September 6, 2016

ATTN: Harbor Comments
United States Environmental Protection Agency
805 SW Broadway, Suite 500
Portland, OR 97205

Re: Portland Harbor Superfund Site: Kinder Morgan Energy Partners, L.P.'s Comments on Proposed Plan

Dear Sir or Madam:

Kinder Morgan Energy Partners, L.P. ("Kinder Morgan") appreciates the opportunity to provide comments on EPA's June 6, 2016 Proposed Plan and draft final Feasibility Study for the Portland Harbor Superfund Site ("Proposed Plan" and "2016 FS").

Kinder Morgan is an energy infrastructure company with a substantial presence in the Pacific Northwest. We handle a variety of bulk products and liquid materials at our terminals, including two petroleum terminals and one bulk export terminal within the Portland Harbor. According to the Port of Portland, Kinder Morgan's soda ash export facility at Terminal 4 is the most active ship berth in the Portland Harbor and the largest export gateway for soda ash in the United States.[1]

Kinder Morgan is committed to being a good corporate citizen and conducting ourselves in an ethical and responsible manner. We spend hundreds of millions of dollars each year on integrity management and maintenance programs to operate our assets safely and to protect the public, our employees, contractors and the environment. Since Kinder Morgan began operating in the Portland area in the late 1990s, we have made significant capital investments and upgrades to our facilities, many of which were originally constructed in the early 1900s. Additionally, from the outset until today, Kinder Morgan has cooperated with Oregon Department of Environmental Quality to identify, control and remove potential sources of legacy contaminants at its liquids terminal facilities, which have been in operation for nearly 100 years.

Kinder Morgan is a member of the Lower Willamette Group (LWG), a group of ten parties that signed agreements with EPA to conduct the remedial investigation and feasibility study for the Portland Harbor and four other parties that have contributed financially to the project. The LWG is only a small subset of the more than 140 potentially responsible parties identified by EPA. Nevertheless, over the past sixteen years, Kinder Morgan has contributed significant funding, resources and time to support the LWG's work on the remedial investigation, baseline risk assessments and 2014 draft feasibility study, all of which have provided a solid foundation for EPA to select a protective,

[1] Source: World Institute for Strategic Economic Research (WISERTrade)

achievable and cost-effective remedy for the Portland Harbor. Unfortunately, EPA's 2016 FS and Proposed Plan do not meet these objectives.

The Lower Willamette Group has submitted extensive comments on the Proposed Plan and 2016 FS, which Kinder Morgan supports and hereby incorporates by reference. The PCI Group[2] has also submitted comments on the Proposed Plan and 2016 FS, which Kinder Morgan also supports.

Despite the significant technical and legal flaws in EPA's 2016 FS and Proposed Plan, Kinder Morgan supports EPA's efforts to continue moving towards a final remedy. We believe the LWG's work to date has provided EPA with the information it needs to produce a protective, scientifically sound, cost-effective remedy that can be constructed in the next few years rather than over the next few decades. With that goal in mind, EPA should incorporate these recommendations into its final remedy and publish a Final Record of Decision in 2017.

Enclosed please find Kinder Morgan's additional comments on EPA's 2016 FS and Proposed Plan. Please contact me at 303-914-4634 if you have questions about this letter or the attached comments.

Sincerely,

for Nancy Van Burgel
Assistant General Counsel, Senior Environmental

cc: Mark Schneider, Perkins Coie LLP

Enclosure

[2] Kinder Morgan is a member of the Participation and Common Interest (PCI) Group, a group of businesses and federal, state and local public entities participating in a voluntary mediation process to allocate cleanup costs for the Portland Harbor.

Kinder Morgan Energy Partners, L.P.'s
Comments on the Proposed Plan and draft Final Feasibility Study for the Portland Harbor Superfund Site

September 6, 2016

Overview

Kinder Morgan submits the following comments on EPA's June 8, 2016 Proposed Plan (Proposed Plan) and draft final Feasibility Study (2016 FS) for the Portland Harbor Superfund Site (Portland Harbor). As is set forth in more detail below:

1. Risk management decisions and associated remedial goals should reflect site-specific uses and conditions within the Portland Harbor.

    a. Exposure scenarios should be revised to reflect realistic exposure frequencies.

    b. Neither the recreational beach user nor the tribal fisher exposure scenario should be applied to establish a site-wide cPAH PRG, because much of the Portland Harbor is designated for industrial use and public access is limited.

    c. EPA should revise the PRG for cPAHs using the same approach that was followed for the Lower Duwamish Waterway.

2. EPA should consider the limited bioavailability of PAHs in developing remedial goals for cPAHs and total PAHs.

3. EPA should revise the SDU boundaries in the vicinity of Willbridge Cove to avoid unnecessary remediation.

4. EPA should revise downstream RALs to address actual risks and to avoid recontamination from upstream areas with less stringent RALs.

5. EPA should redraw groundwater plumes to accurately reflect data from source control activities and findings from the RI.

6. EPA should identify how the presence of contaminated groundwater impacts sediment remediation goals and technology assignments.

7. EPA should identify the compliance point for the groundwater and porewater PRGs.

8. EPA should abandon its inclusion of riverbanks as part of the sediment remedy and allow DEQ to complete its source control efforts. At a minimum, riverbank

remedial decisions should be based on accurate data that reflect source control efforts to date.

9. If riverbank remediation is included in the final remedy, EPA should accurately depict contaminated river bank areas for each alternative and revise its technology decision tree for contaminated riverbanks.

10. The non-detect PCB SMA near the Kinder Morgan Linnton Terminal should be eliminated because it relies on the inaccurate use of unreliable data.

11. The PRG for TPH-diesel in groundwater and pore water is neither supported in the administrative record nor technically defensible and should be eliminated.

12. Consistent with its own conclusions, EPA should eliminate the TPH-diesel PRG for the identification of benthic toxicity areas.

13. The EPA background level for cPAH should be revised to reflect anthropogenic sources immediately upstream of the investigation area.

14. EPA should identify all Sediment Decision Units by their associated river mile rather than by "associated key upland facilities."

These comments are further explained below.

Specific Comments

1. Risk management decisions and associated remedial goals should reflect site-specific uses and conditions within the Portland Harbor.

EPA has established a site-wide preliminary remedial goal (PRG) for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) for both river bank soils and river sediments.[1] This PRG is based on exposure scenarios that are unrealistic and overly conservative when applied to Kinder Morgan facilities and a majority of the rest of Portland Harbor. EPA's site-wide approach improperly assumes, contrary to available evidence, that direct contact with sediment may occur everywhere in the Portland Harbor, without consideration to variations in land uses, site conditions and public access.

[1] There appear to be differences between the remedial goals set forth in the Proposed Plan and the 2016 FS. Specifically, the Proposed Plan incorporates a site-wide PRG of 12 µg/kg for cPAHs for both river bank soils and river sediments, presumably based on a recreational beach user scenario (Table 11, U.S. EPA 2016b). This is a significant shift from the 2016 FS, which establishes a cPAH PRG of 106 µg/kg based on a tribal fisher (direct contact) risk exposure scenario. As an initial matter, EPA should revise Table 11 to clearly identify PRGs by COC for each of the nine RAOs, rather than summarizing PRGs by one of four media subgroups (compare Table 11 in the Proposed Plan to Table B3-4 in the 2016 FS). Regardless of which exposure scenario was used to establish the cPAH PRG, Kinder Morgan believes that a site-wide PRG is inappropriate for cPAHs.

EPA's current approach is contrary to both the Portland Harbor baseline risk assessments (BLRAs) and EPA guidance. First, the exposure scenarios do not reflect realistic exposure frequencies for recreational beach users and fishers in the Portland Harbor. Second, risks to recreational beach users and fishers vary according to site use, and much of the site is currently designated for industrial uses that provide limited or no access to recreational users. Rather than establishing a single, site-wide cPAH PRG, EPA should follow the approach taken for the Lower Duwamish Waterway (LDW) Superfund site and establish multiple PRGs to reflect site-specific uses and conditions.

a. Exposure scenarios should be revised to reflect realistic exposure frequencies.

When compared to other similar sites, the exposure frequency for a recreational beach user is overly conservative. In the Portland Harbor, the majority of which is designated for industrial site uses, EPA determined that the exposure frequency for a recreational beach user is 94 days/year. This is equivalent to a beach visit nearly every weekend of the year, or spending more than a quarter of a year on the beach. According to the Portland Harbor Remedial Investigation (RI), the exposure frequency of 94 days per year is based on "best professional judgment" due to "the absence of specific information" (LWG 2013; U.S. EPA 2016a). In the absence of specific data, there is considerable uncertainty associated with this assumption. In comparison, a beach exposure scenario (child beach play) evaluated for the LDW used an exposure frequency of 64 days per year, which was based on the King County survey of non-contaminated beaches and lakes (Windward 2007). Even then, this exposure frequency was considered an overestimation of the current exposures because the survey was conducted at beaches with more amenities than LDW (Windward 2007). EPA should therefore revise the recreational beach user exposure frequency to accurately reflect site-specific conditions.

Similarly, the tribal fisher direct contact exposure scenario is overly conservative. EPA adopted the assumption that a person would fish for 260 days per year every year for 70 years and, during every single visit, would cover his or her hands and forearms with sediment and ingest sediment when pulling up fishing lines or anchors. The exposure duration for the tribal fisher of 260 days is applied site-wide, which is not supported by any cited documents in the RI. Additionally, the assumption that a fisher would be covered with and ingest river-bottom sediments while fishing from a boat is unsupported. Further, these assumptions are not realistic, which is especially true for industrial areas of the river, including places like Kinder Morgan's Linnton Terminal and Port of Portland's Terminal 4, where there are no recreational beach users and where fishers are rarely spotted (See Appendix A, Letter to EPA from Mark Price, Director of Operations, Kinder Morgan West Coast Region).

b. Neither the recreational beach user nor the tribal fisher exposure scenario should be applied to establish a site-wide cPAH PRG, because much of the Portland Harbor is designated for industrial use and public access is limited.

EPA's site-wide application of a single PRG for both river bank soils and river sediments is inconsistent with EPA's own risk assessment guidance, which specifically instructs risk

assessors to characterize the exposure setting "with respect to the general physical characteristics of the site and the characteristics of the populations on and near the site" (U.S. EPA 1989). EPA's approach is also inconsistent with the Portland Harbor Baseline Human Health Risk Assessment (BHHRA). The BHHRA estimated "current and future risks for exposure within the Study Area, based on known and reasonably anticipated future uses of the Study Area," and evaluated recreational beach exposures only for specific areas identified as beaches, rather than for the entire Portland Harbor (Map 2-1 in LWG 2013 [Figure 1]).

