at best, is not reliable and cannot be used as a basis for remedy selection. In addition, because the FWM was originally calibrated to perform best for site-wide conditions, the model typically performs worse at smaller scales with some SPAFs exceeding the factor of 10.[415]

The fundamental flaws in the foodweb model undermine its reliability as a method of calculating CULs. The uncertainty in the relationship between sediment and fish tissue concentrations is yet another reason that the Region lacks a reasoned basis to conclude that its selected remedy will achieve its remedial objectives.

6. *Region 10's Decision Not to Use a Quantitative Fate and Transport Model Resulted in an Arbitrary Remedial Alternative Comparison*

EPA's Contaminated Sediment Guidance states that "[m]athematical modeling generally is recommended for large or complex sites, especially where it is necessary to predict contaminant transport and fate over extended periods of time to evaluate relative differences among possible remedial approaches."[416] Consistent with this direction, Region 10 and LWG spent approximately ten years developing a quantitative model capable of predicting future changes in sediment concentrations in order to evaluate remedial alternatives. Presented in LWG's 2012 Draft FS, LWG's QEAFATE model projected that all remedial alternatives would "achieve relatively similar Site-wide surface sediment concentrations over the long term." EPA's SEDCAM model similarly showed that all alternatives would reduce contaminant concentrations to approximately the same levels in 30 years. The modeling predictions were consistent with trends in the empirical data, including the 2012 smallmouth bass tissue data and the 2014 Kleinfelder sediment data. Yet in 2015, the Region reversed course and decided that quantitative modeling was unnecessary for remedy comparison. The Region's last minute decision was unsupported. Moreover, it left the Region unable to reach reasoned conclusions about the long-term effectiveness of the remedial alternatives. The lack of quantitative measures leads to an arbitrary and ill-informed remedy comparison.

The development of a quantitative model for Portland Harbor dates to the AOC.[417] The modeling approach was initially presented in a February 2004 technical memorandum and was revised several times to address the Region's comments and as additional data was collected.[418] Leading up to submission of the draft FS, Region 10 and LWG held multiple meetings on the

[414] FS, App. B at B-19.
[415] FS, App. B, Figs. B1-15 & B1-27.
[416] *Contaminated Sediment Guidance*, at 2-36.
[417] Portland Harbor, Administrative Order on Consent for Remedial Investigation and Feasibility Study, at 14.
[418] West Consultants, Inc., Hydrodynamics/Sedimentation Modeling for the Lower Willamette River, Development of a Modeling Approach, Draft (2004); Portland Harbor FGS, Appendix H (summarizing history of the development of the modeling approach).

modeling approach.[419] On July 19, 2010, Region 10 informed LWG that it was "comfortable with the model as currently calibrated" and authorized LWG "to move forward with the application of the QEAFate Model."[420]

The modeling approach developed at Portland Harbor consisted of a series of connected sub-models, including a hydrodynamic model (predicting water depth, velocity, and bed shear stress), a sediment transport model (predicting erosion, deposition, and sediment transport), and a contaminant fate and transport model (predicting contaminant concentrations in surface water and sediment over time).[421] The results of the hydrodynamic and sediment transport models feed into the contaminant fate and transport model.

The hydrodynamic sediment transport ("HST") model was used in the RI to examine the potential for a major flood event to expose subsurface contaminated sediments.[422] In the draft FS, LWG applied the model to "[q]uantitatively predict changes in contaminant concentrations within the water column and sediments of the Site."[423] Simulating a 45-year period, the model provided a line of evidence of the effectiveness of natural recovery processes at reducing surface concentrations throughout the Site.[424] It also projected that all of the remedial alternatives would "achieve similar Site-wide surface sediment COC concentrations over the long term."[425]

Region 10 refused to accept the model's prediction that significant reductions in contaminants concentrations would occur through natural recovery. The Region stated that the model's predictions were "inconsistent with the CSM" because "the majority of the contamination was released into the river 30-80 years ago and similar reductions have not been observed."[426] This rationale was flawed for a number of reasons. First, if the Region had considered more recent data, it would have seen that Site conditions were improving consistent with the model predictions. Second, the Region had no data regarding Site conditions 30-80 years ago to support its conclusion that contaminant reductions had not occurred. Indeed, the ratio of surface to subsurface contaminant ratios shows that historical concentrations were higher than current concentrations. The Region also ignored that source control was only systematically undertaken relatively recently.

Because the output of LWG's QEAFATE model did not support the Region's assumptions, the Region commissioned external reviews of the model by the U.S. Army Corps of Engineers ("USACOE") and Portland State University.[427] Region 10 also unsuccessfully sought to develop its own HST model through USACOE.

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[419] Presentation, Anchor QEA to EPA, Lower Willamette River, Revised Fate and Transport Modeling Study (July 19, 2010); Presentation, Anchor QEA to EPA, Lower Willamette River, Revised Fate and Transport Modeling Study (May 4, 2010); Presentation, Anchor QEA to EPA, Revised HST Modeling Study: Review of Model Development and Calibration (Sept. 2, 2009).
[420] Email from Eric Blischke, EPA, to LWG, Re QEAFate Model Calibration (July 19, 2010).
[421] LWG, Draft FS, App. Ha at 5.
[422] RI at 3-38
[423] LWG, Draft FS, App. Ha at 3.
[424] LWG, Draft FS at 6-26.
[425] *Id.* at 9-14.
[426] FS at 4-4.
[427] ROD, App. H, at H-1 to H-3

At an April 10, 2015 meeting, the Region indicated that it still intended to use the QEAFATE model as a line of evidence in the FS. It also stated that it was working with a simpler model, the SEDCAM model, only predicts sedimentation rates. At the FS "rollout" on July 31, 2015, Region 10's presentation included a set of recovery curves at various areas of the Site generated with the SEDCAM model.[428] The recovery curves showed that each of the alternatives reduced contaminant concentrations to the same levels in approximately 30 years. However, when LWG requested the recovery curves and supporting technical information, the Region refused to produce them stating that it needed "to prepare a memorandum explaining the sediment recovery curves resulting from a run of the SEDCAM model for the administrative record."[429]

In the sections of the revised FS released on July 31 and August 18, 2015, the Region finally revealed that it no longer planned to use any quantitative model in the FS. Appendix H of the FS summarized the "key shortcomings" the Region had been able to identify with the QEAFATE model. In its presentation to the NRRB, the Region explained that there were "too many flaws with PRP [*sic*] model" and the "PRPs unwilling [*sic*] to fix problems."[430] As to the SEDCAM model, the Region stated that it was "too simple."

The Region's reasons for dismissing the QEAFATE model were disingenuous. Many of the issues that the Region now identified as "key shortcomings" had been present when the Region told LWG to "move forward" with the model in July 2010. For example, the Region identified as shortcomings the failure to consider bedload transport and the model grid ratio; but, the Region had agreed with the decision not to include bedload transport well prior to the 2012 draft FS and the model grid ratio had not changed for ten years.

The Region's statement that the LWG was unwilling to fix problems with the model was also hollow. Some of the so-called shortcomings were never presented to LWG.[431] Further, contrary to the Region's representation, LWG did offer analyses to address the other issues raised by the Region. One of the Region's key issues was the lack of feedback between the hydrodynamic and sediment transport models. To address this concern, LWG performed a sensitivity analysis, which showed that the lack of feedback had only a minor impact on model predictions.[432] Region 10 never responded to the sensitivity analysis. Similarly, Evraz Inc., NA, submitted an analysis with its comments on the Proposed Plan that responded to all of the purported shortcomings identified by the Region.[433] The Region again did not respond to Evraz's analysis despite its obligations under the NCP. 40 C.F.R. § 300.430(f)(3)(i)(F); *Am. Iron & Steel Indus v. EPA*, 115 F.3d 979, 1005 (D.C. Cir. 1997) (explaining that an agency's failure to respond to comments is significant "insofar as it demonstrates that the agency's decision was not based on a consideration of the relevant factors"). The Region's critique of the model therefore is a weak basis for dismissing it.

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[428] *See* Presentation, EPA to LWG, Portland Harbor FS Sections 3 & 4, (July 31, 2015).
[429] Email from Lori Cora, EPA, to LWG, Re: Status of LWG September information request (Nov. 25, 2015). LWG received the July 31, 2015 presentation materials by a FOIA request on September 2, 2015.
[430] Presentation, EPA to CSTAG/NRRB, Portland Harbor Feasibility Study, at 104 (Nov. 18, 2015)
[431] Evraz, Comments on the Portland Harbor Proposed Plan, Attachment 3, at 3-4 (Sept. 6, 2016) (explaining that shortcomings identified by Region 10 included additional scenarios that the Region had never requested).
[432] LWG, Additional Comments on EPA's Revised FS Sections 3 and 4, at 42-43 ¶ 152 (Oct. 8, 2015).
[433] Evraz, Comments on the Portland Harbor Proposed Plan, Attachment 3 (Sept. 6, 2016).

The Region offered the additional justification that a quantitative evaluation is "not 'required by Guidance.'"[434] It also noted that the NRRB approved of its decision to proceed without a quantitative model. However, although a quantitative model may not be "required" under guidance, an agency *must* have a reasonable basis to conclude that its decision will achieve its stated objectives. *See Corrosion Proof Fittings*, 947 F.2d at 1221. Region 10's decision to forego any quantitative evaluation prevents it from making a reasoned comparison of the remedial alternatives. The NRRB's recommendations do not substitute for an agency's obligation to conduct a reasoned analysis.

Without a quantitative model, Region 10 has no measure of long-term effectiveness. Long-term effectiveness refers to the residual risk and reliability of remedial measures at the time "cleanup-levels have been met."[435] Because Region 10 determined that it was impossible to quantitatively predict long-term sediment concentrations it was left to measure long-term effectiveness at the end of construction. But post-construction conditions are not a long-term measure; cleanup levels will not be met at the end of construction.[436]

Instead of a true long-term measure, Region 10 relied on arbitrary, unsupported metrics to compare the remedial alternatives. Specifically, Region 10 set "interim targets" for risk "to evaluate the potential for achievement of PRGs in a reasonable time frame, which was considered to be 30 years."[437] If the interim targets are met, the Region assumed that CULs would be met through subsequent natural recovery in 30 years. But the Region offers no reason to justify its selection of either the interim targets or the 30 year natural recovery period. For example, the Region arbitrarily set the child seafood consumption interim targets at a hazard index of ten; the Region does not explain why any of the interim targets are reasonable, or why they were selected rather than other possible values.[438]

The Region is also in the inconsistent position of stating on the one hand that it is unable to quantify natural recovery, while on the other hand assuming that natural recovery will be effective in 30 years. It is well-established that it is unlawful for an agency to arbitrarily selects a value without a reasoned justification. *See Ass'n of Private Colls. & Univs. v. Duncan*, 870 F. Supp. 2d 133, 154 (D.D.C. 2012) ("That this explanation could be used to justify any rate at all demonstrates its arbitrariness.").

The decision to only compare remedial alternatives at the end of construction puts a thumb on the scale for the more intensive alternatives. The Region assumes that post-construction SWACs are static relative to each other — in other words, that an alternative with a four-year construction period can be directly compared to an alternative with a 13-year construction period. This ignores post-construction natural recovery; an alternative that only takes four-years cannot

[434] ROD, Responsiveness Summary, App. A at I-60.
[435] ROD at 91.
[436] The one exception is Alternative H, which was developed to meet all cleanup levels at the end of construction. ROD at 72.
[437] FS at 4-6.
[438] In the ROD Responsiveness Summary the Region explained that interim targets were developed with the SEDCAM model. ROD, Responsiveness Summary at 3-9. If that is in fact the case, that is not explained anywhere in the FS. Elsewhere, the Region offered that "interim targets are levels of risk that would be acceptable should RGs not be achieved in a reasonable time frame." ROD, Responsiveness Summary, App. A at I-58. This explanation is irrelevant as to whether interim targets are reasonable values to achieve CULs.

be compared to a 13-year remedial alternative without factoring in the 9-years of post-construction natural recovery for the shorter alternative. Applying a simple quantitative analysis, LWG concluded that the shorter alternatives would achieve equilibrium concentrations in roughly the same time frame as longer more intensive alternatives. The Region effectively ignores that the alternatives have different durations and concludes that the more aggressive alternatives will allow people to eat more fish sooner.[439] While the Region's assumption simplifies its analysis, it is arbitrary. *See Corrosion Proof Fittings*, 947 F.2d at 1218 (explaining that EPA must discount benefits if it is going to discount costs in order "to preserve an apples-to-apples comparison").

