General Comments on the Portland Harbor Feasibility Study
By Environmental Stewardship Concepts, LLC
For the Willamette Riverkeeper and the Portland Harbor CAG
July 27, 2012

General Comments:

1. There are still current sources of contamination to the Willamette River and control of these must be reached before beginning any cleanup remedies at the downstream Portland Harbor site. A time-specific plan of action regarding these sources needs to be established; it should be open to public comment.

2. A USGS rep :) s)) c)) t)- x Treatment-Plant Effluent and Stormwater Runoff Entering the Columbia River, Columbia River Basin, Washington and Oregon, 2008-E C)))) a) 2012. The report looks at wastewater treatment plant effluent and stormwater runoff samples taken from nine cities along the Columbia River basin, including the Willamette River. The samples were taken from 2008 to 2010, but are not referenced by the LWG in the most recent Draft Feasibility Study. This report details the multitude of sources, point and nonpoint, that are feeding into the Columbia River basin, and subsequently, the Willamette River at high flood tides. The report was prepared in cooperation with the Columbia River Inter-Tribal Fish Commission and the Lower Columbia Estuary Partnership.

   The set of chemical compounds tested for in the WWTP samples were slightly different from those tested for in the stormwater samples, but the report shows that over half of the compounds tested for in each set were detected. The compounds detected in the WWTP samples, however, were more homogeneous (i.e. similar) than those found in the stormwater runoff samples. The stormwater samples indicate the varied sources of contamination indicative of an urban setting.

   WWTP effluent in each city was analyzed for anthropogenic organic compounds, pharmaceuticals, polychlorinated biphenyls (PCBs), polybrominated diphenyl ether (PBDEs [brominated flame-retardants]), organochlorine or legacy compounds, currently used pesticides, mercury, and estrogenicity. Stormwater runoff samples were analyzed for PCBs, PBDEs, organochlorine compounds, PAHs, currently used pesticides, trace elements, mercury, and oil and grease.

   The report also acknowledges that the older Portland sewer system mixes untreated sewage and stormwater runoff an average of 100 times a year. To

improve water quality, the city of Portland has constructed several big pipes that store and transport the overflow so that it can be treated before it is discharged. The sites selected for sampling were upstream and downstream of big pipe drainage areas on the Willamette River. Extra WWTP samples were also needed for analysis of currently used pesticides and mercury. Longview (the most downstream WWTP sample) had the greatest number of detections and some of the highest concentrations for personal-care-product compounds.

3. n)))) *chemical-specific water quality criteria and standards for some COCs (particularly those based)) 6) fish consumption advisories are expected to remain in effect at the Site regardless of which alternative is chosen*A)) i)))))) understand what remediation would have to take place for all the water quality criteria and standards to be met, as a point of comparison for the rest of the alternatives that do not meet these standards. As such, either another alternative needs to be developed, or some explanation provided to describe the steps to clean up to unrestricted use levels.

4. None of the alternatives achieve PCB remediation goals based on human health protection from consumption of resident fish because of technical infeasibility. How has this infeasibility been determined? What studies indicate that PCB remediation is infeasible? What agencies have been involved in its approval?

5. The remediation methods chosen in the FS rely heavily on the majority of the coc)) :))) f t)) *While future* P) *conditions and actual concentrations could vary depending on the effectiveness of source control efforts, it is likely that surface sediment concentrations after active remediation and on-going natural recovery will be similar, regardless of which comprehensive alternative is selected.* Upriver source control measures are under way, but given little attention here.

   This FS concludes that the effectiveness of all the alternatives is the same. They are not. The statement negates all the efforts of choosing a remediation method, making the success of remediation rely solely on source control. Surface sediments are not the sole concern of the remediation. Deeper sediments will continue to re-contaminate the site if not properly remediated.

6. Metals were listed several times as potential contaminants of concern throughout the site, some at high concentrations, but metals are not included in the final list of Contaminants of Concern. The cleanup is not complete without consideration of these site metals.

7. The models used to determine various aspects of the alternatives only reach 45 years into the future. This is very short-sighted for a series of models being used to determine the effectiveness of the alternatives as a long-term solution.

8. The length of the FS precludes most of the public from reading it in its entirety. Therefore, the summaries found before each section should not use abbreviations, but spell out each term on first reference throughout the summaries. Also, much of the sections have information that is repetitive or not entirely relevant.

9. Rather than listing and discussing several times in several sections the various remediation technologies, the information found in these sections should be summarized and combined and placed in one section. This mitigates repetitiveness and confusion from the report.

10. Multiple stressors are present here in the Portland Harbor system, both in terms of human health as well as ecological risks. Official and formal methods for addressing multiple stressors are limited to using toxic equivalency values for a few groups of organic chemicals (i.e. dioxin-like chemicals). These methods do not even consider chemicals acting on the same health effect if in different chemical groups (i.e mercury and PCBs both impair neurodevelopment) In truth, both ecosystems and human health are at risk from multiple chemicals and the consequences of cumulative impacts. Ecologically, systems that are already under stress will respond differently than unstressed systems; human communities are similar. These conditions are unaddressed - the FS will be based on underestimated risks.