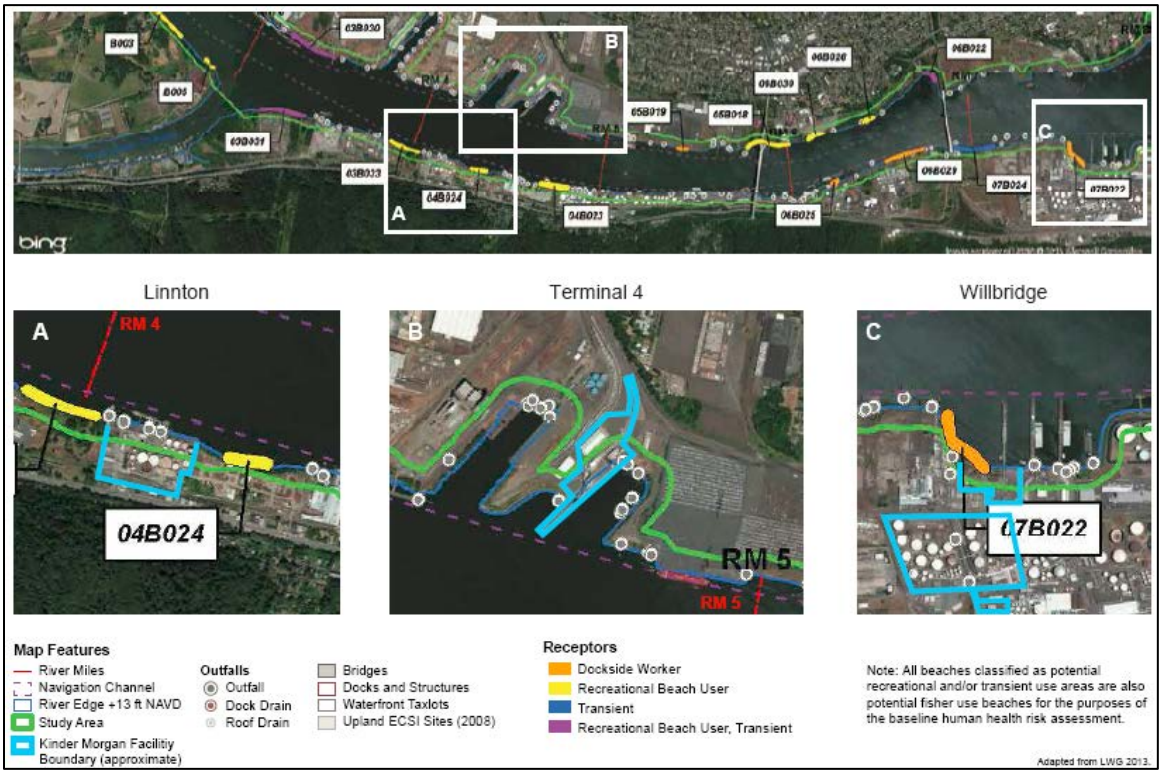

Figure 1. Designated potential human use areas for risk assessment (Map 2-1 adapted from LWG 2013). Yellow lines indicate areas where the recreational beach exposure scenario was evaluated. Recreational beaches are not present at Kinder Morgan facilities.

Much of the site use within the Portland Harbor is industrial, including Kinder Morgan facilities (Figure 2). The RI states that "[t]he majority of the shoreline in the study area is currently zoned for industrial land use and is designated by the City of Portland as an 'Industrial Sanctuary,' with associated industrial and commercial worker activities." (U.S. EPA 2016a). According to the current Portland Comprehensive Plan, Portland Harbor—including much of its riverbanks— is designated as prime industrial area (City of Portland 2016). The RI also recognizes that recreational activities, such as beach use, are associated with public access areas rather than privately owned or operated industrial facilities (U.S. EPA 2016a).

A recreational beach user exposure scenario should not be used to establish site-wide cleanup goals for the Portland Harbor. Recreational beach use is not realistic or possible in most areas of the Portland Harbor, where shorelines are steep, covered with rip-rap, and are restricted due to heavy industrial operations. Although a PRG based on ingestion/direct contact with in-water sediments by tribal fishers presents a more likely exposure scenario than the recreational beach exposure scenario, the scenario cannot be uniformly applied throughout the site.[2]

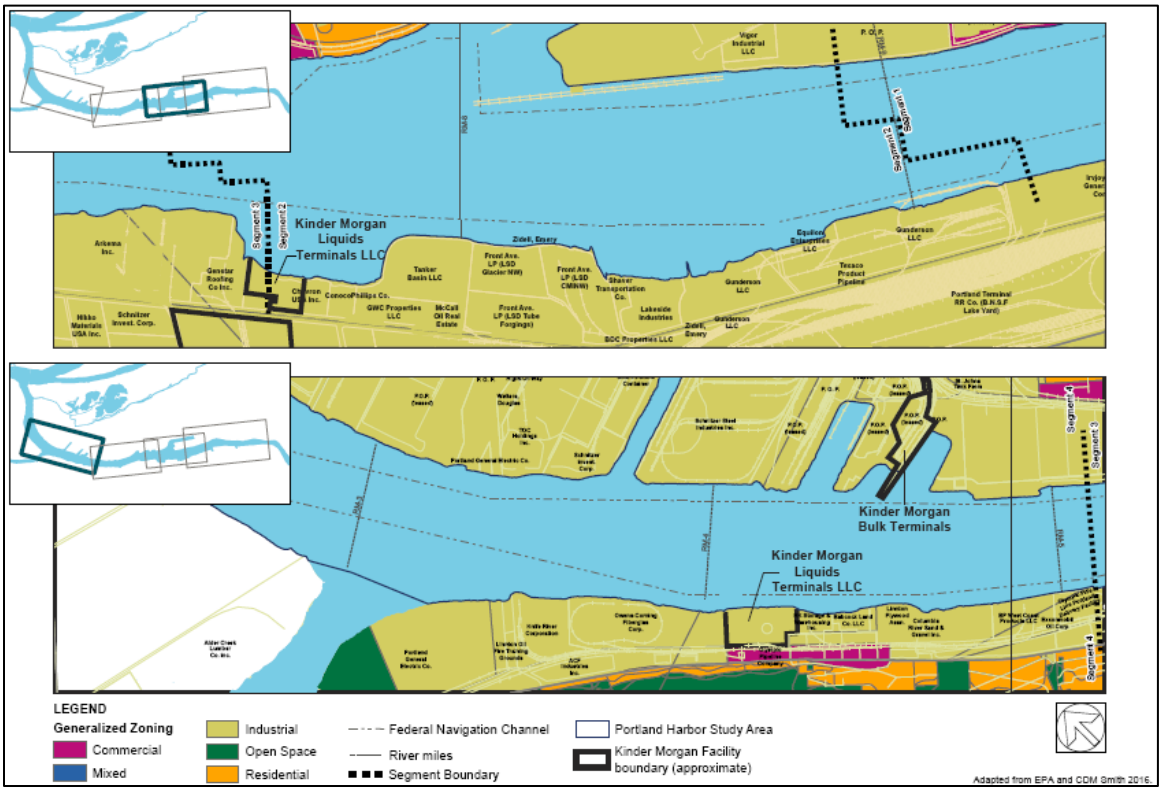

Figure 2. Kinder Morgan facilities are located in industrial zones (adapted from Figures 1.2-1b,d from U.S. EPA and CDM Smith 2016).

For example, at Terminal 4, Slip 3, there is no public access to the shoreline due to Port security policies and the industrial operations at Slip 3 (See Appendix A: Letter to EPA from Mark Price, Director of Operations, Kinder Morgan West Coast Region). Further, current and future marine terminal uses make fishing in and around the slip virtually impossible.

Similarly, there is no public access via land at the Kinder Morgan Linnton Terminal facility, and the steep shoreline and the rip-rap armoring along the bank create an undesirable environment for beach activities and near-shore fishing (CH2M 2015). In summary, the industrial nature of operations at both the Kinder Morgan Linnton and Terminal 4 facilities

[2] The recreational beach exposure scenario overestimates exposures at industrial riverbanks, and should not be applied to them. EPA should eliminate the riverbank PRG (see Comment 8).

prevents people from coming into contact with potentially contaminated riverbanks and near shore sediments at rates anticipated by both the recreational beach user and tribal fisher direct contact exposure scenarios.

c. EPA should revise the PRG for cPAHs using the same approach that was followed for the Lower Duwamish Waterway.

Rather than establishing one site-wide PRG regardless of site use, EPA should follow its more rigorous and specific risk management approach used for the Lower Duwamish Waterway (LDW). The Record of Decision for LDW specifies three cPAH PRGs, all of which are applicable to different uses and areas of the LDW: "LDW–wide," "all clamming areas," and "individual beaches" (U.S. EPA 2014). Further, these cPAH PRGs are higher than PRGs for Portland Harbor: 380 µg/kg, 150 µg/kg, and 90 µg/kg for LDW-wide, clamming areas, and individual beaches, respectively. EPA should take a similar approach for Portland Harbor and establish different PRGs that would be consistent with specific and varying uses within the Portland Harbor.

2. EPA should consider the limited bioavailability of PAHs in developing remedial goals for cPAHs and total PAHs.

The current and widely accepted approach to evaluating exposures of chemicals is focused on their "bioavailability." The National Research Council has recommended that bioavailability be incorporated into decision making at Superfund sites (NRC 2003; LWG 2013). EPA's sediment remediation guidance also indicates that site-specific remedial goals should incorporate factors such as bioavailability of contaminants (U.S. EPA 2005), and EPA has published comprehensive guidance that addresses how bioavailability should be considered (U.S. EPA 2012).

Bulk sediment concentrations for PAHs, including carcinogenic PAHs, can greatly overestimate the actual risk exposure that an organism experiences because, based on their limited bioavailability, only a fraction of PAHs are actually available for exposure. Exposure to PAHs from soils and sediments is related not only to their concentrations, but also to how tightly bound PAHs are to soils and sediments. Bioavailability is also affected by the types of source materials in which PAHs are present (e.g., coal tar pitch, coal, asphalt) and to the amount of organic material and presence of soot or other materials in sediments (Ruby et al. 2016).[3]

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[3] It is well understood that in soils and sediments, PAHs partition between natural organic carbon present in soils/sediments and porewater, and also adsorb strongly to "anthropogenic carbon" such as black carbon (e.g. soot) or to pitch (U.S. EPA 2012). This partitioning and/or adsorption behavior limits the solubility of PAHs in water and reduces the fraction of PAHs available for exposure (Ruby et al. 2016; Khalil et al. 2006). Directly related to the risk from PAHs is the fact that bioavailability and sediment toxicity relate directly to the freely dissolved porewater concentrations derived from sediments rather than from sediment total concentrations (U.S. EPA 2012). This concept has been incorporated into sediment benchmarks establishment for the protection of benthic organisms (U.S. EPA 2012); recent studies also suggest that bioavailability of coal tar pitch PAHs via dermal contact is limited (Xia et al. 2016). A similar correlation,

It appears that EPA did not consider bioavailability when establishing remedial goals for PAHs in the Portland Harbor (Appendix B in U.S. EPA and CDM Smith 2016). Instead, remedial goals for PAHs were developed based on generic sediment quality values or bulk sediment concentrations (U.S. EPA 2008; U.S. EPA and CDM Smith 2016). The lack of consideration of bioavailability is contrary to the uncertainty analysis in the Portland Harbor risk assessment, which states, "it is important to recognize that there is uncertainty associated with not incorporating bioavailability into the risk estimates, especially related to sediment-associated chemicals" (LWG 2013). It is also inconsistent within the Proposed Plan's remedial action objectives (RAOs). Although the concept of bioavailability is an integral component of each RAO, bioavailability of contaminants is not considered in the establishment of remedial goals in the 2016 FS or the Proposed Plan.

EPA should consider bioavailability when finalizing remedial goals for the Portland Harbor. This is especially true in places like Terminal 4, Slip 3, where pencil pitch was historically handled. PAHs in coal tar pitch-based materials, including pencil pitch, strongly partition to the pitch matrix, which limits bioavailability of PAHs (Khalil et al. 2006; Xia et al. 2016). Further, black carbon, or soot, is widely present in sediments and further limits the bioavailability of PAHs (U.S. EPA 2012). In other words, because PAHs in pencil pitch adhere to the sediments in Slip 3, they present very limited risk to the benthic organisms and to people who may come into contact with them by either touching or ingesting them. Ignoring bioavailability implications in places like Terminal 4, Slip 3 will result in a larger remediation footprint than is necessary to protect benthic organisms and people from unacceptable risks.

3. EPA should revise the SDU boundaries in the vicinity of Willbridge Cove to avoid unnecessary remediation.

Under the Proposed Plan, fourteen individual regions of the river within the Site were designated as Sediment Decision Units (SDUs). SDUs are generally identified as areas with the highest focused contaminant of concern (COC) concentrations over one river mile segments where multiple contaminants and/or benthic risk were identified (Appendix D9, U.S. EPA and CDM Smith 2016; U.S. EPA. 2016b). The SDU boundaries appear to be determined based on rolling averages and then placing "boxes" to encompass river segments where the rolling river mile contaminant concentrations were the highest. The Proposed Plan also provides that "[t]he SDUs were confirmed through evaluation of site data for each of the COCs identified in the FS" (U.S. EPA and CDM Smith 2016).