The Region dismissed the quantitative models because it determined that they were too uncertain. Yet, without any quantitative basis, the Region's comparison of remedial alternatives is untethered and could be used to justify any of the remedial alternatives. The measure that the Region substituted for the fate-and-transport model — the interim targets — is arbitrary and unjustified. EPA guidance is clear that a quantitative model is useful even if uncertain: "[M]odels may have significant uncertainty, but may be useful for predicting whether or not there are significant differences between times to achieve protection using different alternatives."[440]

Region 10's decision to disregard established and previously agreed upon quantitative models for Portland Harbor altogether left the agency without a reasonable basis to compare the remedial alternatives and therefore, unable to reach a reasoned remedy selection.

7. *Region 10 Lacks a Reasonable Basis for its Remedial Selection*

All of the above listed deficiencies contribute to a flawed remedy comparison and selection process. The Region's failure to adequately characterize Site risks, background contamination, natural recovery processes, and the relationship between sediment and fish tissue concentrations, prevent a reasoned decision about an appropriate response action. The record shows that the Region repeatedly disregarded analysis and data. The Region therefore put itself in a position to select a remedy on the basis of uncertainty rather than sound science. Region 10's selected remedy lacks any support. EPA should adopt the conclusions of the Pre-RD Report in order to fix the errors Region 10's ROD.

C. Region 10 Did Not Conduct the RI and FS as an "Integrated" Process and Repeatedly Reversed Course without Explanation

The NCP requires "site characterization activities to be fully integrated with the development and evaluation of remedial alternatives in the feasibility study." 40 C.F.R. § 300.430(d)(1). The RI and FS process should be "interactive and iterative."[441] Data collection should always be "directed toward providing information relevant to the selection of a remedial action. In this way the overall site characterization effort can be continually scoped to minimize the collection of unnecessary data and maximize data quality."[442]

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[439] *See* ROD at 99. The Region also ignores the natural recovery that will occur prior to construction during the remedial design phase. This is another example of how the Region treated the Site as if it is in a steady state.
[440] *Contaminated Sediment Guidance*, at 3-14
[441] EPA, *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*, at 1-6 (1998).
[442] *Id.*

It is also a principle in administrative law that an agency must provide a reasoned explanation for changes in position. *See FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009); *see also Encino Motorcars, LLC v. Navarro*, 136 S. Ct. 2117, 2125-26 (2016); *Org. Vill. of Kake v. U.S. Dep't of Agriculture*, 795 F.3d 965, 966 (9th Cir. 2015). The agency must at least "display awareness that it is changing position." *Fox*, 556 U.S. at 515. When a new approach "rests upon factual findings that contradict those which underlay its prior [approach] . . . [i]t would be arbitrary and capricious to ignore such matters." *Id.* "In such cases it is not that further justification is demanded by the mere fact of policy change; but that a reasoned explanation is needed for disregarding facts and circumstances that underlay or were engendered by the prior policy." *Id.* at 515-16.

The record at Portland Harbor shows that Region 10 repeatedly reversed course on key pieces of its remedial approach without explanation. These unexplained changes of approach violate the NCP and are arbitrary and capricious.

Region 10's failure to conduct the RI and FS as an integrated process is evident from the fact that the Region took twice as long to complete them as it had originally planned. Thus, as discussed above, the site characterization activities conducted as part of the RI were stale by the time Region 10 evaluated and selected a remedial action in the FS. Inconsistent with the NCP, there was a ten-year gap between site characterization and remedy selection.

A key reason why the Project took as long as it did was that Region changed its direction on numerous items and made key decisions at the last minute. These changes of approach departed from the Work Plan and long-standing agreements over the remedial approach. The Work Plan describes the "underlying rationale and objectives" for each Project task. In revising the FS, Region 10 arbitrarily disregarded analyses that had been developed over a period of more than eight years.

The Region's failure to integrate the RI and FS is also evident in its failure to take the results of the risk assessments into account. Risk assessments provide information about the magnitude and causes of risk at a site. They should inform which media and contaminants the response action should focus on. Region 10, however, did not perform any risk management step between the baseline risk assessments and FS. This is contrary to both the NCP the EPA guidance.

1. *Region 10 Reversed Its Approach on Key Elements of the Remedial Approach without Basis*

In revising LWG's draft documents, Region 10 freely reversed course on approaches that had been developed over the course of the Project. Some of the issues on which the Region changed approach have already been discussed:

- Fate-and-transport modeling;
- Background;
- Equilibrium; and
- The CSM.

None of the changes in approach were supported by new or even relevant data or analyses, but all of them served to support Region 10's preference for more intensive remedies.

The Region's changes of approach were not limited to these issues. Other notable examples of the Region's ad hoc decision-making process include its changed approach to benthic risk, and its repeated changes to the RAOs and CULs.

a. The FS Benthic Risk Approach Was Inconsistent with the Baseline Ecological Risk Assessment and the Prior Ten Years of Work

The benthic risk approach that Region 10 settled on in the FS was a sharp departure from its approach in the BERA, which had been carefully developed over ten years. The difference in approach can be easily quantified: the BERA determined that 4-8% of the Site posed unacceptable benthic risks, whereas the FS determined that 59% of the Site posed unacceptable benthic risks based on no new data or analyses. The record demonstrates that in preparing the FS the Region arbitrarily concluded that the BERA had underestimated benthic risks and tried a number of different approaches in 2015 and 2016 to support its predetermined conclusion. The increased benthic risk footprint is consequential because, after altering the approach, Region 10 determined that the least intensive alternative (B) would not be protective of benthic receptors.

Region 10 and LWG agreed on the general approach to measuring benthic risk early on. Benthic risk was evaluated with multiple lines of evidence. These included bioassay tests, which directly measured the effects of contaminated sediments on benthic organisms, and modeling, which used sediment chemistry and toxicity to predict the effects on benthic organisms. A weight of evidence approach applied under which the empirical bioassay tests were the "primary" line of evidence, which is typical of how the lines of evidence are applied.[443]

The various predictive approaches were the subject of extensive negotiation and revision between 2006 and 2011. Two principles were assumed in the negotiations: (1) each predictive line of evidence presented different information and (2) each predictive line of evidence was insufficient on its own to fully characterize benthic risks.[444] The approach that was ultimately applied in the EPA-approved BERA reflected a number of long-negotiated agreements about the appropriate use of the various lines of evidence.

In April 2010, Region 10 provided LWG with several "guidelines" for identifying benthic risk areas for the FS.[445] These guidelines were incorporated into an approach that LWG titled the "Comprehensive Benthic Risk Approach" ("CBRA"). The CBRA built on the weight of evidence approach in the BERA. It included all the lines of evidence, and considered their relative reliability and relevance, and the frequency and degree of exceedance in identifying benthic risk areas. The CBRA was first presented to Region 10 at a meeting on September 22, 2010. Region 10 and LWG

[443] LWG, "Estimating Risks to Benthic Organisms Using Sediment Toxicity Tests," at 1 (Mar. 18, 2005).
[444] EPA, Comments on LWG Benthic Approach, at 1 (Sept. 27, 2010); letter from EPA re Clarifications to Resolution of EPA September 27, 2010 Comments on Benthic Risk Evaluation (Feb. 25, 2011) (stating that "the sediment quality guidelines produced by any model (LRM, FPM or generic SQGs such as PECs or PELs) are intended to be used as a set – not individually").
[445] Letter from EPA, to LWG (Apr. 21, 2010).

agreed that an "updated version of the comprehensive benthic analysis" would be developed for the FS.[446] LWG included the CBRA as Appendix P to the LWG Draft FS.[447]

After Region 10 disapproved the LWG draft FS, it provided LWG with recommendations on how to revise the CBRA.[448] LWG incorporated these recommendations in a revised version of Appendix P, which was delivered to Region 10 on April 3, 2015. The modifications resulted in the addition of five acres to the benthic risk areas (61 acres total).

At the same time that it was giving directions to the LWG on the CBRA, however, Region 10 was internally developing its own alternative approach to benthic risk. In its revised FS section 4, released August 18, 2015, Region 10 stated, without explanation, that benthic risk areas were identified by "bioassays or predicted by the LRM," one of the two predictive models developed for the Site.[449] No mention was made of the CBRA which the Region had agreed in 2010 would be the basis of the FS approach. The Region had indicated as recently as February 2015 that it was working with LWG on the benthic risk approach.[450] The Region applied its new approach to conclude that there were "a substantial number of locations where unacceptable benthic risk . . . [is] not encompassed by the areas of construction."[451]

The Region's approach was inconsistent with the BERA and the Region's 2011 agreement that the values produced by any of the models and predictive approaches "are intended to be used as a set — not individually."[452] That agreement was based on the understanding that none of the predictive lines of evidence was sufficient to fully characterize benthic risks separate from the other lines of evidence. Region 10, without explanation, abandoned the multiple lines of evidence approach to benthic risk that had been developed since the 2004 Work Plan.

Yet, the August 2015 revised FS approach would not be the Region's final approach. When the final FS was issued just less than a year later, on June 8, 2016, Region 10 had a new approach for mapping benthic risk areas. Now, the Region evaluated benthic risk "as the area exceeding RAO 5 PRGs."[453] Benthic PRGs, or CULs, were values derived from the two predictive models.[454] The lowest value was selected as the PRG or CUL. Again, the Region provided no acknowledgement or explanation for the change in approach. The conclusion of the revised 2015 FS, however, remained that the less intensive alternatives did not fully address benthic risks.

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[446] Letter from EPA, Re: Clarifications to Resolution of EPA September 27, 2010 Comments on Benthic Risk Evaluation.
[447] Letter from Windward Environmental, Re: EPA Request for Summary of the History of the Comprehensive Benthic Risk Approach for Portland Harbor (Mar. 31, 2014).
[448] Email from Burt Shephard, EPA, to John Toll, LWG, Re Comprehensive benthic approach thoughts and recommendations for the FS (Apr. 4, 2014)
[449] EPA, Revised Feasibility Study Section 4, at 4-16 (Aug. 18, 2015).
[450] Email from Kristine Koch, EPA, to Tom Gainer, DEQ, re Benthic Toxicity PRGs (Feb. 7, 2015)
[451] EPA, Revised Feasibility Study Section 4, at 4-66.
[452] Letter from EPA, to LWG, Re: Clarifications to Resolution of EPA September 27, 2010 Comments on Benthic Risk Evaluation.
[453] FS at ES-14.
[454] FS, App. B at B-38 to B-39. Tissue residue "toxicity reference values" were also used to obtain protective sediment concentrations for DDx and PCBs in clams and crayfish.

Region 10's final approach not only abandoned the CBRA and BERA approaches, but it was also directly contrary to the Region's previous statements. As recently as February 2015, Kristine Koch had stated that there were "technical issues" with using the values derived from the models as "individual chemical benchmarks."[455] She stated that the Region would *not* use PRGs to map benthic risk areas.

Region 10's final approach also inexplicably ignored the empirical bioassay results. Since the start of work at Portland Harbor, the empirical bioassay tests had been recognized as the most reliable line of evidence of benthic risk. In the August 2015 FS, the Region had considered the bioassay results to evaluate benthic risk. In the final FS, the Region stated that it compared exceedances of the RAO 5 PRGs to the empirical bioassay results to evaluate whether they were correlated. But Region 10 provided neither the method nor the results of that comparison.

Region 10's final approach dramatically increased the area of the Site that was considered to pose unacceptable benthic risks. The Region ultimately determined that 1,289 acres, or 59% of the Site, posed unacceptable benthic risk. The CBRA, by contrast, with the revisions previously directed by Region 10, identified only 61 acres, or 3%, as posing unacceptable benthic risk.

b. Region 10 Made Repeated Changes to the Remedial Action Objectives and Cleanup Levels Up until the Point When It Finalized the FS

Region 10's remedial approach at Portland Harbor will tie parties into long-term watershed management, which has never been the aim of CERCLA. The Region set remedial goals for surface water, groundwater, and riverbanks, and designated 108 CULs for 64 different COCs. The Region only arrived at this expansive remedial approach after repeatedly changing its mind on basic questions. While the Region purportedly reached an agreement with LWG on RAOs in 2009 and provided direction on PRGs in 2010, the Region repeatedly and arbitrarily revised the RAOs and list of COCs and PRGs until it issued the final FS in 2016.

i. The Region Established Groundwater and River Bank Remedial Action Objectives that Do Not Have a Foundation in Site Characterization

The Portland Harbor Work Plan proposed five preliminary RAOs addressing human health and ecological risks from sediment, fish and shellfish tissue, and surface water.[456] Upland media, such as soils and groundwater, were not addressed by the preliminary RAOs since they were not covered by the AOC.[457] Under the Portland Harbor Memorandum of Understanding ("MOU"), responsibility for the in-water and upland portions of the Site was divided between EPA and DEQ respectively.[458]

[455] Email from Kristine Koch, EPA, to Jenn Peterson, DEQ (Feb. 2, 2015).
[456] Programmatic Work Plan, App. A, Attachment A1, Remedial Action Objectives Technical Memorandum.
[457] *Id.* at 3.
[458] Memorandum of Understanding for the Portland Harbor Superfund Site.