Specific Comments:

1. **Section 1.0** (Introduction) states that**,** *The exact boundaries of the [Portland Harbor] Site have not yet been defined by EPA, which will do so in the Proposed Plan*A Why are the exact boundaries not determined yet? What is keeping this delineation from occurring at this stage?

2. **Section 2.1.1** (Hydrology) states that, *River stage and currents at the Site are influenced by hydrologic conditions in both the Willamette and Columbia Rivers, and are further affected by the operations of federal and non-federal dams along these two rivers, as well as tidal stages of the Pacific Ocean, which causes tidal fluctuations of up to a maximum of 3 feet per day throughout the Site*A

   Relative to the tide difference, there is more than a 3 foot tidal fluctuation. Is the three feet only referencing the influence of the ocean tides on the fluctuations

seen at Portland Harbor? USGS tides recorded at Morris Street Bridge show that an average tidal fluctuation in a day would not likely average to 3 feet.

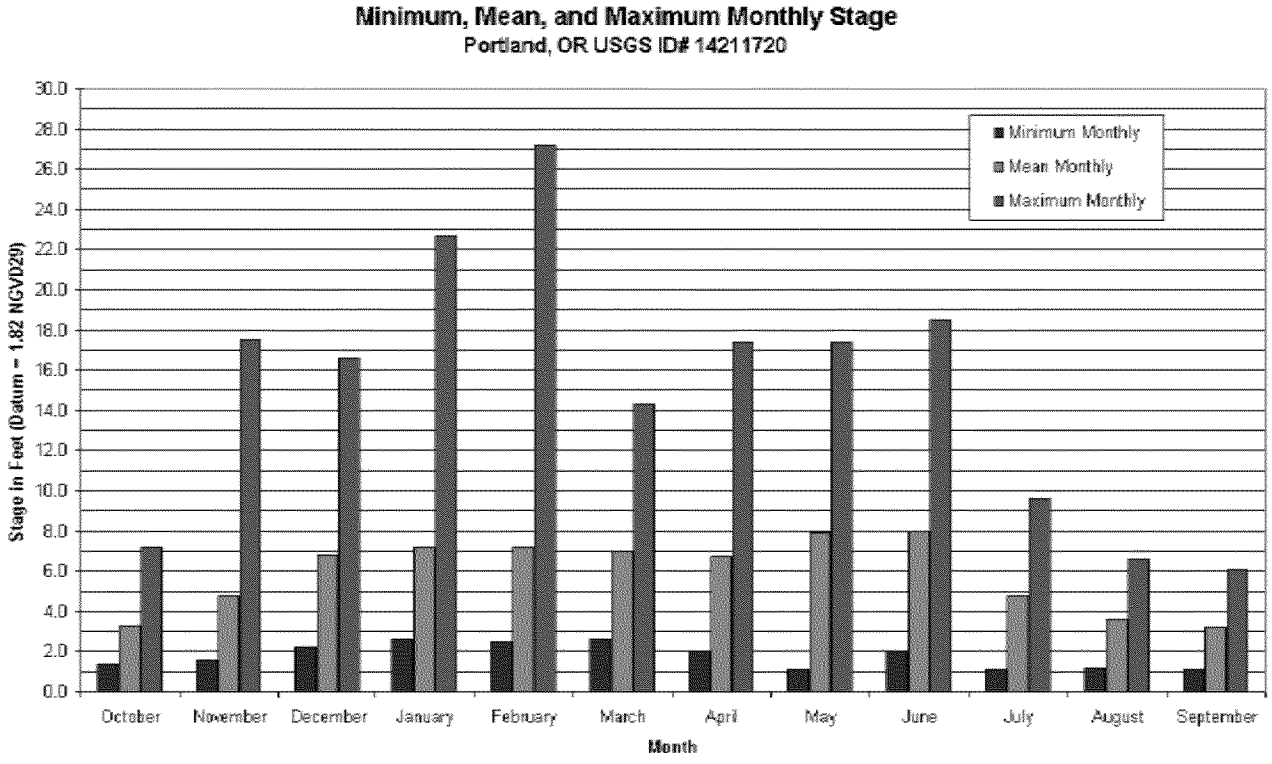

Figure 1. Minimum, mean, and maximum monthly Willamette River stage at Portland, Oregon from years 1973 through 2003. (US Army Corps of Engineers).

3. **Section 2.1.1** references past extreme flood events: *The two highest peaks in the daily mean discharge record occurred during the winters of 1996 and 1997, when peak flows reached 420,000 cfs on February 9, 1996 and 293,000 cfs on*

p r) J 9) I T T P 9))) g))) e)) .

*Columbia River, the Willamette River flows generally increase in response to regional storms due to the comparatively small size of the basin. Record winter floods (e.g., 1964 and 1996) occurred when periods of heavy snowfall at lower elevations were followed by warming periods and heavy rains, resulting in rapid increases in runoff*A

Have the alternatives been examined under conditions **more extreme** than these flood events? Any models using flow and river stage should incorporate the increasing occurrence and frequency of these events, as they are more likely a result of global warming. The following graph shows the Willamette River stage at Portland Oregon and the floods of 1996 and 1997.