Despite EPA's confirmation efforts, certain SDU boundaries result in relatively clean areas of the river being associated with highly contaminated areas, thus leading to a larger remediation footprint than is needed to adequately address risks. This is especially true for Willbridge Cove (RM 7.5-7.9W), which exhibits relatively low levels of COCs, but which has inexplicably and improperly been assigned to the same SDU as the highly contaminated

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between dermal absorption of PAHs and aqueous concentrations (rather than total concentrations), was recently reported (Xia et al. 2016).

sediments adjacent to the former Arkema facility (SDU RM7W) (Figures 9 and 20 in U.S. EPA and CDM Smith 2016). According to the 2016 FS, SDU RM7W was established to address three focused COCs: DDX, PeCDF, and TCDD, none of which are present in high concentrations in Willbridge Cove. Rather, the rolling river mile average in Willbridge Cove is influenced by the much higher COC concentrations and sample density adjacent to the former Arkema facility (U.S. EPA and CDM Smith 2016). The RI data confirm that many of the samples in Willbridge Cove have COC concentrations that are several orders of magnitude lower than those adjacent to Arkema (Figures D9-3c-f, U.S. EPA and CDM Smith 2016 and Figure 3 below). Based on the relative difference in concentrations between the neighboring areas of the river, it appears that EPA did not consider site data in and around Willbridge Cove before establishing SDU boundaries.[4]

As a result, the Proposed Plan applies the more intensive Alternative F remedial action levels (RALs) to all of SDU RM7W, resulting in unnecessary remediation in Willbridge Cove. The fact that much of Willbridge Cove COC concentrations appear to be similar to or lower than concentrations in the upriver SDU RM9W, for which less stringent RALs have been applied based on Alternative E, indicates that Willbridge Cove should not be part of the same SDU as the sediments adjacent to Arkema. Instead, EPA should conduct an analysis to optimize the SDU RM7W boundary by evaluating the risk reduction achievable by active remediation and then redraw the SDU RM7W boundary to eliminate unnecessary active remediation. This would increase the cost effectiveness of the remedy without impacting protectiveness.

[4] This is especially troubling given that EPA's SDU approach is inconsistent with its prior approach that it directed LWG to evaluate in the earlier version of the FS. Instead of SDUs, the LWG's draft 2012 FS identified areas of potential concern (AOPCs): "[t]he broadest identification of the areal extent of potentially unacceptable contaminant levels in sediments is termed AOPC" (p. 5-1, LWG 2012). AOPCs allowed for distinction between areas of higher and lower concentration (e.g. AOPC 14 adjacent to Arkema and AOPC 16 in Willbridge Cove) as opposed to lumping them together as EPA has done in the current FS (Figure 4, bottom panel). It is unclear why EPA abandoned its prior direction and replaced it with an approach that will result in a less cost effective remedy.

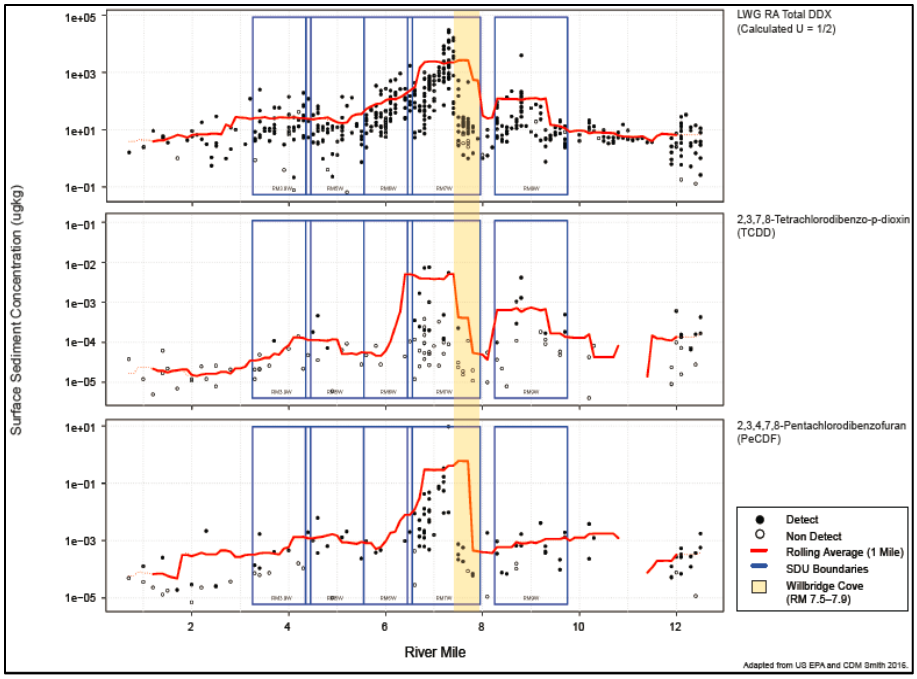

Figure 3. West side rolling river mile averages for DDX, TCDD, and PeCDF compiled from U.S. EPA and CDM Smith (2016). The red line represents the rolling river mile average, black dots (open or filled) are site data, and blue lines are the SDU boundaries. The yellow highlighted area corresponds to the approximate Willbridge Cove (~RM 7.5-7.9).

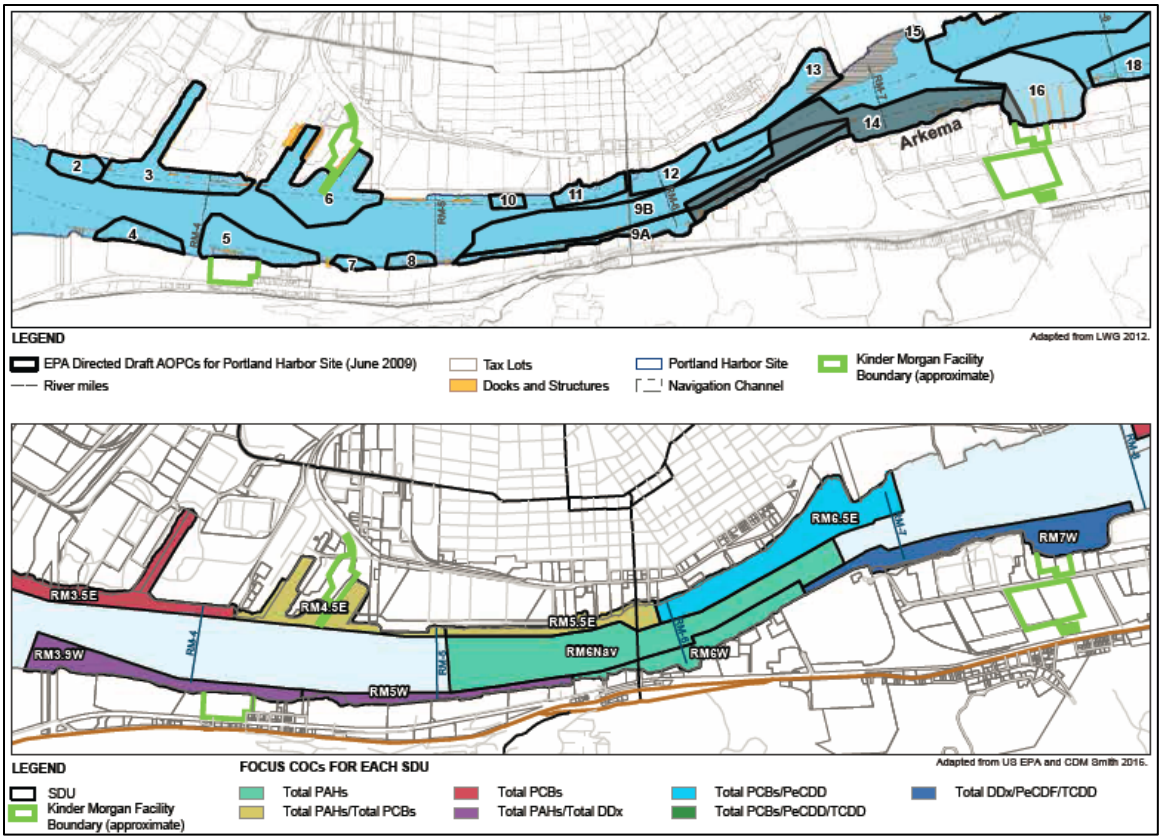

Figure 4. Comparison of AOPCs (top panel, adapted from Figure 5.1-1 in LWG 2012) and SDUs (bottom panel, adapted from Figure 4.1-2 in U.S. EPA and CDM Smith 2016).

4. EPA should revise downstream RALs to address actual risks and to avoid recontamination from upstream areas with less stringent RALs.

EPA's approach to designating certain alternatives/RALs to the various SDUs is unclear. Although EPA states that it "optimized" [5] the remedy by modifying alternatives for certain SDUs like RM7W and RM6W (Koch 2015), it is unclear whether EPA included all SDUs in this optimization approach. For example, in the Proposed Plan, EPA's optimized alternative approach results in "downgrading" SDU RM6W from Alternative E to Alternative D, which results in a lower RAL being applied in and around the former GASCO facility than is applied for the downstream SDUs, including RM3.9W (Figure 9 in U.S. EPA 2016b; Figure 5

[5] The term "optimized" was first used in EPA Region 10's presentation to the National Remedy Review Board and the Contaminated Sediments Technical Advisory Group (Koch 2015). EPA set some goals for an "optimized alternative" and then modified the RALs for select SDUs. According to the NRRB comment letter to Region 10, NRRB understood that "[t]he Region made these modifications [to SDUs] to ensure that risk levels throughout the site will be within the risk range (between 10^{-4} and 10^{-6}) or less than a non-cancer hazard quotient of 10 for individuals [*sic*] COCs for child exposure. In addition, all PTW will still be addressed" (Legare and Ells 2015).

below). In other words, the upstream RAL for total PAHs is nearly twice the downstream RAL.[6]

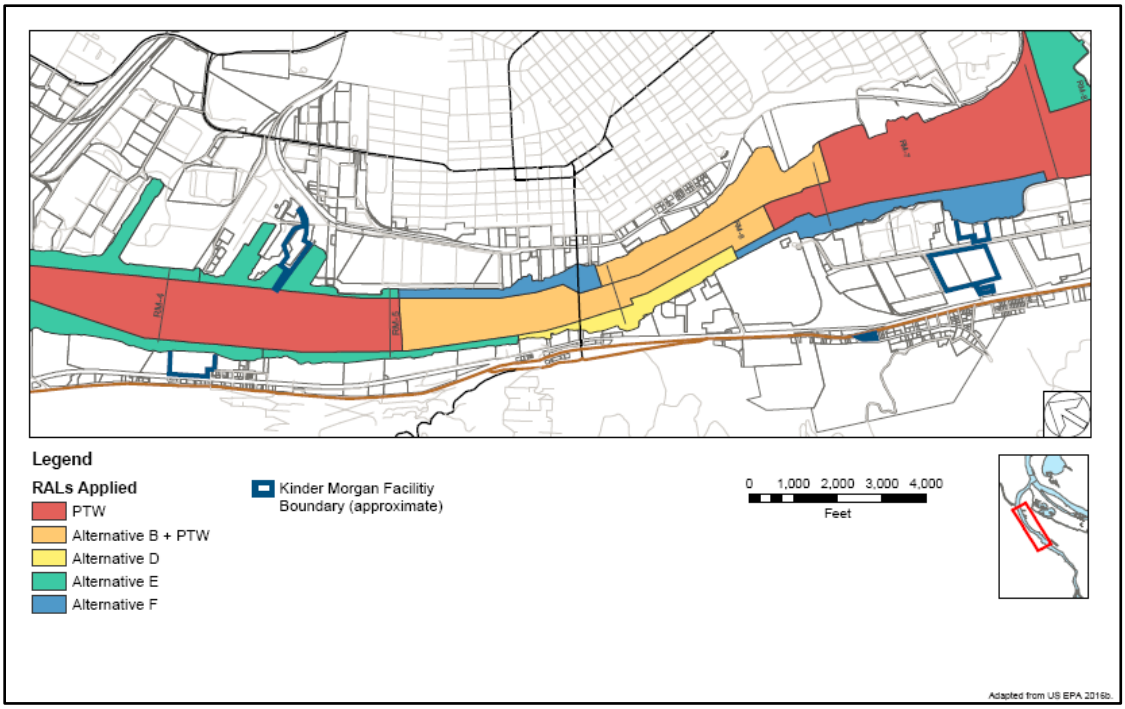

Figure 5. RALs applied to different SDUs. Alternative D RALs are applied to SDU RM6W (top panel, yellow SDU) while more stringent Alternative E RALs are applied to SDUs downstream (Figure 9 adapted from the Proposed Plan [U.S. EPA 2016b]).