In 2009, however, Region 10 directed LWG to add a RAO for groundwater even though groundwater was not part of the in-water investigation.[459] DEQ, as part of its upland source control efforts, investigated groundwater with contaminant plumes that had the potential to recontaminate sediment and to pose risk to river receptors.[460] LWG, by contrast, only investigated groundwater plumes to make recommendations to DEQ for upland source control.[461]

Moreover, the RAO is unnecessary because it is not about exposure to groundwater itself. Further, as DEQ commented, "the LWG has not characterized the nature & extent of contamination in the stranded wedge, & therefore it will be very difficult for them to design remedial alternatives to achieve the RAO."[462] DEQ recommended that groundwater be established as a "management goal" rather than an RAO.[463] Despite the lack of investigation, Region 10 directed that the FS include groundwater RAOs.

Although the 2009 RAOs had been extensively negotiated, and Region 10 had agreed that they would be used in the FS, in its 2015 FS revisions, the Region again revised the RAOs. The Region modified the language and, notably, for the first time after ten-plus years of work on the Project identified an RAO for riverbanks. With riverbanks, Region 10 had initially directed LWG to characterize the riverbank riparian zone, but subsequently withdrew that direction.[464] The riverbank RAO accordingly was not based on data collected during Site characterization. Region 10 explained that the riverbank RAO was created for "efficiency purposes."[465]

There were no PRGs identified for riverbanks until after all data had been collected. Because riverbanks were not included in the RI, the nature and extent of contamination was not evaluated and risk from riverbanks was not characterized. Region 10 simply assigned remedial alternatives to the riverbanks based on an unfounded assumption that they would be identical to nearby sediment remedy assignments. Because there has been no meaningful collection of riverbank data or evaluation of risk, the Region is simply guessing about where riverbank remediation might be necessary and what remedial alternatives might be employed. The Region has presented no analysis of whether the sediment remedy technology decision tree in the ROD is applicable to riverbanks, nor has the Region shown any relationship between riverbank chemistry and sediment chemistry.

The Region's late identification of the groundwater and riverbank RAOs are direct violations of the NCP's requirement that RI and FS be "integrated." Region 10 set remedial objectives that had no foundation in the Site characterization.

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[459] Letter from LWG, to EPA, Re: Portland Harbor Remedial Action Objectives (Sept. 30, 2009).
[460] DEQ, Source Control Report, at 22 (2016).
[461] Remedial Investigation at 4-29 to 4-32.
[462] Email from Jim Anderson, DEQ, to EPA, Re: Groundwater RAO for Portland Harbor (Sept. 24, 2009).
[463] *Id.*
[464] Meeting Notes, DEQ/EPA 1/25/12 Riverbank Meeting Summary (Feb. 14, 2012) (FOIA, SEMS_295529).
[465] TCT Meeting Notes, Draft, January 14, 2015 (FOIA, SEMS_295569).

ii. The Region's Approach to Developing Cleanup Levels Was Haphazard

Similarly, the Region's approach to developing preliminary remediation goals was a moving target. In April 2010, Region 10 presented LWG with a list of 46 PRGs, which it explained was "sufficiently refined for the LWG to proceed with development and evaluation of cleanup alternatives."[466] The Region stated that it did "not anticipate any significant changes to the list of COCs and PRGs," although it was "possible that some limited changes would be needed based on the results of our review" of the baseline risk assessments.[467] LWG's draft FS was based on the April 2010 list provided by Region 10.

Despite the assurance that the April 2010 list was near final, four years later, in April 2014, the Region prepared a list of 192 separate PRGs. One year after that, in March 2015, Region 10 provided yet another list, in which 80 of the values had changed from the April 2014 list. The final list in the ROD contains 108 CULS for 64 different COCs. The Region failed to offer any explanation for its changes.

The Region also arbitrarily changed its approach on certain contaminants such as dioxins/furans. In the BHHRA, risks were assessed on a TEQ basis.[468] Yet, for sediment in the FS and ROD, the Region identified five congeners that contributed 85-95% of the risk; it only developed RALs for three of the congeners "based on areas with greater data density."[469] In an internal email exchange, the Region admitted that the data for dioxins/furans — one of the focused COCs used to define areas of capping/dredging — was "crap."[470]

The Region similarly added contaminants, as discussed in the next subsection, without any application of risk management principles. For example, the Region designated a groundwater CUL for manganese based on a tapwater regional screening level ("RSL") (i.e., risk to human health) even though the BHHRA found that manganese did not pose a risk to human health and surface water already met the RSL. The Region explained that they "pulled in chemicals that they know are problematic for the site."[471]

2. *Region 10 Failed to Perform a Risk Management Step between the Baseline Risk Assessments and the FS*

The final list of 108 CULs and 64 COCs is itself proof that Region 10 did not perform any risk management step between the baseline risk assessments and the FS. This is contrary to the requirement that the baseline risk assessment should be "integrated" with and inform remedy selection.

[466] Letter from EPA, to LWG (Apr. 21, 2010).
[467] *Id.*
[468] Toxicity equivalence (TEQ) values are a weighted value that accounts for the toxicity of different dioxin and dioxin-like compounds.
[469] FS at 3-9.
[470] Email from Elisabeth Allen, EPA, to Mike Poulsen, DEQ, Re: Portland Harbor HexaCDF risk (Aug. 20, 2015).
[471] TCT Meeting Notes, December 10, 2014.

The results of the baseline risk assessment "establish the basis for taking a remedial action."[472] In particular, the risk assessment "[d]ocument[s] the magnitude of risk at a site and the primary causes of that risk."[473] The NCP and EPA guidance are clear that the information provided by the risk assessment should focus the development and evaluation of remedial alternatives on the media and contaminants that pose significant risk in order to achieve a protective remedy. Project managers should "ensure that cleanup levels are clearly tied to risk management goals" and consider "site-specific, project-specific, and sediment-specific risk management approaches that will achieve risk-based goals."[474] The agency should consider risk-management factors such as uncertainty, achievability, and the threshold criteria of protectiveness, in designating final cleanup levels.[475] EPA's ecological risk assessment guidance specifically directs that risk assessors should interpret "the ecological significance of observed or predicted effects."[476]

In 2011, LWG prepared a risk management recommendation memorandum based on the results of the draft final baseline risk assessments.[477] The memorandum made recommendations about the contaminants and exposure pathways that should be a focus of the FS based on factors such as the relative risk contributed by each contaminant; the frequency of potentially unacceptable risks; potential contributions from background concentrations; and the magnitude of risk exceedances. For human health, LWG recommended that remedial alternatives be developed to address the following pathways and contaminants:

- **Fish consumption**: PCBs, dioxins/furans, and total DDx (the sum of the six DDT congeners)
- **Shellfish consumption**: PCBs, dioxins/furans, and cPAHs
- **In-water sediment direct contact**: dioxins/furans (RM 7W) and cPAHs (RM 6W)

These were the only exposure pathways in the draft final BHHRA that exceeded the cancer and non-cancer risk thresholds under which remedial action is warranted.[478] For ecological receptors, LWG recommended PCBs and dioxin/furans as COCs based on significant risks to a range of species. LWG also recommended several contaminants for the transition zone water exposure pathway. Overall, LWG's risk management recommendations indicated that a protective

[472] EPA, OSWER, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions* (OSWER Directive 9355.0-30) at 4 (1991).
[473] EPA, RAGS, Vol. I, at 1-6 (1989).
[474] EPA, OSWER, *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites*, at A-7 (2002)
[475] NCP Preamble, 55 Fed. Reg. 8717 (Mar. 8, 1990); EPA, *Role of Baseline Risk Assessment*, at 7; *Contaminated Sediment Guidance*, at 2-17 (1991).
[476] EPA, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*, at I-12 (1997).
[477] LWG, Risk Management Recommendations: Contaminants of Concern, Receptors, Pathways, and Benthic Areas of Concern for the Feasibility Study (July 22, 2011). LWG's risk management recommendations were prepared based on the draft final baseline risk assessments. As discussed above, these were extensively modified by Region 10.
[478] LWG, Risk Management Recommendations, Attachment A, at 34. The direct exposure to surface water pathway also exceeded the threshold cancer risk level for the domestic drinking water scenario. This scenario was highly uncertain since there are no current or future plans to use the Lower Willamette River as a drinking water source, and Region 10 directed LWG to apply the scenario assuming *no pretreatment* of the water.

remedy could be developed by focusing on a small set of the chemicals that are present at the Site. LWG's risk management recommendations were provided to Region 10 on July 22, 2011.[479]

LWG worked on updating its 2011 risk management recommendations in Fall 2013, but did not finalize the updates due to the uncertainty about how Region 10's PRGs and RALs would be modified. LWG provided risk management recommendations in commenting on the Region's revised FS section 2.[480] Whereas Region 10, at that point, was proposing 46 COCs and 192 PRGs, LWG recommended that the list could be reduced to 23 COCs and 55 PRGs without any loss of protectiveness.

Region 10 never conducted any similar analysis of its own. The Region had originally planned to include a risk management section in the BERA, which would include its recommendations as well as LWG's. After LWG submitted the final BERA in April 2013, the Region held up final approval while it prepared its recommendations. Region staff did not complete the recommendations until September 2013, and when the draft was received it was deemed unacceptable by the Region's project manager. The Region therefore decided to delete the risk management section from the BERA altogether. The Region promised that it would eventually provide its recommendations. It never did so.

The final FS does not contain a risk management section. In the ROD, Region 10 states that "[t]he risk assessments reduced the [contaminants of potential concern] to a smaller number of [contaminants of concern] that contribute a *significant* amount of risk to the human and ecological receptors evaluated."[481] This explanation demonstrates that the Region skipped the risk management step. A risk assessment only identifies contaminants of *potential* concern; making decisions about which contaminants pose significant risk is a function of risk managers.[482] Region 10 identified every contaminant of *potential* concern as a contaminant of concern. Contaminants of potential concern are identified solely based on risk thresholds (cancer risk greater than 1×10^{-6} or non-cancer risks HQ>1). Region 10 made an unsupported determination that any contaminant exceeding the risk threshold was *significant*. It did not consider any contextual information about the magnitude, extent, or relative risk posed by different contaminants.

By conflating potential concern with significant risk, Region 10 undermined the purpose of risk assessment. In all cases, some contaminants pose more significant risks than others. But the Region failed to develop a remedy based on a reasoned analysis of risk.

The Region's approach also ignored the uncertainties in the risk assessments. Uncertainty and assumptions are "inherent" in a risk assessment.[483] The results calculated by a risk assessment

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[479] Email from LWG, to EPA (July 22, 2011). LWG worked on updating its 2011 risk management recommendations. These updates were not finalized due to the uncertainty about how Region 10's PRGs and RALs would be modified. LWG provided risk management recommendations in commenting on the Region's revised FS section 2.

[480] *See* LWG, Comments on Revised FS Section 2, Attachment 1 (June 19, 2014).

[481] *See* ROD at 18 (emphasis added).

[482] EPA, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, at 2 (1991) (explaining that "[t]he primary purposes of the baseline risk assessment is to provide risk managers with an understanding of the actual and potential risks to human health and the environment . . . ."); *see also* Portland Harbor BHHRA at 102 (identifying contaminants posing *potentially* unacceptable risks).

[483] *See* EPA, RAGS, Vol. I, at 8-17.

are conservative estimates of risk. By only considering a risk threshold for determining significance, the Region in effect treated the results of the risk assessments as measurements, not estimates, of risk.

The Region set an unachievable number of CULs that are unnecessary to develop a protective remedy and will ensure that the Site will never achieve close-out. The Region's actions are arbitrary and violate the NCP's requirement to "integrate" site characterization activities with remedial development and selection.

D. EPA Failed to Meaningfully Consider Contrary Evidence

An agency must "engage the arguments raised before it," *Del. Dep't of Nat. Res. & Envtl. Control v. EPA*, 785 F.3d 1, 11 (D.C. Cir. 2015), and "respond meaningfully to objections," *BNSF Ry. Co. v. Surface Transp. Bd.*, 741 F.3d 163, 168 (D.C. Cir. 2014). The agency "must respond to objections and address contrary evidence in more than a cursory fashion." *Trans. Agency of N. Cal. v. FERC*, 628 F.3d 538, 543-44 (D.C. Cir. 2010). "An agency's 'failure to respond meaningfully' to objections raised by a party renders its decision arbitrary and capricious." *PPL Wallingford Energy LLC v. FERC*, 419 F.3d 1194 (D.C. Cir. 2005). Courts "cannot infer an agency's reasoning from mere silence or where the agency has failed to address significant objections and alternative proposals." *Beno v. Shalala*, 30 F.3d 1057, 1073 (9th Cir. 1994).