Leaving elevated COC concentrations in the sediment in SDU RM6W has the potential to impact downstream sediments. Specifically with regard to total PAHs, the significant difference in RALs effectively means that upriver areas will remain more contaminated than downriver areas, potentially leading to recontamination of downriver sediments.

Also, as EPA has recognized, contaminated sediment particles can be mobilized and deposited downstream of the area being dredged. "A combination of silt and bubble curtains was unable to prevent multiple water quality criteria exceedances downstream of the 2005 Gasco removal action involving NAPL… ; thus, more rigorous controls will be necessary for removal of this material from the Site" (U.S. EPA and CDM Smith 2016).

Much higher total PAH concentrations are present adjacent to SDU RM6W than adjacent to SDU RM3.9W (Figure 6). Further, higher total PAH-concentration sediments at the dredged surface can be transported downstream by forces caused by river flow. Because of the likely phased approach to the Portland Harbor remediation (i.e. upriver areas are remediated before downriver areas), there is significant potential that SDU RM6W

[6] The Alternative D total PAH RAL is 69,000 µg/kg while Alternative E total PAH RAL is 35,000 µg/kg (Table 13, U.S. EPA 2016b).

sediments will continue to impact downstream areas of the river, both during and after the dredging at SDU RM6W.

EPA should revise downstream RALs to prevent recontamination from upstream areas with less stringent RALs. Indeed, since active remediation in the SDU RM3.9W is limited (and in part erroneously based on non-detect PCB result; see Comment 10 below), the application of the higher RAL to SDU RM3.9W would result in equal residual risks regardless of using Alternative E or Alternative D RALs. Since the residual risks immediately after active remediation are the same between Alternatives D and E for RAOs 1 and 2 for SDU RM3.9W (Figures 4.2-1b and 4.2-3c, U.S. EPA and CDM Smith 2016; Figure 7 below), application of Alternative D RALs to SDU RM3.9 would be equally protective. In fact, even applying an Alternative A RAL (no action) would be equally protective as Alternative E (Figure 7) in SDU RM3.9.

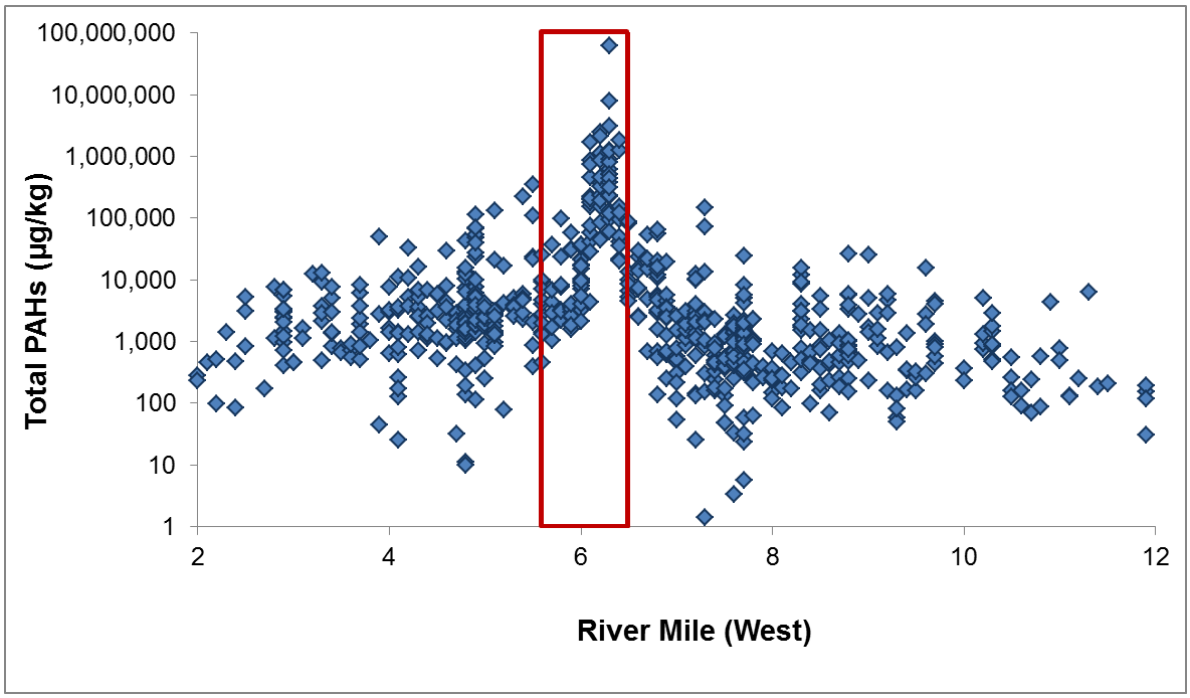

Figure 6. Total PAH concentrations in surface sediments on the west shore of the Willamette River (navigation channel excluded). Total PAH concentrations are the highest adjacent to SDU RM6W (RM5.6 - 6.5W), directly adjacent to the former GASCO facility.

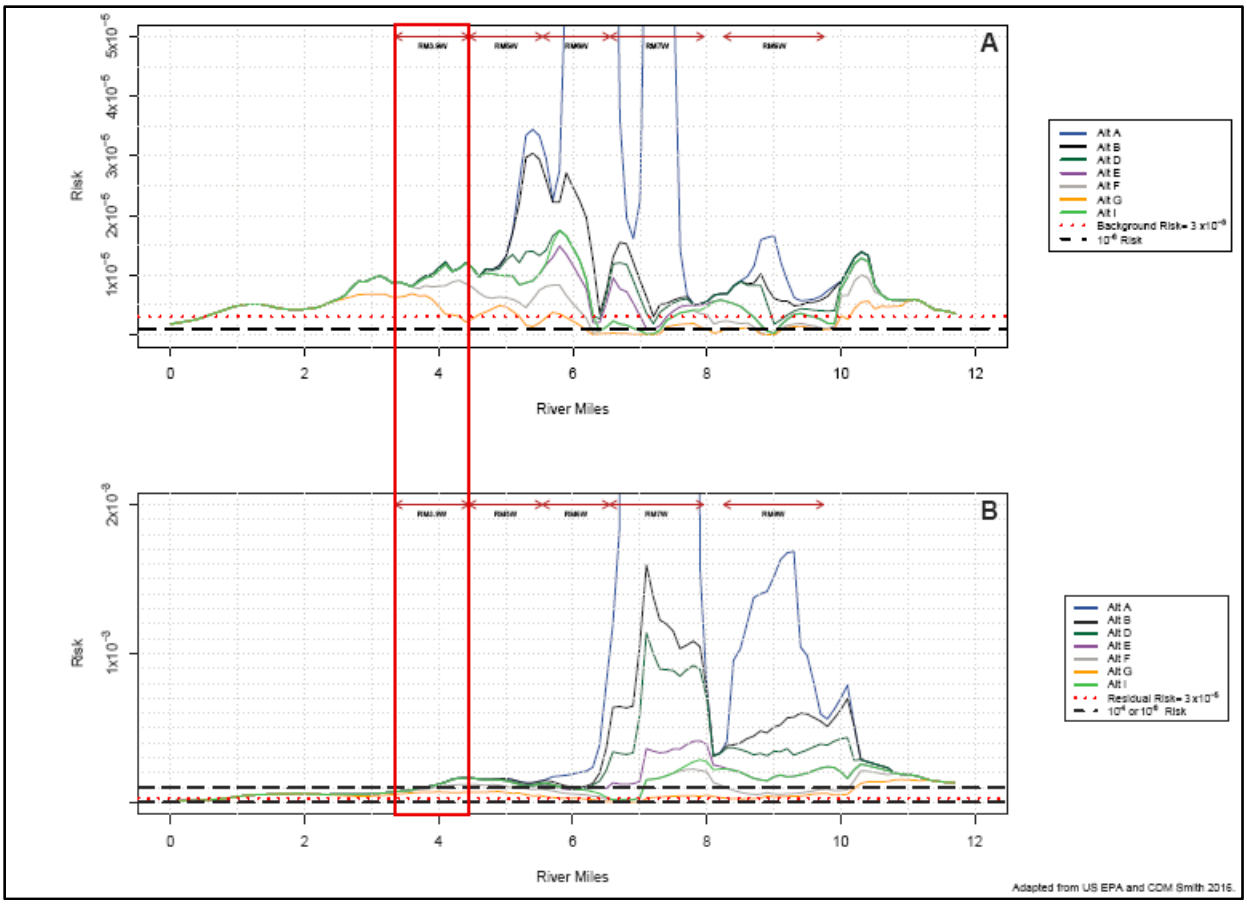

Figure 7. Residual risks for RAO 1 (top panel) and RAO 2 (bottom panel) immediately after construction. Residual risks for SDU RM3.9W (shown in red box) are the same for Alternatives A through E for both RAOs. Adapted from Figures 4.2-1b and 4.2-3c (U.S. EPA and CDM Smith 2016).

5. EPA should redraw groundwater plumes to accurately reflect data from source control activities and findings from the RI.

The Proposed Plan should account for previously implemented and ongoing source control efforts at upland facilities, as well as data from the RI. As written, Figure 5 of the Proposed Plan inaccurately depicts groundwater plumes in the vicinity of the Kinder Morgan Linnton Terminal, Terminal 4 Slip 3, and certain areas within Willbridge Cove (U.S. EPA 2016b).

Figure 5 of the Proposed Plan depicts a groundwater plume covering most of the Kinder Morgan Linnton Terminal, including the upland areas in and around the Terminal (see Figure 8, below). However, DEQ's Portland Harbor Upland Source Control Summary Report Update confirms that the groundwater pathway at the Kinder Morgan Linnton Terminal facility is controlled, with a source control decision anticipated later this year (Figure 9, ODEQ 2016).

Similarly, Figure 5 of the Proposed Plan shows a groundwater plume at the head of Terminal 4, Slip 3 (Figure 8), despite the fact that groundwater is not identified as an uncontrolled pathway for that area (Figure 9, ODEQ 2016).

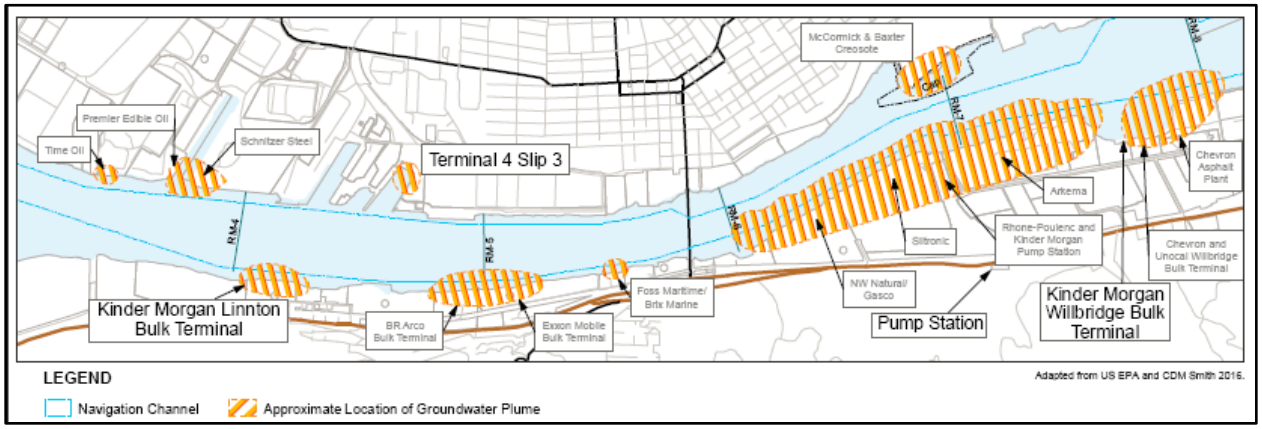

Figure 8. Groundwater plumes exaggerated by EPA (adapted from Figure 5 in U.S. EPA 2016b)

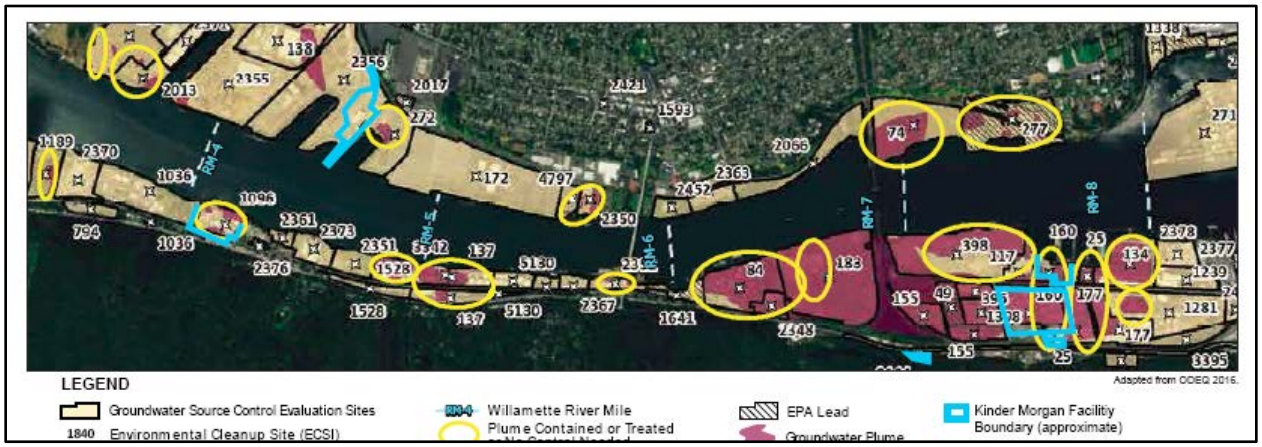

Figure 9. Groundwater plume locations and degree of containment/treatment (ODEQ 2016). According to ODEQ, groundwater plumes are contained or treated at Kinder Morgan Facilities.

EPA also ignores the groundwater discharge data collected during the RI in the depiction of groundwater plumes in the Proposed Plan, and ignores its own groundwater plume map (Figure 10 below, adapted from Map 4.4-3 in U.S. EPA 2016a). Although a groundwater discharge zone exists at Kinder Morgan Linnton Terminal facility, the zone is small and limited to the southern portion of the Linnton Terminal shoreline within the dock structure and riverward of the barrier wall, rather than covering the entire facility shoreline as is inaccurately depicted in Proposed Plan's Figure 5. Further, the RI notes that migration of contaminants to the river via the groundwater pathway at Linnton, if any, is limited to low levels of PAHs. "The combined lines of evidence suggest some possibility that low levels of PAHs in upland groundwater may be migrating to the transition zone in the groundwater discharge zone offshore of the Kinder Morgan Linnton site. For other upland groundwater

COIs at this site, however, there is no evidence of a complete and significant transport pathway to the TZW environment" (U.S. EPA 2016a). EPA should revise Proposed Plan Figure 5 to accurately reflect the findings from the RI and the recent source control information from ODEQ.

EPA should further revise Proposed Plan Figure 5 to either delete or accurately identify source areas for groundwater contamination. The plume labeled "Rhone-Poulenc and Kinder Morgan Pump Station" is inaccurate and misleading. The Kinder Morgan Pump Station is located upgradient/west of Highway 30 and more than 2,800 feet from the Willamette River (see Figure 8). Groundwater contamination associated with the facility has been fully delineated and shown to have no connection to any properties downgradient of Highway 30, including the former Rhone Poulenc facility and the Willamette River (Antea 2016). DEQ has confirmed that the groundwater and surface water pathways for the Kinder Morgan pump station are controlled (ODEQ 2016).

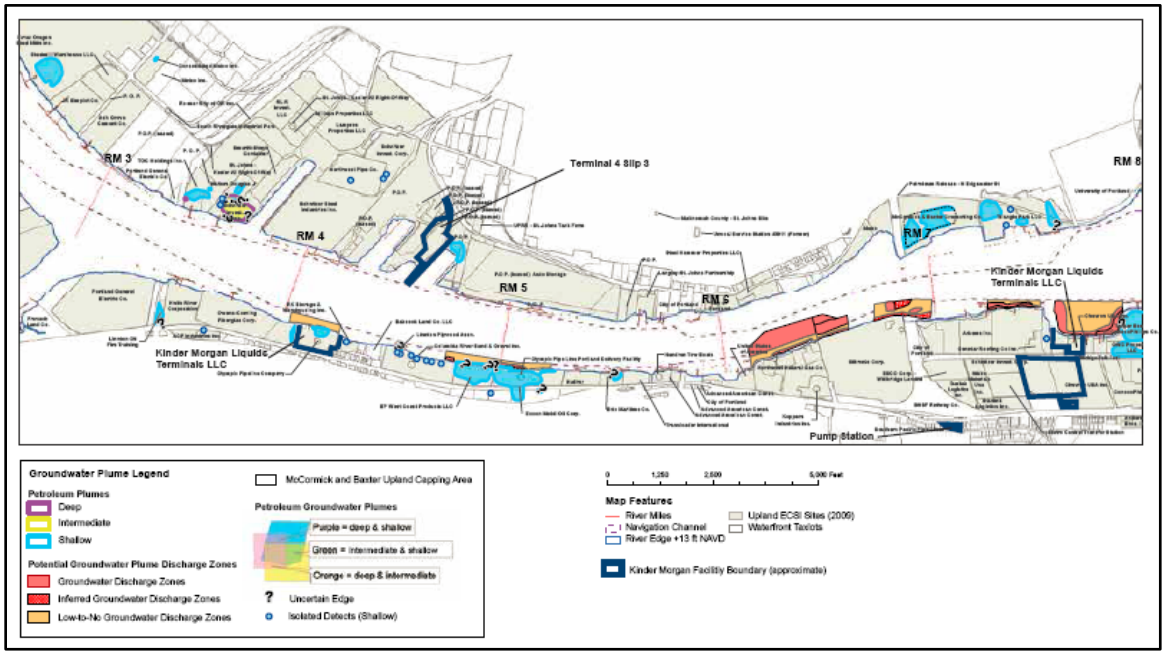

Figure 10. Petroleum groundwater plumes and groundwater discharge zones. Small groundwater petroleum plumes are present at Kinder Morgan Linnton Terminal. Sediments adjacent to Kinder Morgan Linnton terminal are mostly classified as low-to-no groundwater discharge zone (U.S. EPA 2016a). No other plumes were present at Linnton Terminal (U.S. EPA 2016a).

6. EPA should identify how the presence of contaminated groundwater impacts sediment remediation goals and technology assignments.

EPA should clearly identify the relationship between contaminated groundwater and remedial technology assignments for adjacent sediments. According to the 2016 FS:

> *Areas with groundwater contamination that exceed the PRGs or have the potential to exceed the PRGs for pore water are assumed to require an in-river*

> *reactive cap that relies on activated carbon to reduce the contaminant flux and limit potential exposures in conjunction with upland source control measures to address contaminated groundwater such as hydraulic containment. A reactive cap is also assumed to be required in areas where contaminated groundwater may seep through river banks* (U.S. EPA and CDM Smith 2016).

Further, the Proposed Plan states that "[a]ll areas, including river banks, with known discharges of contaminated groundwater are assumed to require an in-river reactive cap to reduce the contaminant movement and limit potential exposures" (U.S. EPA 2016b). EPA's discussion regarding contaminated groundwater is inconsistent with the technology assignments decision trees (i.e. Figures 10a-c) in the Proposed Plan. These decision trees indicate that actively remediated sediment areas (SMAs) within the footprint of groundwater plumes necessitate reactive caps, but areas outside the SMAs are subject to monitored natural recovery (MNR). EPA should revise the text in the Proposed Plan and the 2016 FS to confirm that an exceedance of groundwater PRGs does not necessarily trigger the need for a reactive cap. Rather, only areas within SMAs will be subject to active remediation due to groundwater contamination.

7. **EPA should identify the compliance point for the groundwater and porewater PRGs.**

EPA has also proposed PRGs for groundwater that are intended to be protective of sediment and surface water for human and ecological exposures, which EPA sometimes refers to as "porewater PRGs."[7] It is unclear what the compliance point is for meeting these PRGs. Additionally, in setting the PRGs, EPA has not considered whether the porewater concentrations (if porewater is indeed the compliance point) might be driven by COC concentrations in sediments, or whether they are driven by COC concentrations in groundwater that discharges into the sediments. It is also unclear whether groundwater discharge zones exist that would warrant the PRG. For example, adjacent to the Kinder Morgan Linnton Terminal, EPA mostly identified "low to no groundwater discharge" in the sediments adjacent the Terminal, with "one small, nearshore area as a groundwater discharge zone" (Appendix C in U.S. EPA 2016a).

EPA should identify the compliance point for the groundwater and porewater PRGs. The groundwater PRGs should apply only to areas where groundwater discharge to sediments is known to occur. EPA should also take into account the fact that sediment porewater concentrations are not only influenced by COCs in groundwater, but are also influenced by COCs in sediments.

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[7] See Remedial Action Objective (RAO) 4 (Reduce migration of COCs in groundwater to sediment and surface water such that levels are acceptable in sediment and surface water for human exposure) and RAO 8 (Reduce migration of COCs in groundwater to sediment and surface water such that levels are acceptable in sediment and surface water for ecological exposure). In Table 11 of the Proposed Plan, EPA has indicated a single PRG for groundwater. In the FS, EPA refers to the RAO 8 PRG as "porewater" (U.S. EPA and CDM Smith 2016).

8. **EPA should abandon its inclusion of riverbanks as part of the sediment remedy and allow DEQ to complete its source control efforts. At a minimum, riverbank remedial decisions should be based on accurate data that reflect source control efforts to date.**

EPA's sediment remediation guidance does not address remediation of riverbanks (U.S. EPA 2005). Further, EPA did not include an investigation or analysis of riverbanks in the RI or risk assessments. Nevertheless, EPA has now chosen to incorporate riverbank remediation into the sediment remedy at Portland Harbor.

In establishing a new Remedial Action Objective (RAO) for riverbanks, EPA ignores years of source control investigation and remediation that has occurred under DEQ oversight. The riverbank data upon which EPA apparently relied are insufficient to accurately delineate the nature and extent of riverbank contamination in the Portland Harbor.[8]

For example, the Proposed Plan and 2016 FS depict "contamination" in the riverbanks along the entire Kinder Morgan Linnton Terminal facility, extending from the upriver facility boundary to the downriver facility boundary (Figure 6 in U.S. EPA 2016b). This ignores the actual data collected from the riverbanks under DEQ oversight and is misleading with regard to the extent of potential impacts present at the facility. According to DEQ, bank soils are not identified as an uncontrolled pathway for the Kinder Morgan Linnton Terminal facility (ODEQ 2016). Rather, bank soil sampling at Linnton demonstrates that contaminants in river banks at the Linnton facility were limited to a thin layer corresponding to water table and below one foot (CH2M 2015). A recent erodible soil investigation concluded that in most areas, riprap-armoring stone covers the riverbank, specifically where COC impacts to bank soil are located, and that the riverbank armoring has sufficient size and depth to prevent erosion from river currents (CH2M 2015).

Further, the Proposed Plan and 2016 FS do not include an evaluation of available riverbank data for RAL or PRG exceedances. Instead, it appears that EPA has simply identified riverbank contamination subject to remediation based on a single COC detection, without analyzing the data for PRG or RAL exceedances. For example, despite the fact that the entire Kinder Morgan Linnton Terminal shoreline has been identified as "contaminated" in the 2016 FS and Proposed Plan, none of the samples contained in the EPA riverbank database that were collected from the riverbank adjacent to Kinder Morgan Linnton Terminal during DEQ-led source control activities exceed Total PAH RALs in surface sediments.