Region 10 repeatedly disregarded processes it had agreed upon with LWG and ignored substantive critiques of its decisions. As discussed above, the Region and LWG agreed to a process in which they would exchange positions regarding the LWG draft RI and FS in order to seek consensus. But Region 10 came to view LWG's ability to comment on its revised drafts as an obstacle to finalizing the ROD before the change of administrations. The Region shortened comment periods, stopped responding to LWG's comments, and finally decided to takeover the FS rather than respond to the issues raised by LWG. Although the Region permitted LWG to dispute the FS, the dispute process was a sham, with the agency issuing its decision simultaneous with the ROD. The 8-page "decision" by EPA's hearing officer offers no independent analysis of the issues raised by LWG and merely recites the Region's responses from their brief.

The Region's failure to address the merits of contrary evidence illustrates the lack of support for the Region's decision-making. The Region elected to ignore, rather than attempt to address, the weaknesses identified by LWG and other PRPs. The ROD Responsiveness Summary largely consists of descriptions of what Region 10 did, while ignoring the substance of the comments.

E. EPA Failed to Disclose the Basis For Its Decision-Making

The role of a court under the arbitrary and capricious standard is "to ensure that the agency considered the relevant facts and articulated a rational connection between the facts found and the choices made." *Greater Yellowstone Coal., Inc. v. Servheen*, 665 F.3d 1015, 1023 (9th Cir. 2011) (quoting *Nw. Ecosystem All. v. U.S. Fish & Wildlife Serv.*, 475 F.3d 1136, 1140 (9th Cir. 2007)). To enable judicial review, an agency must "reveal the reasoning that underlies its conclusion," *Transcon. Gas Pipe Line Corp. v. FERC*, 54 F.3d 893, 898 (D.C. Cir. 1995), and provide a "clear

explanation of the factual and policy bases" for its decision, *San Luis Obispo Mothers for Peace v. U.S. Nuclear Regulatory Comm'n*, 789 F.2d 26, 47 (D.C. Cir. 1986). "[T]he agency must set forth the basis of the decision 'with such clarity to be understandable. It will not do for a court to be compelled to guess at the theory underlying the agency's action; nor can a court be expected to chisel that which must be precise from what the agency has left vague and indecisive.'" *Tarpon Trans. Co. v. FERC*, 860 F.2d 439, 442 (quoting *SEC v. Chenery Corp.*, 332 U.S. 194, 196-97 (1947)).

Region 10's decision-making at Portland Harbor was marked by a lack of transparency. The Region's numerous unexplained changes in approach in the Proposed Plan and FS from the RI and baseline risk assessments frustrated the public's evaluation of the remedial alternatives and ability to comment. Examples of the Region's unexplained changes in method that conceal its reasoning include:

- **New Methods of Calculating SWACs.** The FS cites multiple values for the starting sitewide PCB SWAC; the SWAC is alternatively listed as 92.6 µg/kg (FS, Appendix B), 79 to 205 µg/kg (FS, Appendix I), and 208 µg/kg (Appendix J). The FS and Proposed Plan created confusion about which methods were used for which analysis.

- **Inconsistent Exposure Scales.** The spatial scales used to derive post-construction and residual risk estimates vary from the exposure scales in the baseline risk assessments, frustrating a comparison between post-construction and baseline conditions. For example, for RAO 2 (human health fish consumption), the river mile exposure scale in the FS was split into the east and west sides of the River and the Navigation channel, whereas in the BHHRA, risks were evaluated by whole river miles with no splitting.

- **Inconsistent Risk Calculations.** The baseline risks calculated in the BHHRA should in theory be equivalent to the risks under the no action alternative (Alternative A). But, there were significant discrepancies in the calculations. Sitewide dioxins/furans risks were an order of magnitude higher in the FS than in the BHHRA, whereas sitewide PCB risks were an order of magnitude lower. The Region's calculated sitewide risk for 1, 2, 3, 4, 7, 8-HxCDF was higher than the sitewide risk from the dioxins/furans total TEQ in the BHHRA. Scientifically, the risk from a single congener cannot be higher than the total TEQ.

LWG and the Portland Harbor Participation and Common Interest ("PCI") Group submitted Freedom of Information Act ("FOIA") requests between March and August 2016 regarding the supporting analysis and information for the Region's decision-making. The Region has stalled and delayed answering those requests. Critically, the Region did not answer the requests during the public comment period on the Proposed Plan, nor did it answer the requests before it issued the ROD in January 2017. *See New York v. Salazar*, 701 F. Supp. 2d 224, 242-43 (N.D.N.Y. 2010) ("[T]he DOI did not produce documents responsive to plaintiffs' FOIA requests until long after the DOI issued its ROD . . . . [T]he FOIA requested documents should have been produced to plaintiffs much sooner, at a time when access to them would have been meaningful to the process."). Instead, the agency dragged its feet, pushing to narrow the scope of the requests and only conducting limited "manual" searches between April 2016 and March 2017, due to delays with the electronic records collection process.

In August 2017, LWG and the PCI Group agreed to the consolidation of their requests. Region 10 provided an estimated timeline of 44 months to review approximately 67,300 potentially responsive records, meaning that the Region's response will not be complete until May 31, 2021.

The Region's productions to date suggest that it is withholding a majority of the documents it reviews. In the more than two years since the Region identified the approximately 67,300 potentially responsive documents, it has made 14 interim productions and produced only 5,912 records. The Region has stated that it will make interim productions every two months until the requests are closed, which amounts to twenty-two interim productions over the 44 month period. The Region has completed approximately 63% of the interim productions.

Assuming that the Region is reviewing an equal number of documents for each interim production, the Region should have reviewed approximately 42,000 documents to date. Yet, the region has only produced 5,912 records — or approximately 14% of the documents it should have reviewed by this point. The Region is either marking the vast majority of records it is reviewing as non-responsive or privileged. But even when certain information is exempt from disclosure, FOIA requires that "[a]ny reasonably segregable portion of a record shall be provided to any person requesting such record after deletion of the portions which are exempt . . . ." 5 U.S.C. § 552(b). It is not credible that 85% of the documents reviewed are either non-responsive or exempt in whole from disclosure.

The Region's delay in responding to the FOIA requests is ripe for challenge. FOIA requires agencies to make a "determination" within twenty days of receiving a proper FOIA request, or, at most, thirty days in the case of "unusual circumstances." 5 U.S.C. § 552(a)(6)(A) & 552(b)(i); *Citizens for Responsibility and Ethics in Wash. v. Fed. Elec. Comm'n*, 711 F.3d 180, 186 & 188 (D.C. Cir. 2013). When an agency fails to make a determination within the statutory timelines, the requester is entitled to seek intervention of the courts, which may "require the agency to process documents according to a court-imposed timeline." *Clemente v. Fed. Bureau of Investigation*, 71 F. Supp. 3d 262, 269 (D.D.C. 2014). "The value of information is partly a function of time. Hardly anyone who needs the information can anticipate having the same need for it, or use for it, 15 or eight years later. Congress gave agencies 20 *days*, not years, to decide whether to comply with a request . . . ." *Fiduccia v. U.S. Dep't of Justice*, 185 F.3d 1035, 1041 (9th Cir. 1999). By the time the Region completes its response to the FOIA requests in 2021, the requests will be five years old.

Region 10 has a record of abusing the deliberative process privilege in violation of FOIA's standard of broad disclosure.[484] The Region's lack of transparency violates FOIA and the NCP. This is not a trivial matter. The Portland Harbor ROD is full of changes of approach and undocumented assumptions. The Region's failure to disclose its reasons for its changes of approach and assumptions is a mark of arbitrary decision-making.

[484] *See Pebble Ltd. Partnership v. U.S. EPA*, 2015 WL 6123614 (D. Alaska 2015) (Showing that Region 10 either released in whole or in part 120 of the 130 documents it originally withheld in whole related to Pebble Mine. "At this point, the court has no confidence that defendant has properly withheld documents, either in full or in part, pursuant to the deliberative process privilege.").

VI. EPA HAS NOT OFFERED VALID REASONS FOR REFUSING TO ACCEPT THE CONCLUSIONS IN THE PDI REPORT

EPA has accepted all of the data in the PDI report, but so far — first through its September 13, 2019 comments and now through its March 2, 2020 letter — has refused to modify the remedy called for in the ROD based on the PDI data.[485] Before issuing the ROD, EPA promised that it would conduct comprehensive post-ROD sampling to re-characterize site conditions.[486] Now that the Pre-RD Group has completed that sampling, consistent with EPA's direction, EPA should keep its prior promises to use the new data to re-evaluate the ROD, re-characterize the Site, and revise the remedy. Failing to do so would be arbitrary and capricious.

A decision to reject the PDI Report's conclusions and recommendations would demonstrate that EPA's decision-making was driven by pre-determined conclusions rather than sound scientific and technical analysis. The ROD, issued in 2017, was based predominantly on data collected over fifteen years ago. The results of the PDI Investigation confirm that, since the issuance of the ROD, Site conditions have improved dramatically. In its March 2, 2020 letter, EPA acknowledged that the PDI data "confirm that natural recovery is occurring."[487] These data and findings are compelling new information that should be considered on a Site-wide basis early in the design process, not simply during performance of area-specific design for the purpose of selecting remedial technologies within SMAs. EPA should update the remedy based on this critical new information.

Despite the clear evidence of substantially improved Site conditions, EPA has stated in comments on the PDI Report that it intends to proceed into the remedial design phase of the work without any Site-wide course corrections. In its March 2, 2020 letter, EPA affirmed its determination from its September 2019 comments that "the analysis and adjustments … do not warrant a remedy change at this time."[488] This approach cannot be justified. EPA should modify the remedy called for in the ROD in order to account for the new site information and the recommendations of the Report.

A. EPA's Attempts to Limit Data Use Are Inappropriate

The Pre-RD Group voluntarily undertook the Pre-RD Investigation in reliance on EPA's representations that it would review the resulting data and analyses and follow the conclusions properly derived from the data. However, EPA thus far appears intent on protecting the ROD in its current form at the expense of the new data and valid scientific analyses. Rather than acknowledge the need for updating the remedy, EPA's comments in September 2019 and the subsequent letter dated March 2, 2020 suggest that all that is needed are ad hoc, minor changes on

[485] *See* General Comment #1, at 1-2 (Letter from Davis Zhen, EPA, to Betsy Ruffle, AECOM, Re: EPA Comments for the Pre-Remedial Design Investigation Evaluation Report (Sept. 13, 2019) ("Based on EPA's review of the data, EPA finds the pre-design investigation and baseline sampling (PDI/BL) data to be of suitable quality and generally acceptable for remedial design and the long-term monitoring program. . .").
[486] *See* ROD at 105.
[487] Letter from S. Bodine and C. Hladick letter to The Pre-Remedial Design Group c/o R. Gold (Mar. 2, 2020).
[488] *See id.*

an SMA-by-SMA basis during the remedial design phase. However, the new data warrants Site-wide changes to the remedy — changes that cannot be made piecemeal in remedial design.

Region 10 cannot justifiably find "the PDI/Baseline data collected under the Administrative Settlement Agreement and Order on Consent to be of suitable quality and generally acceptable," while limiting the use of data solely to remedial design and long-term monitoring applications.[489] Despite the conclusive evidence of significantly improved Site conditions, EPA asserts with little explanation that "evaluations of data that revisit many decisions made in the ROD are not well supported and do not provide evidence of significant changed circumstances or inaccuracies in the assumptions in the ROD."[490] If the data is high quality and comprehensive, it should be used for any proper purpose, including updating past assumptions in the ROD that are clearly inaccurate and no longer valid.

The decisions made in creating the ROD were based on fifteen-year-old data. The new data clearly shows that circumstances have changed and that key assumptions made by EPA in the ROD are inaccurate. When the new data is considered, sound scientific methods demand that the remedy be updated. *See Sierra Club*, 671 F.3d at 968 ("We hold that EPA's failure to even consider the new data and to provide an explanation for its choice rooted in the data presented was arbitrary and capricious."); *see also Northern Plains Res. Council*, 668 F.3d at 1086 ("Reliance on data that is too stale to carry the weight assigned to it may be arbitrary and capricious."); *Catawba Cty.*, 571 F.3d at 46 (stating that agencies "have an obligation to deal with newly acquired evidence in some reasonable fashion"). Region 10 has provided no valid reason to ignore these critical findings of the Report. Thus, if EPA decides to reject the Report's conclusions and recommendations, such a rejection would be arbitrary and capricious.