[8] In establishing areas for riverbank remediation, EPA references Appendix A of the Proposed Plan as the source of riverbank data. Appendix A appears to be a random compilation of various data, some of which has nothing to do with riverbanks, and several of which do not even have coordinates. Appendix A also contains a disclaimer noting that the data are taken exactly as-is, from third party sources with no quality assurance or control by EPA (U.S. EPA and CDM Smith 2016).

EPA should eliminate RAO 9 from the 2016 FS and Proposed Plan. At a minimum, the Proposed Plan should reflect current riverbank conditions that are based on DEQ-led source control efforts.

9. If riverbank remediation is included in the final remedy, EPA should accurately depict contaminated river bank areas for each alternative and revise its technology decision tree for contaminated riverbanks.

EPA's approach to depicting and identifying contaminated riverbanks in the Proposed Plan and 2016 FS is inconsistent with EPA's riverbank assumptions. In the figures associated with the Proposed Plan, the extent of contaminated riverbank does not change regardless of the SMA, which gives the impression that the riverbanks require cleanup for each alternative (for example, see Figures 11a-g in U.S. EPA 2016). However, EPA has also assumed that riverbank cleanup is associated with contiguous SMAs, such that cleanup would only occur in riverbanks that are adjacent to an SMA (see, e.g., Table D2.b in U.S. EPA and CDM Smith 2016). To correct these discrepancies, the depiction of contaminated riverbanks for each alternative should be consistent with EPA's actual approach defined by that alternative.

The Proposed Plan is also inconsistent in its treatment of riverbanks. On the one hand, the Proposed Plan states that "technology assignments for SMAs adjacent to identified contaminated river banks are extended to include those riverbanks. Where SMAs are projected onto the riverbank, removal followed by capping is the assigned remedial technology." However, EPA's technology decision trees as applied to riverbanks are inconsistent with the above statement because they appear to require active remediation, regardless of the presence of adjacent sediment SMAs, when principal threat waste (PTW) is present in the riverbanks.

Specifically, the decision tree for contaminated riverbanks (Figure 10d in the Proposed Plan) appears to indicate that if PTW is present in the riverbanks (even if the riverbank is not adjacent to an SMA), riverbanks will be excavated and then covered with a significantly augmented reactive cap. EPA's decision tree appears to associate PTW with riverbanks. This is inconsistent with the Proposed Plan and 2016 FS, which identify PTW only in sediments. EPA should therefore correct the decision tree for contaminated riverbanks in the ROD and remove PTW from the riverbank decision tree altogether.

10. The non-detect PCB SMA near the Kinder Morgan Linnton Terminal should be eliminated because it relies on the inaccurate use of unreliable data.

A small area adjacent to the Kinder Morgan Linnton Terminal is currently subject to remediation by capping (Figure 11h in U.S. EPA 2016b). It appears that this small SMA is identified based on a single, non-detect PCB (Aroclor) result (274 ppb) that "exceeds" the PCB RAL for Alternative I (200 ppb)(Figure 11 below, see also Figure 1.2-6a. in U.S. EPA and CDM Smith 2016).

In particular, this PCB datum (location S3), where PCB Aroclors were not detected and which has an elevated reporting limit for Aroclor 1221 over other reported Aroclors,

should not be used to define areas for remediation. A detected PCB concentration in an adjacent surface sample (G127) collected during the RI was well below the PCB RAL for Alternative E, suggesting that PCB concentrations necessitating active remediation are not present in the vicinity of this SMA. Aroclor 1221 was not detected in this surface sample or a core sample collected at the same location (location C127), further suggesting that the Aroclor 1221 non-detect is not representative of the nature and extent of contaminants in the sediments in the vicinity of the Linnton Terminal and should not be used to determine areas to be remediated. In fact, the detection limit of the surface sample collected from S3 is higher than any other detected total PCB result in surface samples collected from the western shore of Willamette River between RM 3W and 5W.

EPA does not provide any description or discussion with regards to the use of non-detect data in their assignments of SMAs in the Proposed Plan or the 2016 FS. Further, EPA does not provide any assessment of uncertainty resulting from the use of such data. This is inconsistent with the discussion on data usability, and in particular on elevated detection limits, provided in the RI:

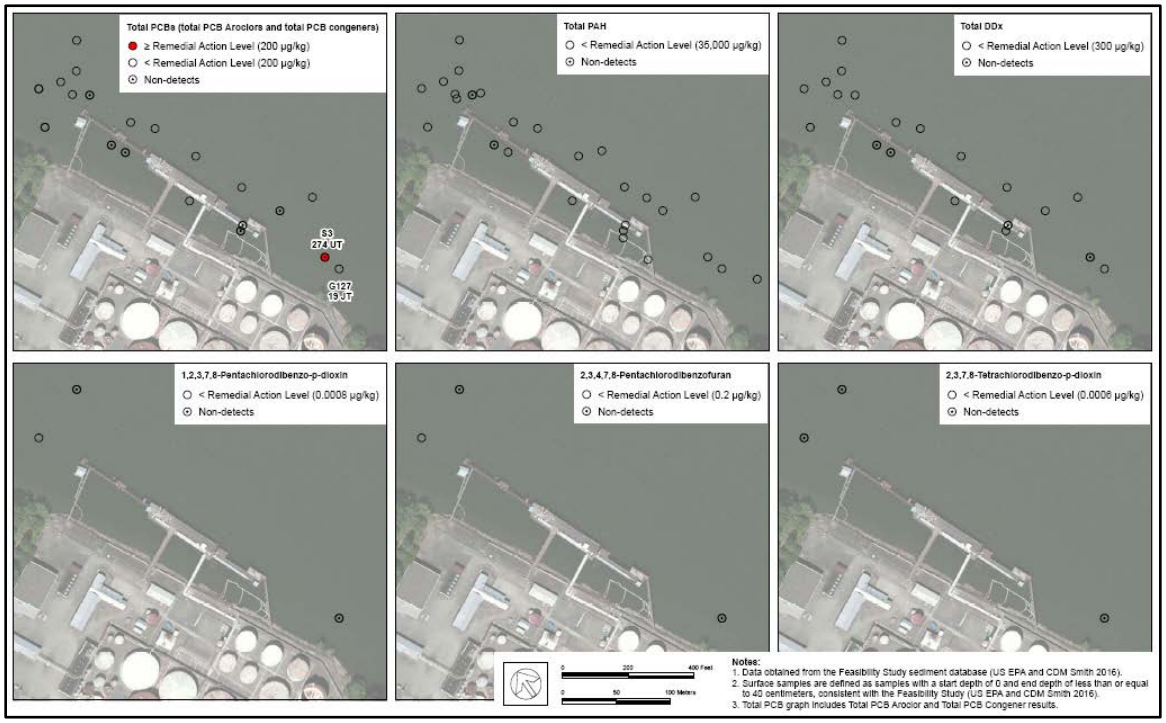

Figure 11. Alternative I RAL exceedances in sediments adjacent to Kinder Morgan Linnton Terminal, at SDU RM 3.9W. Total PCB result that exceeds the Alternative I RAL is non-detect.

> *However, the acceptability of these data [with elevated detection limits] is dependent on their specific use. For example, in the absence of other data, elevated detections limits may provide insight on the need for additional analyses for which lower detection limits are achievable. From a data-needs standpoint, however, these same data may not be useful because if*

inappropriately compared to a concentration benchmark, they could unnecessarily result in the perceived need for additional sampling and analysis (despite their attendant uncertainty in actual concentration). From a predictive risk assessment perspective, these data are recommended by USEPA to be excluded from formal risk quantification because of their uncertainty in concentration (USEPA 1989). From an applied engineering and feasibility standpoint, elevated detections limits are also not useful because they are not capable of defining with precision actual chemical concentration data that can be used to set boundaries for remedy considerations (Appendix A3 in U.S. EPA 2016a).

Given the discussion in the RI, EPA should use only data that can reliably support the delineation of areas to be remediated, and not use non-detect data for that purpose. EPA's own guidance advises that sample results with unusually high quantification limits should be removed from the dataset prior to analysis (U.S. EPA 1989). Additionally, EPA should be transparent in how non-detect data is incorporated into the 2016 FS and discuss the limitations and uncertainties associated with the use of non-detect data.

11. The PRG for TPH-diesel in groundwater and pore water is neither supported in the administrative record nor technically defensible and should be eliminated.

The FS specifically excludes TPH-diesel as a COC (U.S. EPA and CDM Smith 2016). According to the FS, "Total petroleum hydrocarbons, diesel range" was not selected as a COC because it is "[n]ot a hazardous substance; co-mingled with other hazardous substances" (Table 2.2-2 in U.S. EPA and CDM Smith 2016). Regardless, the Proposed Plan establishes a PRG for TPH-diesel of 2.6 µg/l (Table 11, U.S. EPA 2016b). This PRG should be eliminated for the following reasons:

- The use of a TPH-diesel PRG for ground water and pore water is incorrect. The PRG for TPH-diesel in ground and pore water (2.6 µg/l) was not developed for TPH-diesel in water, but instead was established for a very selective fraction of petroleum, "C10-C12_aliphatic" (U.S. EPA 2008). Therefore, it seems that EPA has either incorrectly extended the application of a PRG originally developed for C10-C12 aliphatic to TPH-diesel, or EPA has simply made a clerical mistake. TPH-diesel should not be substituted for C10-C12 aliphatic because the latter is a small fraction of diesel or gasoline (ODEQ 2003). Evaluating TPH-diesel measurement data against a C10-C12 aliphatic PRG would result in incorrect identification of ecological risks where they might not otherwise exist.
- The method by which the PRG was established has not been validated, peer reviewed or published. EPA's derivation of this 2.6 µg/l value was described in the 2008 document "Toxicity Reference Values for Portland Harbor Baseline Ecological Risk Assessment" (U.S. EPA 2008). As noted in the EPA 2008 document, limited information is available regarding the underlying toxicity values, for which EPA

provides insufficient support.[9] Further, EPA also acknowledged that "the literature on water and sediment concentrations of petroleum alkanes associated with toxicity to aquatic life is limited" (U.S. EPA 2008). EPA's modeling results have never been confirmed using bioassays.

- Given the extremely low solubility of these compounds, their low concentration in either gasoline or diesel, and their affinity to partition to sediment organic matter and black carbon, it is unlikely that dissolved concentration of the C10-C12_aliphatic fraction will ever exceed 2.6 µg/l.
- A TPH-diesel PRG of 2.6 µg/l is not measurable, because the concentration is below commercially available detection limits for diesel. Oregon's TPH analytical methods are based on State of Washington's "Analytical Methods for Petroleum Hydrocarbons" (WDOE 1997), which identifies reasonable detection limits as >100 µg/l for both gasoline and diesel. Thus, the applicable analytical method cannot accurately measure the C10-C12 aliphatic fraction in groundwater or pore water at concentrations within its solubility limits (see above).

Given the errors, the lack of peer review and bioassay validation, and impracticability in reaching appropriate detection limits, EPA should revise its approach for including a groundwater PRG for TPH, either for TPH-diesel or TPH C10-C12 aliphatic fraction, and simply eliminate it.

12. Consistent with its own conclusions, EPA should eliminate the TPH-diesel PRG for the identification of benthic toxicity areas.

In the 2016 FS, EPA established a sediment PRG for TPH-diesel for RAO 5 (Tables 2.2-1d, 2.2-8, and B4-1 in U.S. EPA and CDM Smith 2016). EPA apparently used this PRG to identify large areas of benthic toxicity (Figures 4.1-1 and D11-1o in USEPA and CDM Smith 2016). The TPH-diesel PRG for sediment is incorrect and should be eliminated for the following reasons:

- First, the 2016 FS excludes TPH-diesel as a sediment COC. "Total petroleum hydrocarbons, diesel range" was not selected as a COC because it is "[n]ot a hazardous substance; co-mingled with other hazardous substances" (Table 2.2-2 in USEPA and CDM Smith 2016).
- Second, the development of a TPH-diesel PRG in sediments is technically incorrect because it is based on maximum water solubility rather than a concentration that is sufficiently protective of aquatic life. A review of EPA's approach suggests that EPA selected a value of 90.6 mg/kg, established for Alaska diesel range organics in sediment, as the applicable TPH-diesel PRG for sediments (RAO 5) (U.S. EPA 2008). The sediment PRG should be based on the

[9] Specifically, the source of the underlying data used to establish the critical body residue, which is central to the development of the PRG, is unclear.

dissolved concentration of TPH-diesel that is protective of aquatic life.[10] Here, EPA appears to have based the PRG on the maximum water solubility for TPH-diesel, rather than a concentration that is protective of aquatic life. Because the maximum water solubility of TPH-diesel is lower than the protective water concentration, the TPH-diesel PRG is overly protective. In other words, regardless of the TPH-diesel level in sediment, it will not result in benthic toxicity because the dissolved TPH concentrations will not go above the level that is protective of aquatic life.

- Third, the use of the TPH-diesel PRG of 90.6 mg/kg is inconsistent with EPA's own conclusions regarding the use of the Alaska diesel range organics value: "EPA previously recommended TRVs for TPHs… that were based on approaches used in Alaska and Washington... LWG elected not to use these TRVs… owing to concerns over the reliability of these values and because they were to some extent based on narrative criteria. Therefore, EPA is proposing to use an updated approach for derivation of TRVs for selected TPH fractions" (U.S. EPA 2008).[11]
- Fourth, EPA has used the value of 90.6 mg/kg without considering site-specific conditions. The 90.6 mg/kg value was derived for sediment that has 1% of organic carbon; however, the percentage of organic carbon is higher in Portland Harbor (approximately 1.7%; U.S. EPA 2016a). Based on principles of bioavailability, the higher percentage of organic carbon in Portland Harbor sediments should result in a higher TPH-diesel PRG.[12]
- Finally, the derivation of TPH sediment PRGs is not technically justified. As further discussed in Comment 11 above, EPA's approach was not peer reviewed, published or validated. Specifically, with regard to the sediment TPH PRG, the BERA indicated that "[t]he TPH SQGs [sediment quality guidelines] were derived by EPA for use in the Portland Harbor BERA. These values have not been subject to peer review nor have they been published elsewhere…"

For these reasons, the TPH-diesel PRG for RAO 5 should be eliminated from the 2016 FS and Proposed Plan and should not be relied on to establish areas of benthic toxicity.

13. The EPA background level for cPAH should be revised to reflect anthropogenic sources immediately upstream of the investigation area.

The background concentration for cPAHs in the Portland Harbor is unrealistically low because it does not account for the type of non-point, diffusive anthropogenic sources

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[10] The PRG was based on toxicity reference values or TRVs that are considered protective of aquatic life. The TRV for TPH-diesel in sediment is derived from a TRV for TPH-diesel in water. The TRV for sediment was then selected as the PRG.

[11] Contrary to the EPA (2008) recommendation, it appears that the Alaska TPH PRGs were used in the BERA. The 90.6 mg/kg value was associated with gasoline range organics, presumably incorrectly.

[12] See discussion regarding bioavailability in Comment 2, above.

typical of a downtown urban environment. By ignoring these sources, EPA sets a "natural" background concentration for cPAHs that is unattainable in an urban environment.

EPA established a background concentration for cPAHs and other COCs in the RI. The cPAH background level of 12 µg/kg (or 12 µg TEQ/kg) is based on an analysis of samples collected from a chosen "reference area." Rather than including downtown Portland, which is directly upstream of the investigation area, in the reference area, EPA excluded downtown Portland and instead chose a reference area located upstream of downtown Portland between Ross Island and Willamette Falls (corresponding to Willamette River between RM 15.3 and RM 28.4). According to the RI, this area was selected "because it is considered broadly representative of the upstream sediment loading to Portland Harbor" (U.S. EPA 2016a). However, because the reference area selection ignores the large urban area immediately upstream of the Portland Harbor, it biases the establishment of background concentrations and sets a background value for cPAHs that is unattainable in an urban environment.

In establishing background concentrations for cPAHs, EPA should consider the correlation of population density with diffuse cPAH sources. PAHs are ubiquitous with many natural and man-made sources, including forest fires, residential wood burning, cooking, vehicle emissions, power generation, spills, creosote pilings, vessel traffic, and current and past industrial discharges, among others (Boehm 2006; Newfields 2016). Many more non-point diffusive sources exist in more urbanized areas than in less urbanized areas (Boehm 2006). Thus, a larger number of natural and man-made non-point and diffusive sources are present within the downtown Portland area than within the upstream reference area.

This is simply illustrated by comparing the population density in downtown Portland area with that of the reference area (Figure 12). The population density of downtown Portland is much higher than that of the more sparsely populated reference area, indicating the presence of many more diffuse PAH sources in the downtown Portland area relative to the reference area. Population density has been positively correlated with heavy PAHs in background soils and sediments (Brändli et al. 2008; Newfields 2016). Indeed, the cPAH concentrations are much higher in the downtown Portland area than in the reference area (Figure 13).

For example, population effects were recently taken into account in determining a regional background cPAH value for Port Angeles Harbor Sediments. There, the original background estimate for cPAHs of 31 µg TEQ/kg was revised upward to 64 µg TEQ/kg because it did not "adequately represent diffuse sources of cPAH to Port Angeles Harbor, because all three bays used in the NOP regional background calculation had lower populations and less anthropogenic influence" (Newfields 2016). These data suggest that the proposed cPAH background value of 12µg/kg for Portland Harbor is more representative of natural background rather than anthropogenic background.

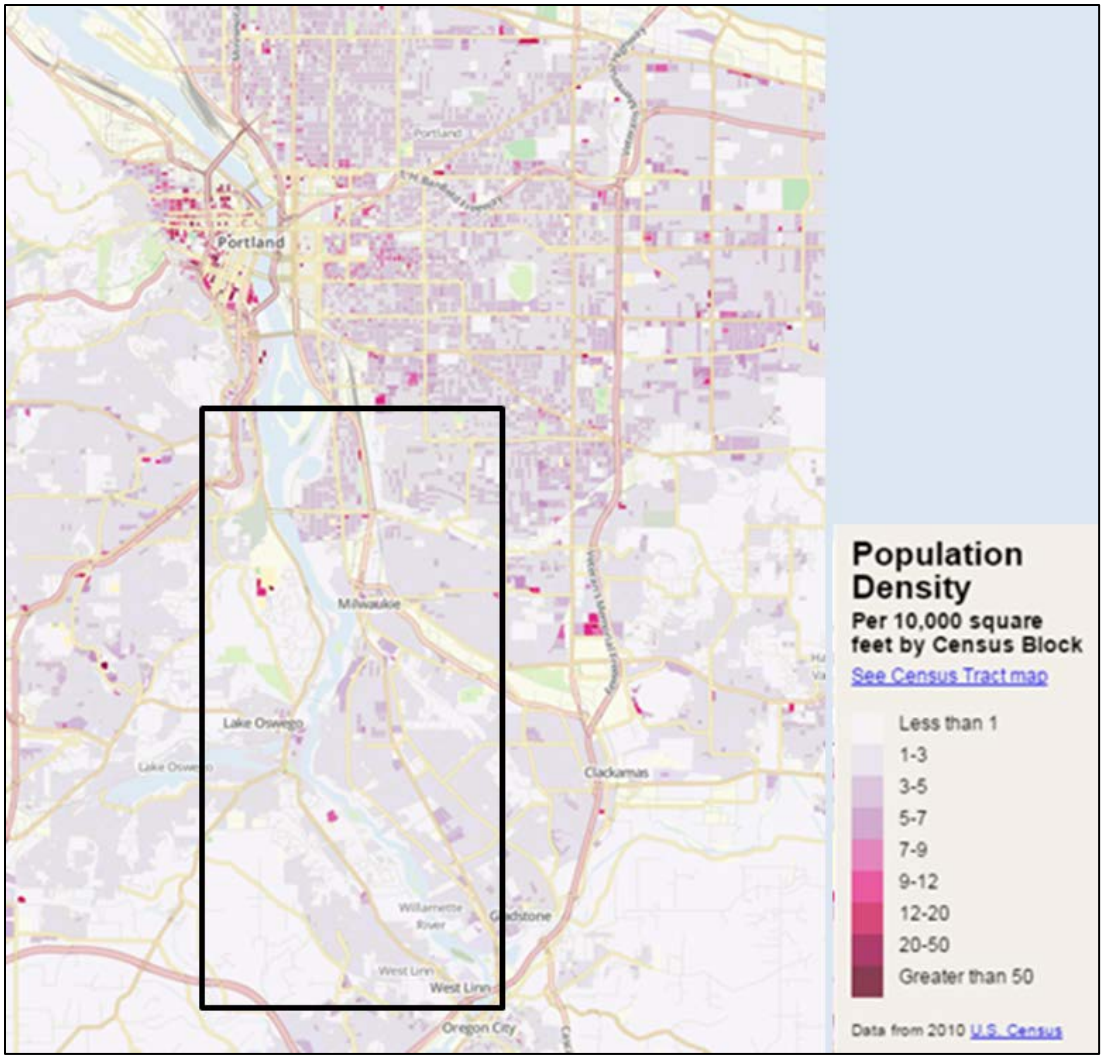

Figure 12. Population density of metropolitan Portland area. Source: http://projects.oregonlive.com/maps/density/. The black square signifies the approximate extent of the Portland Harbor Superfund Site reference area.

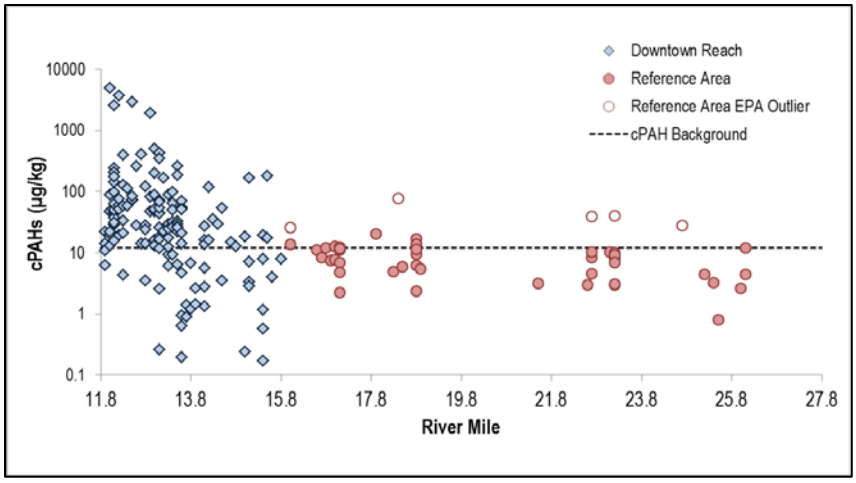

Figure 13. Comparison of cPAHs from Downtown Portland sediments and from reference area sediments. Only detected concentrations are shown. cPAH data (as calculated) obtained from U.S. EPA (2016).

By ignoring anthropogenic background, EPA's is violating its own guidance. According to EPA guidance, "background" refers to constituents or locations that are not influenced by the releases from a site, and is usually described as naturally occurring or anthropogenic (U.S. EPA 2002). Anthropogenic background is defined as "natural and human-made substances present in the environment as a result of human activities (not specifically related to the CERCLA release in question)" (U.S. EPA 2002). According to EPA guidance:

> *[F]or anthropogenic contaminant concentrations, the CERCLA program normally does not set cleanup levels below anthropogenic background concentrations [(U.S. EPA 1996; U.S. EPA 1997; U.S. EPA 2000)]. The reasons for this approach include cost-effectiveness, technical practicability, and the potential for recontamination of remediated areas by surrounding areas with elevated background concentrations* (U.S. EPA 2002).

As cited in the RI, "background concentrations may be used to develop remedial goals when risk-based PRG concentrations are less than naturally occurring or anthropogenic background" (U.S. EPA and CDM Smith 2016).

Sediments in the downtown Portland area are more representative of anthropogenic background than those of upstream reference area sediments. Therefore, EPA should re-evaluate its exclusion of downtown Portland from the reference area to avoid biasing the cPAH background levels for Portland Harbor to values that are both unrealistic and unattainable.