B. EPA's Assertions about the Comparability of PDI Data to RI/FS data Are Unsupportable

Region 10's suggestion that RI/FS data cannot be used as a point of comparison with PDI data is inconsistent with the Work Plan that the Region's staff approved. Evaluating how the Site has changed over time was an express and central objective of the PDI Investigation agreed to by EPA. Table 5 of the Work Plan states that "evaluating recovery changes since the RI/FS" was a data use objective for the surface sediment sampling, fish tissue sampling, surface water sampling, and sediment core programs. The Work Plan also states that the Report would include evaluation of recovery since the RI/FS.[491]

Studies, even those designed to replicate each other, will always differ in some respects. But statistical analyses can account for these differences.[492] In assessing the new data, the Pre-RD

[489] *See* Letter from Davis Zhen, EPA, to Betsy Ruffle, AECOM, Re: EPA Comments for the Pre-Remedial Design Investigation Evaluation Report, at 1.
[490] EPA, Review Comments on PDI Evaluation Report and Acoustic Fish Tracking Study 12-Month Addendum ("EPA Review Comments"), General Comment #1 at 1-2 (Sept. 12, 2019).
[491] Pre-RD AOC Work Plan, at B-9 (discussing anticipated data evaluation approaches in a section titled, "Comparing Differences in Concentrations to RI/FS Datasets").
[492] *See* FS, App. I ("Because predictions of post-construction SWACs are based on a sample from the population of contaminated sediments, statistical uncertainties are unavoidable. In addition, because most remedial investigation data are based on a mixture of sampling designs, some of which are spatially biased accurate estimates of spatial

Group consultants employed weighted averages and de-clustering, as prescribed by FS Appendix I, to minimize any bias. Thus, the PDI evaluations of temporal change are scientifically sound and clearly demonstrate significant Site recovery.

Moreover, the Pre-RD Group worked closely with Region 10 staff and consultants in developing the PDI sampling program. The program ultimately incorporated additional tasks and numerous changes to accommodate the Region's requests and to ensure that the agency would consider the data statistically valid and usable for analytical purposes. In the Report, the PDI data is compared appropriately to the RI/FS data. Both data sets include grid and targeted sampling at hundreds of locations. This type of data comparison is routine at Superfund sites and is consistent with EPA practice.

If Region 10 had concerns about comparing the old RI/FS dataset with the new PDI dataset for the uses specified in Table 5 of the Work Plan, it should have disclosed those concerns in the many months during which the program was being developed. Instead, the Region approved the program as implemented and signed off on the data usage. Furthermore, the sampling methodology employed by the Pre-RD Group was purposely based on the RI/FS methodology in order to ensure that it could be used to evaluate recovery trends at the Site. While EPA's approval of the program was well founded, a rejection of the program's resulting data would not be. *Tarpon*, 860 F.2d at 442 (quoting *SEC v. Chenery Corp.*, 332 U.S. 194, 196-97 (1947)).

For example, in Comment #4, EPA stated, "[d]ifferent compositing methods were used for the RI/FS and PDI/BL surface water sampling events such that direct comparisons can only be considered qualitative in nature. Furthermore, samples were collected under different flow conditions despite targeting similar flow regimes for the three rounds of sampling."[493] However, the seasonal approach to surface water sampling was acceptable during the RI/FS and for making decisions supporting the ROD. It is therefore arbitrary and inconsistent that such an approach would now be deemed unacceptable, particularly after the lengthy consultation between the Pre-RD Group and EPA on the study design.

Similarly, in Comment #5, EPA noted that "[t]he previous (2002 and 2007) fish tissue sampling events were designed and conducted differently from more recent studies (2012 and 2018)" and that "[t]hese differences in study design preclude direct comparisons and make temporal change evaluations semi-quantitative estimates."[494] However, the Pre-RD Investigation's fish tissue sampling study was developed in consultation with EPA specifically in order to meet the stated objective of evaluating changed conditions.[495] For EPA to now state that differences in study design between previous sampling and Pre-RD sampling precludes comparisons would not be technically justified. Moreover, EPA had an opportunity to express this position two years ago before the Pre-RD sampling took place, but failed to do so. As such, EPA's current assertion that this data is not comparable is arbitrary and capricious. *Tarpon*, 860 F.2d at 442 (quoting *SEC v. Chenery Corp.*, 332 U.S. 194, 196-97 (1947)).

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averages must generally be based on weighted averages which are intended to counter the effects of spatially biased sampling designs. In geostatistics this is referred to as de-clustering the data.") (internal citation omitted).

[493] EPA Review Comments, Specific Comment #4, Section 2.1.3 and Figure 2.5 series, at 4.

[494] EPA Review Comments, Specific Comment #5, Section 2.1.4 and Figure 2.6 series, at 4.

[495] *See, e.g.*, Work Plan, Table 8 (stating that the PDI data would be utilized to "provide plots of the tissue data over time.").

C. EPA's Application of Standards Was Inconsistent

EPA is trying to hold the Pre-RD Group's work to a different set of standards than those to which it has held itself. For example, the Pre-RD Group conducted analyses and made findings based on the six focused COCs identified in the ROD, using the same process that Region 10 employed in the ROD. However, General Comment #3 criticizes the data analyses on the basis that all Table 17 COCs should have been addressed.[496] EPA never required such an analysis in the Work Plan and the analyses made were consistent with the ROD.[497]

Similarly, EPA has criticized several of the appendices of the Report, alleging that samples may not have been or were not collected in accordance with acceptable protocols.[498] However, all of this data was collected in accordance with the EPA approved FSPs, subsequent field program modifications, and with 100% EPA oversight. As such, EPA has already approved this data for use.[499]

In another example, the PAH standard that is called for under EPA's ESD is in the IRIS database, fully vetted, defensible, and in use by EPA at other sites. EPA itself had been operating as though the ESD would soon be finalized, and it now has.[500] Despite criticism in General Comment #4, there is no reason why the Pre-RD Group should have treated it differently. There was no reason to utilize PAH RALs and CULs that EPA had already acknowledged were erroneous and obsolete.

Finally, Region 10 has selectively applied guidance in its comments on the Report to date. For example, in the context of PTW, the comments have taken issue with the use of the term "mobile NAPL" on the basis that the ROD does not distinguish between mobile and non-mobile NAPL.[501] But EPA's 1991 PTW guidance explicitly describes PTW as having combined mobility and toxicity.[502] In other words, mobility is a requirement for a source material to be PTW in the first place; if NAPL is not mobile, it is, by definition, not PTW.

Because Region 10's inconsistent treatment of the Pre-RD Group's work cannot be justified, any decision to ignore the Report's recommendations would be arbitrary and capricious.

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[496] EPA Review Comments, General Comment #3, at 3.
[497] *See, e.g.*, Appendix J, Section 3.4; Tables 6a, 6b (evaluating the extent to which refined SMAs addressed other sediment COC exceedances, similar to the analysis conducted in the FS).
[498] *See* EPA Review Comments, Appendix B2 Comment #1, at 11-12; Appendix B3 Comments #1-3, at 12-13; Appendix B4 Comments #1-2, at 13.
[499] *See* EPA Review Comments, General Comment #1, at 1-2 ("EPA considered the data provided by the Pre-RD Group as presented in the PDI Report and Appendices. Based on EPA's review of the data, EPA finds the pre-design investigation and baseline sampling (PDI/BL) data to be of suitable quality and generally acceptable for remedial design and the long-term monitoring program, pending minor corrections described in the Appendix C Comments.").
[500] EPA, Explanation of Significant Differences, Portland Harbor (Dec. 2019).
[501] EPA Review Comments, Appendix L Comment #6, at 36.
[502] PTW Guidance, at 2.

D. Some of EPA's critiques of the Report Are Inaccurate

Many of EPA's comments and critiques of the Report are simply incorrect. For example, numerical J-flagged values are recognized in EPA and Department of Defense guidance as being *estimates*. Only the question of whether an analyte is present can be answered with any certainty.[503] Notwithstanding this guidance, EPA asserts in Comment #23 and elsewhere that dioxin/furan J-flagged concentration values themselves are accurate with 99% confidence. This is simply inaccurate.

In another example, one of the project goals in the EPA-approved Work Plan is to assess current baseline conditions.[504] However, Comment #11 states that an update on the current baseline risks was never part of the approved data quality objectives. The comment further asserts that the Report included a risk assessment, but it did not. Rather, it provides risk updates for key exposure scenarios in the Baseline Human Health Risk Assessment using PDI data.[505]

Finally, EPA states that the location of gaps in bathymetric coverage was not provided in Appendix B1.[506] Appendix E to Appendix B1 includes hillshade maps to show the coverage.[507] Similar maps showing coverage were also provided in Appendix D1, in the PDI Footprint Report in January 2019, and as a separate submittal in September 2018.

The regulated community should be able to expect, at a minimum, that all of the agency's assumptions are accurate before it issues critical comments on a deliverable. Because that has not been the case here, any decision to reject the Report's conclusions and recommendations would be arbitrary and capricious. *See Greater Yellowstone*, 665 F.3d at 1023 (the court must "ensure that the agency considered the relevant facts and articulated a rational connection between the facts found and the choices made.").

E. EPA's Procedures Continue to Have Significant Flaws

Many of EPA's comments to date cannot be evaluated fully due to a lack of transparency. This is consistent with the Region's long history of justifying conclusions by referring to internal analyses but without providing access to those analyses.[508]

Before beginning this process, the parties expected that there would be areas of disagreement with respect to data evaluation. As a result, they negotiated a detailed process for

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[503] *See, e.g.*, DOD/DOE QSM 5.3 (detection limit "…may be used as the lowest concentration for reliably reporting a detection of a specific analyte in a specific matrix with a specific method with 99% confidence"); EPAs SW-846 Update V Chapter 1, Revision 2 (July 2014) (defines the lower limit of quantitation as "an instrument's or method's minimum concentration that can be reliably measured or reported"); Environmental Working Group's Revised Detection and Quantitation Fact Sheet (https://www.denix.osd.mil/edqw/documents/documents/resed-detection-and-quantitation-fact-sheet-october-2017/) ("Quantitative results, with a known degree of precision and bias, can only be achieved at or above the LOQ. Detections between the DL and the LOQ assure the presence of the analyte, but their numeric values are estimates and are therefore indicated as such on test reports.") (emphasis added).
[504] *See* Table 4 (listing one question as "What are current baseline risks?").
[505] PDI Rep. at 22-26.
[506] *See* EPA Review Comments, Specific Comments, Appendix B.1 Comment #2 at 11.
[507] Similar to RI maps, in hillshade maps, no hillshading is present where there is no coverage.
[508] *See supra* Section V.E.

the resolution of technical disputes, including the ability to submit outside expert reports and obtain opinions from the Contaminated Sediment Technical Advisory Group. Region 10, however, repudiated that negotiated progress by asserting that the Report is not a deliverable that requires EPA approval. But it was understood by all parties at the time the AOC and supporting documents were negotiated that the Report would be submitted to the agency for review, comment, and approval in accordance with Section 5.6 of the Statement of Work ("SOW").

Instead of following this agreed-upon process, EPA informed the Pre-RD Group that it does not intend to provide further review and comment on future iterations of the Report. This is inconsistent with the express language of the SOW and with prior discussions between EPA and the Pre-RD Group. The express language of SOW Section 6.2 requires the Pre-RD Group to revise the Report within forty-five days of receiving EPA's comments. Similarly, in discussions between the Pre-RD Group, Regional staff, and EPA's lead consultant, CDM Smith, prior to the issuance of the formal comments, the agency indicated that it was open to having a dialogue about the analyses before taking a final position on any of it.

In response to the Report, the Region provided twenty-seven specific comments to the main text of the Report, as well as an additional approximately 100 comments on the Report's appendices. Many of these comments refer to analyses that the Regional staff and its consultants claim to have performed using the PDI data as support for rejecting the PDI analyses.[509] However, EPA initially did not provide *any* of that analysis to the Pre-RD Group. Additionally, on October 3, 2019, the Pre-RD Group submitted a FOIA request to the Region seeking information about the analyses Regional staff and consultants conducted using the PDI data. In its response, EPA stated that the analyses would not be made available to the Group until April 2020.[510] However, at a SETAC conference in October 2019, EPA and its consultants presented a poster that suggests that at least some of these analyses had been made publicly available even before EPA responded to the FOIA request. Not only did EPA fail to engage with the Pre-RD Group about the analyses it performed using the PDI data, it jumped straight to public consumption. The contents of this poster provide further support for the assertion that EPA's conclusions are questionable.[511]

Furthermore, on December 3, 2019, another FOIA request was submitted to the Region requesting information about information contained on the SETAC conference poster. Although the Region responded to this request, it responded with only twelve documents, none of which contained supporting technical information and about half of which were duplicates. Thus, even after multiple FOIA requests and direction from the Administrator to provide the analyses, the Region has continued to withhold critical supporting materials. As a result, the Group has been unable to evaluate fully the majority of the Region's technical positions and comments. *See Tarpon*, 860 F.2d at 442 (quoting *SEC v. Chenery Corp.*, 332 U.S. 194, 196-97 (1947)).

[509] *See* EPA Review Comments, Specific Comments 2, 5, 8, 10, 13, 17, 20, 22; Appendix D1 Comment #2; Appendix D2 Comment #6; Appendix E Comment #3.
[510] Letter from EPA, Re: Response to October 3, 2019 FOIA request by Pre-RD Group, dated November 4, 2019.
[511] For example, the poster states that each temporal dataset needs to be compared against each other, not in a combined pool.

VII. THE PDI REPORT SUPPORTS BROAD CHANGES TO THE REMEDY

The PDI Report data and conclusions should lead EPA to make a broad and significant set of changes to EPA's selected remedy. If EPA does not adopt the limited set of changes requested above in Section IV of this Petition, then the Petitioners ask EPA to consider, and make a formal, and favorable, administrative decision granting all of the changes requested in this Petition, including the changes requested in Section IV, above, and those requested in this Section VII below. These additional changes are supported by the PDI Report, and are fully warranted.

A. The PDI Report Supports Changes to Fish Tissue Targets

EPA should update the fish tissue targets used in the ROD's remedy because (1) recent studies show that the fish consumption rates relied on by EPA were inaccurate and (2) the PDI data show that background fish tissue concentrations exceed the targets specified in the ROD's remedy, meaning that the ROD's fish tissue target is effectively unattainable. Either one of these factors on its own would be reason enough to update the ROD's fish tissue targets Taken together, the case for increasing them is unassailable.[512]

EPA established the fish tissue targets to help monitor risks to human health or to other animals that consume fish or shellfish from the Site.[513] According to the BHHRA, the consumption of fish is the most important exposure pathway resulting in unacceptable risks to human health at the Site. Indeed, the BHHRA concluded that "[r]isks resulting from the consumption of fish or shellfish are generally orders of magnitude higher than risk resulting from direct contact with sediment, surface water, or seeps," and other potential exposure routes pose considerably lower or de minimis risks.[514] The BHHRA also determined that PCBs are the principal COC relative to Site-wide fish consumption pathways.[515] Fish tissue targets therefore should be based on realistic and relevant exposure scenarios and consider background conditions.

1. *The Baseline Human Health Risk Assessment Exposure Scenarios Involve a High Degree of Uncertainty and Are Highly Conservative Representations of Hypothetical Scenarios*

The BHHRA lacked Site-specific data, including FCR, the amount of fish consumed from the Site by actual users of the fishery, and the species of fish consumed.[516] As a result, the BHHRA

[512] In addition, EPA failed to update its FCR based on, or account for, its own updated default exposure assumptions, which were published well before the ROD was issued. *See* Section 4, *infra*.

[513] ROD, at 58. Per the ROD, fish tissue target levels are also used to inform fish advisories, evaluate construction impacts, and update best management practices and institutional controls (EPA 2017a)

[514] EPA, Portland Harbor, BHHRA, at 3. Two of EPA's nine remedial action objectives (RAOs) specifically address risks based on exposure to COCs in fish and shellfish. *See* ROD at 53 (defining RAO 2 as "Reduce cancer and non-cancer risks to acceptable exposure levels (direct and indirect) for human consumption of COCs in fish and shellfish"); *id.* at 54 (defining RAO 6 as "Reduce risks to ecological receptors that consume of COCs in prey to acceptable exposure levels").

[515] *Id.* at 4.

[516] The BHHRA assumed the tribal diet consists of approximately half resident species and half migratory species (salmon, lamprey, and sturgeon). The same assumption was applied for the RI/FS Scenario in the PDI Report's risk update. The assumption that half the tribal diet comes from the Lower Willamette River is not realistic and was not supported by the 1994 study used to identify the species consumed. This overly conservative assumption was noted in the BHHRA, and more recent tribal studies indicate the majority of fish consumed are salmon, which are migratory.

made conservative assumptions that, as acknowledged in the BHHRA itself, could cumulatively result in baseline risk estimates that are well above any actual risks that may be posed by the Site.[517] Also, EPA's fish tissue targets are unreliable because the agency failed to follow its own guidance regarding the calculation of exposure point concentrations in that they are not based on a sufficient number of samples. Because actual fish consumption rates in the region are substantially lower than EPA had assumed and background fish tissue concentrations exceed the ROD targets, EPA can and should increase the fish tissue targets above those set in the ROD's remedy.

The updated risk-based fish tissue targets presented in the Report are more appropriate than those relied on in the ROD because they are based on recent, Site-specific data that were not available when EPA prepared the ROD. Therefore, the updated risk-based fish targets are more realistic and more representative of what can be achieved by cleanup actions in Portland Harbor. And, as noted in the Report, EPA should consider background concentrations, along with risk-based fish tissue targets to monitor progress toward achievement of remedial goals. Indeed, it is incumbent upon EPA to rely on the best data available; failure to do so would be arbitrary and capricious.[518] While the PDI data did not assume that human receptors were eating the same fish species as the risk assessment relied on in the RI/FS, the fish tissue data set used in the Report was more robust than the data set used in the BHHRA because the Pre-RD Group collected and used a much greater number of fish in the Report for exposure calculations. Moreover, AECOM analyzed the uncertainty resulting from the use of only one fish species in the PDI risk assessment and concluded that even if COC concentrations in other fish species have not declined as they have in smallmouth bass, significant risk reduction has nevertheless already taken place.[519]

2. *EPA Did Not Consider Recent, Regional Studies on Fish Consumption Rates*

Although EPA issued the ROD in 2017, it relied on the BHHRA, which in turn relied on a national FCR from a 2002 EPA study, rather than more recent and more relevant EPA guidance and regional studies of tribal and recreational fisher populations.[520] EPA's 2000 Human Health Methodology recognizes the variability of FCRs among population groups and by geographic region, and urges the use of local or regional data.[521]

See Polissar, et al., A Fish Consumption Survey of the Nez Perce Tribe (prepared for U.S. EPA Region 10) (2016); Polissar, et al., A Fish Consumption Survey of the Shoshone-Bannock Tribes (prepared for U.S. EPA Region 10) (2016).

[517] *Id.* at 100.

[518] *See, e.g., Dist. Hosp. Partners, L.P. v. Burwell*, 786 F.3d 46, 56-57 (D.C. Cir. 2015) ("To be clear, agencies do *not* have free rein to use inaccurate data. . . . These requirements underscore that an agency cannot *ignore* new and better data."); *Northern Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1086 (9th Cir. 2011) ("Reliance on data that is too stale to carry the weight assigned to it may be arbitrary and capricious.").

[519] *See* Memorandum dated Sept. 6, 2019 from B. Ruffle & K. Vosnakis of AECOM to Portland Harbor Pre-RD AOC Group re Fish Diet Sensitivity Analysis (attached hereto as Exhibit B).

[520] PDI Rep. at 35 & App. G.

[521] U.S. EPA, Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health, at 4-24 (Oct. 2000).

The BHHRA uses an FCR of 228 meals per year or 142 grams per day of Lower Willamette River resident fish for subsistence fishers.[522] That FCR is based on the 99th percentile value for national consumption of freshwater and estuarine fish and shellfish, as determined in a 2002 EPA study.[523] That FCR, however, is not based on local or regional data, is inconsistent with current EPA fish consumption rate data, and does not apply current statistical analysis methods for use in fish consumption risk assessment.[524]

EPA should update its FCR based on the more relevant and up-to-date regional fish consumption data and analysis available to it in the Report. Specifically, the Report relied on a 2014 analysis by the EPA from a National Health and Nutrition Examination Study data and a National Cancer Institute method report to assess the usual fish consumption rate.[525] This analysis describes how the National Cancer Institute method for assessing the usual fish consumption rate is an improvement over prior methods and states that the method is "preferred."[526]

The PDI human health risk assessment applied relevant values from EPA's 2014 report for the FCR of 131 meals per year or 81.2 grams per day of resident fish for adult subsistence fishers in the region. This updated FCR is based on the 99th percentile value for pertinent regional data — specifically, Pacific Coast region consumption of freshwater and estuarine fish and shellfish, as set forth in the 2014 EPA report — a highly conservative assumption.[527] This updated FCR figure is more than 40% lower than the FCR used by EPA in the ROD's remedy, and is still a conservative representation of the FCR.

EPA's use of an outdated and unrealistically high FCR is responsible, in significant part, for the unattainably low fish tissue targets it set in the ROD. EPA should have adjusted its FCR after taking into consideration the more recent and geographically relevant data presented by EPA[528] and used in the Report.

3. *Background Fish Tissue Concentrations Exceed the ROD Targets*

The smallmouth bass dataset gathered in connection with the Report also shows that the ROD's fish tissue targets are unreasonably low. The ROD fish tissue targets are inappropriate because they are less than both the most stringent of the updated risk-based tissue targets and background concentrations generated in the Report based on the 2018 data.[529] The 2018 PDI fish tissue study provides a representative dataset of baseline COC concentrations in smallmouth bass

[522] PDI Rep. at 34-35; App. G at 8.
[523] *Id.*
[524] PDI Rep. at 34-35.
[525] EPA, *Estimated Fish Consumption Rates for the US Population and Selected Subpopulations* (April 2014).
[526] *Id.* at 2.
[527] *See id.* at 48 & Table 9b; PDI Report at 34-35; App. G at 8-9. Specifically, the use of the Pacific coast region FCR for adult subsistence fishers (81.2 grams per day) is highly conservative because, according to EPA, it is intended for people in counties whose central point is within 25 miles of the Pacific coast. *See*EPA, *Estimated Fish Consumption Rates for the US Population and Selected Subpopulations*. Both Portland Harbor and the center of Multnomah County are more 60 miles from the coast. As such, the actual FCR for subsistence fishers in and around Portland Harbor would, most likely, be better represented by the Inland West FCR of 51.6 grams per day. Nevertheless, in an abundance of caution and to be as conservative as possible, the PDI Data Evaluation Report used the much higher Pacific coast region FCR of 81.2 g/d.
[528] EPA, *Estimated Fish Consumption Rates for the US Population and Selection Subpopulations*
[529] PDI Rep. at 35, 43; App. F.2; Table 3.3.

collected upstream of the Site — information that was not available to EPA during preparation of the ROD.[530] By filling this data gap, the Report provides the basis for estimating background fish tissue concentrations, which is essential to setting an accurate and effective fish tissue target.[531]

The Report shows that the ROD's fish tissue targets are unattainable. Notably, the fish tissue target for PCBs is approximately 60 times lower than the lowest background statistic (16 µg/kg – the low end of the 95 upper confidence limit range for background concentrations in fillet tissue) and more than 100 times lower than other background statistics for PCBs.[532] The lowest background statistic calculated for the dioxin and furan congeners in fish tissue (after removing a potential outlier) is 2 to 10 times higher than the corresponding ROD tissue target.[533]

Because fish tissue on the site can never be expected to have lower concentrations than background fish tissue, EPA should update and increase the ROD's fish tissue targets to provide a meaningful indicator of progress that results from remedial action and natural recovery. Upstream media entering the Site and present in the D/U Reach contribute focused COCs to fish in and upstream of the Site at concentrations that exceed the risk-based fish tissue targets established in the ROD for those COCs.[534] As a result, it is not reasonable to expect that any amount of Site remediation will ever achieve the ROD's fish tissue targets.[535]

When determining the ROD's remedy, EPA did not consider background fish tissue concentrations because they were not measured or available during the RI/FS. The PDI background fish dataset fills this important gap in the data, and EPA should apply these data and update its fish tissue targets for the Site to improve the realism of its goals, and to more effectively monitor progress toward achieving the remedial action objectives for the Site.[536]

4. *The PDI Report Supports Using EPA's Own Updated Exposure Assumptions*

In the ROD, based on the BHHRA, EPA relied on older default values of 70 kg body weight for adults and 30 years' exposure duration for subsistence and recreational fishers.[537] In 2014 guidance, however, EPA updated these default values to 80 kg body weight for adults and 26 years' exposure duration.[538]

EPA's updated default body weight is more than 14% greater than the body weight value used by EPA in the ROD, while the default exposure duration used in the ROD is 15% greater

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[530] PDI Rep., App. F.2 at 5.
[531] *Id.*
[532] PDI Rep., Table 3.3 & App. F.2 at 5.
[533] *Id.*
[534] PDI Rep. at 21.
[535] *Id.*
[536] This is particularly so with respect to RAOs 2 (protection of human health regarding fish tissue consumption) and 6 (protection of ecological receptors/predators regarding fish tissue consumption). *See* PDI Rep. at 43, Table 3.3 & App. F.2.
[537] PDI Rep., App. G at Table 4; *id.* at Ex. A, at 9 (citing EPA, Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors (Interim Final) (Office of Emergency and Remedial Response) (1991)).
[538] *See* EPA, *Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors* (Feb. 2014).

than the updated duration. By using outdated body weight and exposure assumptions, the 2013 BHHRA overestimated the baseline risks of fish consumption. In light of these differences, EPA should have (i) acknowledged the uncertain and overly conservative nature of the exposure assumptions it relied on in the ROD; (ii) updated exposure assumptions in its ROD; and (iii) adjusted its fish tissue targets accordingly.