14. EPA should identify all Sediment Decision Units by their associated river mile rather than by "associated key upland facilities."

The Proposed Plan and 2016 FS identify fourteen Sediment Decision Units (SDUs) and "associated key upland facilities" (U.S. EPA and CDM Smith 2016). SDU RM3.9W has been labeled simply as "Kinder Morgan." (Table 16, U.S. EPA and CDM Smith 2016). This

designation is misleading because it suggests that Kinder Morgan is the only "key upland facility" associated with this particular SDU.

The Proposed Plan is not intended to identify or allocate responsibility among parties, and to our knowledge, EPA has not conducted an independent analysis to determine the key contributors to each SDU. At a minimum, EPA should acknowledge that several other upland facilities are present currently and have been present historically within the SDU RM3.9W (approximate RM 3.4 to 4.5W), including Knife River, Owens-Corning Fiberglass, RK Storage & Warehousing, Babcock Land Company, Linnton Plywood Association and Columbia River Sand and Gravel (Figure 1.2-1d, U.S. EPA. 2016a). Additionally, based on the nature of COCs within SDU RM3.9W, it is likely that one or more upriver facilities (both historical and current) contributed COCs to the sediments adjacent to the Kinder Morgan Linnton Terminal.[13] Because it is impossible to provide an accurate description of "key upland facilities" associated with each SDU at this stage, EPA should eliminate the description and label each SDU simply by river mile.

References

Antea. 2016. Source control evaluation. SFPP – Portland Station. 6565 NW St. Helens Road, Portland, Oregon 97210. ESCI#2104. Prepared for SFPP, L.P., operating partnership of Kinder Morgan Energy Partners, L.P., Orange, CA. Prepared by: Antea Group, Portland, OR. March 8.

Boehm, P.D. 2006. Polycyclic aromatic hydrocarbons (PAHs). pp. 313–337. In: Environmental Forensics-A Contaminant-Specific Approach. R. Morrison and B. Murphy (eds). Elsevier, New York, NY.

Brändli, R.C., T.D. Bucheli, S. Ammann, A. Desaules, A. Keller, F. Bluma, and W.A. Stahel. 2008. Critical evaluation of PAH source apportionment tools using data from the Swiss soil monitoring network. Journal of Environmental Monitoring. 10: 1278-1286.

CH2M. 2015. Groundwater and bank soil source control evaluation. Kinder Morgan Linnton Terminal. Oregon Department of Environmental Quality ESCI No. 1096. Prepared for Kinder Morgan Liquid Terminals, LLC., Portland, OR. Prepared by: CH2M, Portland OR. December.

City of Portland. 2016. Composite zoning proposal. Available at https://www.portlandmaps.com/bps/mapapp/maps.html#mapTheme=cz; accessed on August 16, 2016.

Khalil, M.F., U. Ghosh, and J.P. Kreitinger. 2006. Role of weathered coal tar pitch in the partitioning of polycyclic aromatic hydrocarbons in manufactured gas plant site sediments. Environmental Science and Technology. Vol. 40: 5684-5687.

[13] See Comment 4 above, which discusses potential recontamination issues at SDU RM3.9W.

Koch, K. 2015. Portland Harbor Preferred Alternative. Presentation to the CSTAG/NRRB. U.S. Environmental Protection Agency, Region 10. November 18.

Legare, A.R. and S.J. Ells. 2015. Memorandum, dated December 31, 2015, regarding National Remedy Review Board and Contaminated Sediments Techical Advisory Group Recommendations for the Portland Harbor Superfund Site. National Remedy Review Board and Contaminated Sediments Technical Advisory Group, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, DC.

LWG. 2012. Portland Harbor RI/FS. Draft feasibility study. Prepared for The Lower Willamette Group. Prepared by: Anchor QEA, LLC; Windward Environmental, LLC, Kennedy/Jenks Consultants; Integral Consulting, Inc. March 30.

LWG. 2013. Appendix F. Baseline human health risk assessment. Final. Portland Harbor RI/FS. Final remedial investigation report. Produced for the Lower Willamette Group and U.S. Environmental Protection Agency. Produced by Kennedy/Jenks Consultants. March 28.

Newfields. 2016. North Olympic Peninsula regional background sediment characterization. Port Angeles – Port Townsend, Washington. Data and evaluation report. Publication no. 16-09-142. Washington Department of Ecology. Prepared by Newfields, Inc., Edmonds, WA. February.

NRC. 2003. Bioavailability of contaminants in soils and sediments: processes, tools, and applications. Committee on bioavailability of contaminants in soils and sediments, National Research Council. National Academies Press, Washington D.C. 432 p.

ODEQ. 2016. Portland Harbor upland source control summary report. November 21, 2014 - Updated March 25, 2016. Northwest Region Cleanup Program, State of Oregon Department of Environmental Quality, Portland, OR.

Ruby, M.V., Y.W. Lowney, A.L. Bunge, S.M. Roberts, J.L. Gomez-Eyles, U. Ghosh, J.C. Kissel, P. Tomlinson, and C. Menzie. 2016. Oral bioavailability, bioaccesibility, and dermal absorption of PAHs from soil-State of Science. *Environ. Sci. Technol.* 50:2151-2164.

U.S. EPA. 1989. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A), Interim Final. Office of Solid Waste and Emergency Response, EPA/540/1-89/002. December.

U.S. EPA. 1996. Soil Screening Guidance: User's Guide. Office of Emergency and Remedial Response, Washington, DC. EPA/540-R-96/018, OSWER 9355.4-23.

U.S. EPA. 1997. Rules of Thumb for Superfund Remedy Selection. Office of Emergency and Remedial Response, Washington, DC. EPA 540-R-97-013, OSWER 9355.0-69.

U.S. EPA. 2000. Soil Screening Guidance for Radionuclides: User's Guide, Office of Radiation and Indoor Air, OSWER 9355.4-16A.

U.S. EPA. 2002. Role of background in the CERCLA cleanup program. Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response. OSWER 9285.6-07P. April 26.

U.S. EPA. 2005. Contaminated sediment remediation guidance for hazardous waste sites. EPA-540-r-05-012. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. December.

U.S. EPA. 2008. Toxicity Reference Values for Portland Harbor Baseline Ecological Risk Assessment. Portland Harbor Administrative Record Document: 100006159.

U.S. EPA. 2012. Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Procedures for the Determination of the Freely Dissolved Interstitial Water Concentrations of Nonionic Organics. EPA-600-R-02-012. Office of Research and Development, Washington, DC 20460.

U.S. EPA. 2014. Record of Decision. Lower Duwamish Waterway Superfund Site. U.S. Environmental Protection Agency, Region 10. November.

U.S. EPA. 2016a. Portland Harbor RI/FS. Remedial Investigation Report. Final. February 8.

U.S. EPA. 2016b. Superfund Proposed Plan. Portland Harbor Superfund Site, Multnomah County, Oregon. Superfund Site ID#: ORSFN1002155. U.S. Environmental Protection Agency, Region 10, June.

U.S. EPA and CDM Smith. 2016b. Portland Harbor RI/FS. Feasibility Study. Prepared by: U.S. Environmental Protection Agency and CDM Smith. June.

WDOE. 1997. Analytical Methods for Petroleum Hydrocarbons. Washington Department of Ecology, Olympia, WA.

Windward. 2007. Lower Duwamish Waterway Remedial Investigation. Remedial Investigation Report, Appendix B: Baseline human health risk assessment. Final. Prepared by Windward Environmental, LLC, Seattle, Washington. November 12.

Xia, H., J.L. Gomes-Eyles, and U. Ghosh. 2016. Effect of Polycyclic aromatic hydrocarbon source materials and soil components on partitioning and dermal uptake. Environ Sci Technol. 50:3444-3452.

Appendix A

KINDER MORGAN
TERMINALS

West Coast Region

September 6, 2016

Attn: Harbor Comments
U.S. EPA, 805 SW Broadway, Suite 500
Portland, OR 97205

RE: Kinder Morgan Ship Loading Operations at Terminal 4

Dear Sir or Madam:

Kinder Morgan Bulk Terminals, Inc. (Kinder Morgan) is providing the following information in support of both the Port of Portland's and Kinder Morgan's comments on the United States Environmental Protection Agency's (U.S. EPA's) June 8, 2016 Proposed Plan for the Portland Harbor Superfund Site (Proposed Plan). In this letter, Kinder Morgan describes its ship loading operations at its Terminal 4 facility and the lack of public access to the slip and shore areas of the facility.

Kinder Morgan Operations at Terminal 4, Slip 3

Kinder Morgan's Terminal 4, Slip 3 facility spans approximately eight acres of heavy industrial land on the eastern shore of the Willamette River, directly to the south of Slip 1 and directly north of the Toyota facility at river mile 4.5. The Kinder Morgan facility is leased from the Port of Portland and consists of a loading dock (berths 410/411), a ship loader, rail lines, an office building and a warehouse.

Terminal 4 has been an active industrial site for more than 100 years and will remain one into the foreseeable future. At Slip 3, berths 410/411, Kinder Morgan unloads bulk soda ash from rail cars and loads it onto ships for export. The ships are extremely large —approximately 200 meters long with a capacity to carry up to 50,000 tons of cargo—and fill most of the slip when at the berth. Ships are loaded 5 days per week, year-round, and include both day and night shifts. In 2015, Kinder Morgan loaded 2.6 million metric tons of soda ash onto 75 ships over a period of 229 day shifts and 169 night shifts. Kinder Morgan estimates that it will load 3 million metric tons of soda ash in 2017. At this pace, ships move in and out of the slip every 2-3 days.

Kinder Morgan has operated at Terminal 4 for nearly 20 years. Between 2013 and 2015, Kinder Morgan made significant upgrades to the facility to maximize efficiency and environmental protection. Kinder Morgan removed the old ship loader and constructed a new, state of the art ship loader and dust control system. Kinder Morgan's current lease term extends through December 2022, and the company has no plans to stop operating at the facility. Given its

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location and improvements, there is no other productive use for the property other than heavy industrial operations.

Public Access is Prohibited

Access to the facility is strictly controlled. The only access point to the Terminal via land is through the secured main entrance. The public is not allowed within the terminal or berth property without prior approval from Kinder Morgan management. Further, Kinder Morgan is required to report any trespass to the Port. When loading ships at the berth, other vessels (including fishing boats) are discouraged from entering the slip for safety reasons, and, there is a U.S. Coast Guard Restricted Navigation Area in place to protect areas of engineered cap and bank stabilization in Slip 3 and Wheeler Bay. Multiple signs reading "NO ANCHORING, GROUNDING OR SHORE TIE-UPS" are located at the edge and center of Wheeler Bay, and at the entrance and head of Slip 3, to maintain this restriction.

No Recreational Use

Even if the facility were open to the public, the shoreline in and around Terminal 4, Slip 3 has virtually no beach or shallow water areas for the public to access. The slip is bordered on the north side by a 330 meter long, 10 meter high loading dock. The shoreline at the head of the slip consists of a 100 meter long, steep, vegetated riverbank with approximately 2-3 meters of rocky beach at the foot of the bank. This shoreline is almost completely obstructed by a line of wooden pilings capped with a metal rail. The southern edge of the slip consists of a 6 meter high concrete and wood retaining wall bordered by dozens of decaying wood pilings that historically supported a loading dock. The riverbed within Slip 3 drops steeply from the shoreline, reaching a maximum depth of 12.2 meters in the center of the slip. As a result, there is no beach use, clamming, shore fishing or other recreational activity that occurs in and around the Kinder Morgan facility. Although fishing boats have the ability to access Slip 3 from the main channel of the river, they are rarely spotted in or near the slip due to the heavy industrial activity and shipping traffic.

Conclusion

Given the industrial nature of Kinder Morgan's operations and the limited opportunities for public access to the shoreline and near-shore sediments, the U.S. EPA's assumptions regarding recreational beach user, diver and fisher exposure to contaminated sediments at Terminal 4 are unrealistic and should be revised to more accurately reflect site-specific uses.

Sincerely,

Mark Price
Director of Operations

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