B. The PDI Report Supports Reconsideration of Principal Threat Waste Management

The NCP creates an expectation that EPA will use treatment to address "principal threats" posed by a site, wherever practicable.[539] Principal threats for which treatment (as opposed to non-treatment alternatives, such as containment) is most likely to be appropriate, include highly toxic and highly mobile materials.[540] The NCP does not otherwise address principal threats — the term is not even defined. One year after the NCP was promulgated, EPA published "A Guide to Principal Threat and Low Level Threat Wastes," to provide instructive definitions, examples, and requirements ("PTW Guidance"). For the nearly 30 years since then, the PTW Guidance has served as EPA's definitive source of instruction for how to properly identify and manage PTW.[541] During that time, EPA followed the PTW Guidance at cleanup sites across the country, creating a body of precedent on which the agency and PRPs can and should rely.

1. *The ROD's Principal Threat Waste Designation Is Inconsistent with EPA's Guidance and Precedent*

EPA's designation of PTW in the ROD's remedy is inconsistent with both the PTW Guidance and with precedent at other similar sites. EPA's rationale and discussion of PTW in the ROD and in the administrative record is imprecise and vague, resulting in an overly broad and unjustified designation of PTW at the Site. Concentration thresholds and other criteria for PTW management should be reviewed and revised to eliminate concentration-driven PTW designations. EPA's flawed designation of PTW unnecessarily triggers treatment — expensive reactive caps — despite the impracticability of such treatment due to the extraordinary volume of materials and complexity of the Site. Consequently, EPA should reconsider its PTW designations in a manner that is consistent with its own definitions, requirements, and precedent.

2. *Principal Threat Waste Management*

a. EPA's PTW Guidance Explains How to Properly Designate Principal Threat Waste

EPA's PTW Guidance sets forth key definitions that are essential to the proper identification of PTW. The importance of the definitions found in the PTW Guidance is

[539] 40 C.F.R. § 300.4309(a)(1)(iii)(A).
[540] *Id.* at (A) and (C).
[541] EPA, "Rules of Thumb for Superfund Remedy Selection" contains a section on "Identifying Principal and Low-Level Threat Wastes (1997) that was "derived from" the PTW Guidance. The "Rules of Thumb" largely repeats the key language in the PTW Guidance, and reemphasizes that "no 'threshold level' of risk has been established to identify principal threat waste." Rules of Thumb at 11.

underscored by the fact that they are not otherwise defined in the NCP. EPA incorporated these foundational definitions verbatim into the ROD, but failed to apply them properly.

The PTW Guidance defines "principal threat wastes" as:

> [t]hose source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur.[542]

Waste material must be a "source material" in order to be designated as PTW. The PTW Guidance defines the term "source material" as:

> [m]aterial that inc ludes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, to surface water, to air, or acts as a source for direct exposure.[543]

Therefore, in order to be properly designated PTW, the waste must be source material, and must either (i) be highly toxic; (ii) be highly mobile and unable to be reliably contained; or (iii) present a significant risk through (direct) exposure. To be considered a source material, a waste must either (i) act as a reservoir for migration or (ii) act as a source for direct exposure.

The PTW Guidance cautions that the "concept of principal and low level threat waste should not necessarily be equated with the risks posed by site contaminants via various exposure pathways."[544] Wastes do not have to be characterized as principal or low level threat wastes.[545] The PTW Guidance explains that the "principal threat/low level threat waste concept and the NCP expectations were established to help streamline and focus the remedy selection process, not as mandatory waste classification requirements."[546]

b. EPA Improperly Identified Principal Threat Waste in the ROD

Despite incorporating the PTW Guidance in the ROD, EPA failed to adhere to its own requirements, definitions, and examples. As a result, EPA improperly designated PTW at the Site in a manner that is inconsistent with both the PTW Guidance and precedent at other sites.

i. The ROD Contains No Evidence of PTW Mobility and, Even Where the PTW Is Allegedly Mobile, the ROD Did Not Determine Whether the PTW Is "Reliably Contained"

Source material may be designated as PTW if it is highly mobile and generally cannot be reliably contained.[547] The ROD identifies only NAPL as PTW source material, and claims that

[542] PTW Guidance at 2.
[543] *Id.* at 1.
[544] *Id.* at 2.
[545] *Id.*
[546] *Id.*
[547] *Id.*

PTW was identified based "on an evaluation of mobility of contaminants in sediment."[548] But the presence of highly mobile PTW has not actually been confirmed by a mobility study. While areas of NAPL could be further evaluated later during Remedial Design, PTW is designated at the time of remedy selection. Mobility testing should have been performed in areas with separate phase materials to evaluate if highly mobile NAPL is present within the Site, and whether it can be reliably contained. Because mobility testing was not performed, and the NAPL identified in the ROD as source material consists of only "globules or blebs" (as opposed to more mobile "pools" or liquid free product), the ROD offers no basis to designate any source material as PTW based on the high mobility requirement.

Even if source material is highly mobile, it is not properly designated PTW unless it cannot be reliably contained.[549] The ROD plainly states that "reliably contained was not used in identifying PTW."[550] Thus, even if the ROD contained evidence of highly mobile source material, EPA's failure to assess whether it could be reliably contained would make its designation as PTW arbitrary and capricious.

The ROD provides no explanation for why "reliably contained" was not used to identify PTW. The ROD does explain how "reliably contained" was used:

> "Reliably contained" was not used to identify PTW, but rather was used to determine how to address it through cleanup and whether there are concentrations of PTW that could be reliably contained.[551]

In essence, the ROD purports to have used "reliably contained" to determine whether there are concentrations of PTW that could be "reliably contained." EPA's circular explanation is meaningless. EPA is required to consider whether a source material *cannot be* "reliably contained" in designating highly mobile PTW and failed to do so. EPA misapplied the requirement again in its review and comments to the Report, Appendix L, where the agency explained that the ROD requires the removal of "all NAPL and PTW that cannot be reliably contained where technologically feasible."[552] This misrepresents the ROD's remedy because the ROD states that "reliably contained was not used."

ii. Highly Toxic Principal Threat Waste Is Not Present at the Site

EPA may designate source material as PTW if it is highly toxic, but the PTW Guidance makes clear that EPA has not established any " 'threshold level' of toxicity/risk" that equates to " 'principal threat.' "[553] Even when "*toxicity and mobility* of source material *combine* to pose a potential risk of 10^{-3} or greater," a PTW designation is not automatic, such a potential risk level only "generally" indicates that EPA should evaluate treatment alternatives.[554]

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[548] ROD at 20, 102
[549] PTW Guidance at 2.
[550] ROD at 20.
[551] *Id.* (emphasis added).
[552] EPA Review Comments, at 36.
[553] PTW Guidance at 2.
[554] *Id.*

EPA identified PTW at the Site "based on 10^{-3} (1 in 1,000) cancer risk from concentrations in sediment."[555] EPA evaluated the 10^{-3} cancer risk on the basis of toxicity alone, rather than on the basis of toxicity and mobility combined as required.[556] In other words, contrary to its own PTW Guidance, EPA established the 10^{-3} cancer risk as a toxicity threshold level to designate PTW in the ROD.[557]

Setting a threshold concentration level for PTW is also inconsistent with precedent at other sediment sites. A review of sediment CERCLA sites released within the last 10 years shows that none of the RODs presents a PTW threshold concentration level or required remedial technologies to specifically address PTW.[558]

The Pre-RD Group submitted updated data to EPA in support of the PDI Data Evaluation Report demonstrating that average sediment concentrations now resemble those of background conditions for multiple COCs at the Site. Assuming EPA's threshold level for toxicity was proper, the PDI analyses show the estimated cancer risk for the subsistence fisher pathway scenario is below EPA's $1x10^{-3}$ threshold, including when the mixed diet was considered.[559] In fact, substantially reduced media concentrations and refined risk estimates show that virtually all Site risks fall below the 1×10^{-3} cancer risk.[560] It is improper for EPA to establish a risk-based sediment concentration as a PTW threshold, and then use that concentration to require removal or treatment of areas smaller than the spatial area of interest to the supporting risk assessment.

Because risk estimation — the basis for EPA's threshold of 1×10^{-3} cancer risk — necessarily integrates exposure over the area of the site and across decades, the absence of risk at this threshold level corresponds to an absence of PTW. Therefore, the PDI analyses show that highly toxic PTW is not present at the Site and EPA should not consider it in the development of SMAs or the selection of remedial technology.[561] EPA should eliminate the concentration-based, highly toxic PTW designations in the ROD.The ROD's remedy should focus on immediate exposure risks, not long-term (30-year) exposure to a chemical substance via fish consumption pathway at a Site-wide scale.[562]

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[555] ROD at 102.

[556] ROD, Table 6 ("Concentrations of PTW Defined as 'Highly Toxic'").

[557] In its review comments to the PDI Evaluation Report, Appendix K, EPA notes that the PTW threshold for PCBs was based on a 10^{-3} cancer risk and does not hinge on the ability of caps to reliably contain higher contamination levels. EPA Review Comments on PDI Rep. at 35. This strictly toxicity based assessment is inconsistent with the requirement for toxicity and mobility of source material combined to pose a potential risk of 10^{-3} or greater. See PTW Guidance at 2.

[558] PDI Rep. at 40. The San Jacinto River Waste Pits ROD is one exception where a dioxin concentration of 300ng/kg was established to indicate PTW.

[559] *Id.* at 39.

[560] *Id.*

[561] *Id.* at xvii, 42-43. The PDI data also show estimated baseline risks are 91% - 99% lower than the 2013 BHHRA estimates across the four risk scenarios discussed in the ROD. The BHHRA did not identify risks greater than $1x10^{-3}$ at the Site for DDx, TCDD-TEQ, or BaP-TEQ for any evaluated scenario.

[562] Long-term (30-year) indirect exposure from sediment through fish to humans (RAO 2) is an exposure pathway not typically used for PTW "highly toxic" designations.

iii. NAPL Was Improperly Designated as "Source Material" in the ROD

EPA's PTW Guidance requires analysis of two basic characteristics — mobility and toxicity — to inform the agency's process of designating PTW. For any material (either highly toxic or highly mobile) to be designated as PTW, the material must be a "source material."[563] The PTW Guidance provides examples of source materials, including NAPL. But the source material examples describe "pools" of NAPL and NAPL floating on groundwater.[564] The ROD discusses only one source material (NAPL) but EPA's process for identifying source material in the ROD is flawed.

The ROD identifies "source material" at the Site as follows:

> **Source Material:** NAPL has been identified in subsurface sediments offshore of the Arkema and Gasco facilities (RM 6 through RM 7.5) as globules or blebs of product in surface and subsurface sediment. However, areas of NAPL have not been fully delineated.[565]

EPA first describes the NAPL as having been identified in subsurface sediments, then later, in both surface and subsurface sediment. The NAPL is also described as "globules and blebs" of product rather than pools of free product. For the NAPL to satisfy the definition of "source material," it must either act as a reservoir for migration, or act as a source for direct exposure.[566] Globules and blebs are small droplets of NAPL, not pools or reservoirs. And to the extent the NAPL is in subsurface sediments, it is not a source for direct contact, though it is capable of being a reservoir for migration. However, because the ROD explains that the "PTW evaluation included *only surface* sediment," it is implausible that EPA could identify NAPL as a PTW source material in *subsurface* sediment.[567]

c. Treatment of Waste Designated in the ROD as Principal Threat Waste Is Not Appropriate, Necessary, or Cost-Effective

Because the designation of PTW in the ROD creates an expectation for treatment, designating PTW has consequences. There may be situations where wastes identified as constituting a principal threat may be contained rather than treated due to difficulties in treating the wastes.[568] This might occur when the "extraordinary volume of materials or complexity of the site make the implementation of treatment technologies impracticable" or when "implementation of the treatment-based remedy would result in greater overall risk" (e.g., disturbing contaminated subsurface sediments through dredging).[569] The NCP's general expectation for treatment reflects

[563] PTW Guidance at 2.
[564] *Id*. The PTW Guidance also provides examples of Principal Threat Wastes. NAPL is included among the examples in its liquid, free product form. *Id.*
[565] ROD at 20 (emphasis added).
[566] PTW Guidance at 1.
[567] *Compare* ROD at 21 *with* ROD at 20.
[568] NCP Preamble, 55 FR at 8703 (March 8, 1990); PTW Guidance at 3.
[569] PTW Guidance at 3.

that, in addition to the fact that treatment for all waste will not always be appropriate or necessary, it may also not be cost effective.[570]

The ROD's requirement for a reactive cap to contain all areas of "highly toxic" PTW is overly conservative and unnecessary, and is not cost effective. The PDI Report included updated cap modeling using a sophisticated transient cap model,[571] which shows that a non-reactive cap can provide reliable containment, even in areas with PCB concentrations exceeding EPA's arbitrary 200 µg/kg highly toxic PTW threshold.[572] The determining factor with respect to mapping SMAs based on PTW and remedial technology selection should be an updated evaluation of the extent to which highly mobile source material can be contained (because the ROD did not use "reliably contained" to identify PTW), not concentration levels or PTW designations made in the ROD. Non-reactive caps would be protective at concentrations above ROD PTW levels.[573]

C. The PDI Report Supports Updating Background Levels and Cleanup Levels

1. *PDI Background Data Provides Relevant and Comprehensive Coverage of Upstream Areas*

The PDI background dataset is the most relevant, comprehensive, and updated set available reflecting background conditions. Consistent with the Pre-RD AOC and the agreed-upon Pre-RD Investigation and Baseline Sampling protocols, the PDI background dataset collected in 2018 consisting of 59 upstream sediment samples broadly covers the upstream areas and provides comprehensive data.[574] All were collected as 3-point composites, which strengthens the statistical relevance of the data. The Pre-RD Group designed the PDI sampling to provide spatial coverage throughout the D/U Reach, with samples randomly placed in areas with similar fines and total organic carbon content to the Site, which resulted in less need for data exclusion. Random sampling minimizes the need for data exclusion as was done in the EPA RI; in the PDI, one sample was removed as it was found to be near a source area.[575] This contrasts with the EPA RI background analysis where a statistical approach was used to identify and then remove outliers. The EPA RI approach resulted in the removal of all fine-grained locations with sediment similar to the site. A background concentration based on coarser-grained sediment, which tends to have lower COC concentrations, is not representative of what is achievable within the Site. EPA's approval of the PDI Work Plan, which included sampling focused on fine-grained areas, shows that the agency understood this limitation of the RI and ROD in establishing background concentrations.

Although the RI included only Upriver Reach (RM 15.3 to 28.4) data for evaluating background sediment, EPA should use updated and combined data for the D/U Reach to update background conditions. Sediments from the Downtown Reach (RM 11.8 to 15.3) were not used in the RI due to ongoing remediation that is now largely complete. As a result, a more complete

[570] *Id.* at 1.
[571] (Lampert, et al. 2018).
[572] PDI Rep. at 42, App. K.
[573] PDI Rep. at xvii, 38. PCBs at concentrations higher than the ROD PTW threshold of 200 µg/kg can be safely and reliably managed in placed with ENR and/or conventional capping technologies. *See* PDI Rep. at 39, 41-42, App. K.
[574] PDI Rep. at 29.
[575] PDI Rep. at 29.

picture of background conditions is available through the analysis of both the Upriver Reach and Downtown Reach, particularly given that the RI dataset included just a few samples from the Downtown Reach. The 2018 PDI data from the D/U Reach provides critical information about sediment loading to the Site and recovery potential that exceeds what could be understood with the Upriver Reach alone.

Suspended sediment concentrations upstream of the Site indicate similar (total PCBs and total PAHs) and higher (DDx, 2,3,7,8-TCDD, 1,2,3,7,8-PeCDD, 2,3,4,7,8-PeCDF) COC concentration than those detected in bedded sediments upstream of the Site (within the D/U Reach). Concentrations of all focused COCs are consistently highest in the surface water particulate fraction that has the smallest particle size. The sediment trap samples also had higher percentages of fines than the bedded sediments. Because suspended and settleable sediments represent the watershed load of material in transit, and the higher-concentration fines can transit into the Site before depositing, these high sediment trap and particulate concentrations are largely representative of background conditions and predictive of solids/sediment that may settle in the Site. Using 2018 surface sediment data to represent background conditions provides a conservatively low estimate of overall predicted contributions from upstream of the Site.

2. *New PDI Data and Other Procedural, Conceptual, and Technical Issues Demonstrate that the Food Web Model Is Not Appropriate For Determining Updated Cleanup Levels in Sediment*

New PDI data demonstrates that the food web model used to calculate CULs for several COCs significantly overstates the relationship between fish tissue concentrations and localized sediment COC concentrations and is not appropriate for determining updated CULs for sediment.[576]

The ROD's remedy's CULs for PCBs, DDx, aldrin, dieldrin, and dioxins/furans are based on human consumption of fish (RAO 2).[577] For PCBs and DDx, a mechanistic food web model was used to relate COC concentrations in sediment to resident fish species, including smallmouth bass. For PCBs, application of the food web model resulted in target sediment concentrations of less than zero. In short, any detectable concentration of PCBs in sediment would result in an unacceptable fish tissue concentration. Without a practical food web model-derived value, the ROD instead used an estimated background PCB sediment concentration of 9 µg/kg as the sediment CUL that was expected to be protective of fish consumption exposures.[578]

Given how central the food web model is for identifying ROD CULs and assessing residual risk, the availability of the extensive 2018 PDI fish tissue concentrations for PCBs and DDx, a corroboration exercise was performed to analyze the reliability of the food web model's predictions to determine its appropriateness for setting updated CULs for sediment. The food web model failed the reliability test.

The food web model dramatically over-predicted fish tissue concentrations. Analysis of the PDI smallmouth bass data showed a consistent downward trend in measured fish tissue

[576] PDI Rep. at 31.
[577] *See* FS
[578] *See* FS, ROD.

concentrations over time.[579] However, applying the food web model to the PDI sediment data does not yield the fish tissue concentrations observed in the Report. Instead, when 2018 Site-wide sediment SWACs were input into the food web model, the resulting model estimated smallmouth bass tissue concentrations for PCBs and DDx were similar to concentrations observed several years ago. The food web model overestimated 2018 sampled concentration by 75% for PCBs and 71% for DDx.[580] Over-prediction of smallmouth bass tissue concentrations was observed for most COC-spatial scale combinations evaluated, except PCBs and DDx in Segment 2 and DDx in Segment 4.[581]

In addition, a linear regression analysis of the 2018 fish tissue surface sediment data on a 1-mile scale found little to no evidence to support a functional relationship between co-located sediment and fish tissue concentrations for PCBs or DDx. This analysis demonstrates that other factors play an important role in contaminant uptake into fish, such as the updated understanding of the smallmouth bass home range from the PDI fish tracking study and dissolved surface water concentrations.

EPA itself acknowledges in the ROD that the presumed relationship between biota and sediment was "highly uncertain" and the analysis of the PDI data has demonstrated that it is significantly different than what the food web model predicts.[582]

As a result, the food web model is not appropriate for determining risk-based CULs for sediment and assessing residual risk. Assuming that risk-based concentrations would still be below background concentrations for PCBs and dioxin/furan focused COCs), the sediment CULs should default to background concentrations as updated with the 2018 PDI data. In addition, updated target tissue concentrations and fish tissue background could be used to evaluate progress toward meeting fish consumption goals for RAOs 2 and 6 (discussed above). Post-remedy residual risks that rely on the food web model are flawed and overstated. Communications on the projected remedy performance that rely on the food web model should acknowledge the level of uncertainty and overestimation of risks.

3. *Updated Sediment Cleanup Levels*

a. PCBs and Dixoin/Furan Congeners

The 2018 PDI data provides a more comprehensive, representative, and timely assessment of COCs in D/U Reach sediment than the RI dataset upon which EPA relied to set background concentrations and CULs. EPA should update background concentrations, and therefore background-based CULs (PCBs and dioxins/furans for RAOs 2 and 6), with the 2018 combined D/U Reach surface sediment dataset, so that the CULs reflect achievable and sustainable post-

[579] PDI Rep., Section 2.5, pp. 22-26
[580] PDI Rep. at 32, App. H.
[581] PDI Rep. 32, App. D.6.
[582] ROD at 87 ("fish and shellfish derive their COC concentrations from both sediments and surface water in proportions that at this time can only be approximated and estimates of the degree to which this CERCLA action will reduce fish and shellfish tissue concentrations are highly uncertain."); PDI Rep. at 32.

remedial goals. The values derived from the 95 upper confidence limit values in the 2018 surface sediment data are:

- Total PCBs = 20.4 µg/kg;
- 2,3,7,8-TCDD = 0.00025 µg/kg;
- 1,2,3,7,8-PeCDD = 0.00049 µg/kg; and
- 2,3,4,7,8-PeCDF = 0.00044 µg/kg.[583]

These changes are consistent with EPA's guidance that background concentrations play a critical role in modifying CULs. "The contribution of background concentrations to risk associated with CERCLA releases may be important for refining specific cleanup levels for COCs that warrant remediation action. … *For example, in cases where a risk-based cleanup goal for a COC is below background concentrations, the cleanup level may be established based on background.*"[584] Here, more comprehensive, representative, and contemporaneous data regarding background conditions demonstrates that the CULs established for total PCBs and dioxins/furans) should be modified to be achievable and cost-effective.

b. Arsenic

EPA needs to further evaluate and establish arsenic's background-based sediment CUL during remedial design and modify the ROD to reflect this change. Although the 2018 PDI surface sediment data generates a 95 upper confidence limit of 4 mg/kg for arsenic in sediment, this background value is likely not representative of watershed-wide, naturally occurring inputs of arsenic to the Site. For example, the mean background concentration of arsenic in Southern Willamette Valley soils is approximately 20 mg/kg[585] and ODEQ reports regional arsenic background concentrations in soils as 8.8 mg/kg in the Portland basin and 18 mg/kg in the south Willamette Valley.[586] For comparison, the mean arsenic concentration among 2018 upstream sediment trap samples is 6.8 mg/kg and the 95 upper confidence limit is 7.8 mg/kg. The 95 upper confidence limit of all SRS samples within the Site is 5.1 mg/kg (the same value as the 95 upper confidence limit of PDI samples located outside of the ROD SMAs). Given the uncertainty, EPA should modify the ROD to permit further evaluation of arsenic's sediment CUL.

VIII. CONCLUSION

For the reasons set forth in this petition, Petitioners request that EPA modify the selected remedy for Portland Harbor consistent with the Pre-Remedial Design Investigation data. Specifically, Petitioners request that EPA: (1) update the remedial action levels for RALs for PCBs, DDx, and the three D/F congeners per the table included in Section IV.A.3; (2) fix the remedy specifications, decision tree, and "applicable" or "relevant and appropriate" requirements;

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[583] PDI Rep. at 33.
[584] EPA, OSWER, *Role of Background in the CERCLA Cleanup Program*, (OSWER Directive 9285.6-07P) at 7, fn. 6 (April 26, 2002) (emphasis added).
[585] Hurtado, H.A., Naturally Occurring Background Levels of Arsenic in the Soils of Southwestern Oregon (2015).
[586] Oregon Department of Environmental Quality, Development of Background Metals Concentrations in Soil (2013).

and (3) update the groundwater cleanup levels for arsenic and manganese. Such a modification would address the most critical deficiencies in the remedy while achieving the same protection of human health and the environment sought in the 2017 Record of Decision, while minimizing disruption to the community and achieving many of the key goals of the Superfund Task Force.

If EPA is unwilling to issue an ESD or ROD amendment implementing Petitioners' limited request, the Petitioners request a determination as to the full suite of changes to the remedy that are supported by the PDI Data Evaluation report and outlined in this Petition and modify the Portland Harbor remedy accordingly. Failure to take action to correct the remedy would be arbitrary and capricious.