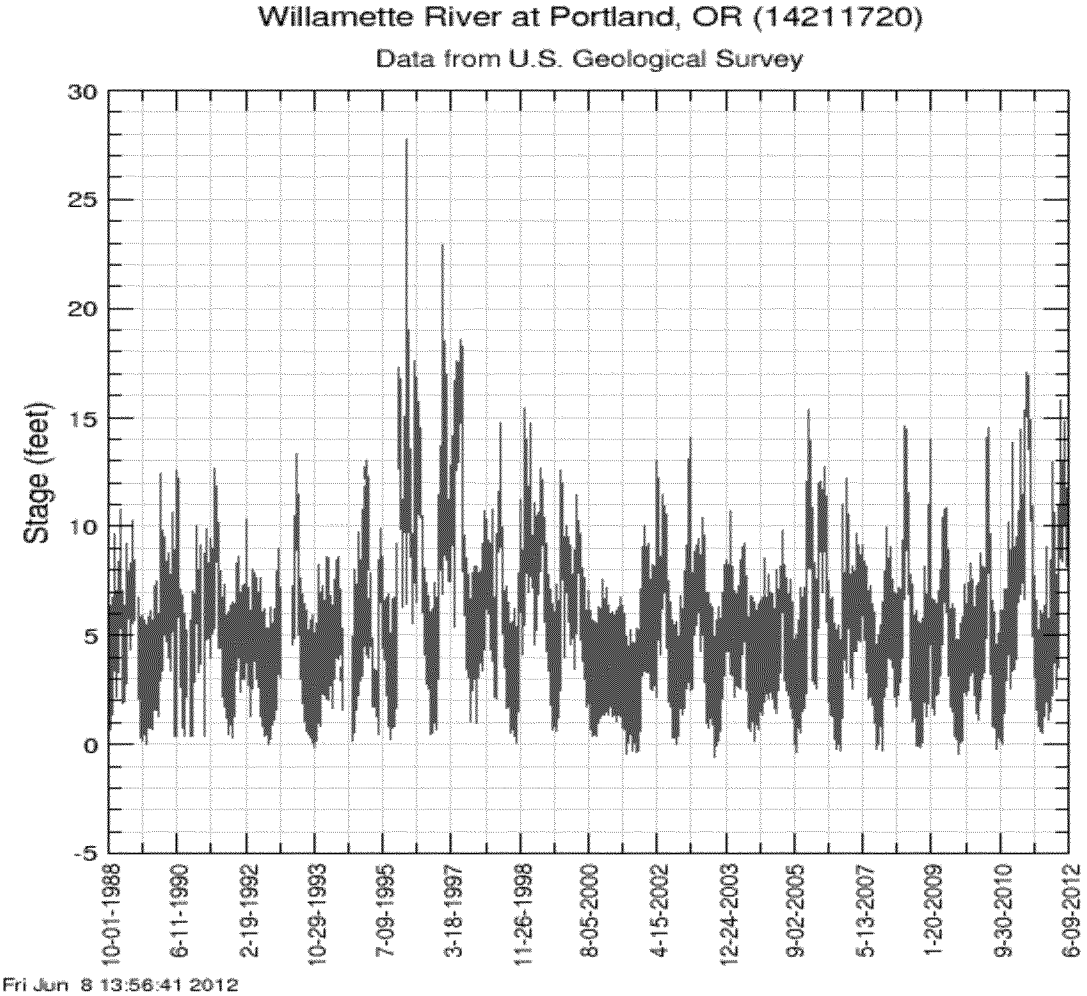

Figure 2. Willamette River stage at Portland Oregon, from October 1, 1988 to June 8, 2012 (USGS)

4. **Section 2.1.1** states that, *Upstream flooding is largely controlled by 13 major tributary reservoirs (Uhrich and Wentz 1999). These 13 federal reservoirs on the Willamette River and its tributaries have a combined storage capacity of over 1.6 million acre-feet. These reservoirs reduce the river flow during the winter snow and rain events by storing water*A

   As these several reservoirs were unable to keep the water contained during the flooding event of 1996, have the limits of these reservoirs been thoroughly examined in regards to the models used to evaluate the several alternatives? Are there any future plans for additional reservoirs either during or after the Harbor cleanup?

5. **Section 2.2** (Chemical System) states that, *for some human health exposure scenarios, risk from PAHs was evaluated using the combined toxicity of all carcinogenic PAHs (cPAHs).* The explanation of BaP and BaPEq and their

calculations are footnotes that should be brought up into the main text, as these terms are used often throughout the document.

6. **Section 2.2.2** (Surface Water) states that, *Concentrations of total DDx in surface water were generally highest during high-flow conditions and lowest during stormwater influenced conditions. Concentrations of dioxins/furans in surface water were generally lowest during high-flow conditions and highest during low-flow and stormwater influenced conditions.*

   x))))))))))
   also a high flow event? Please give an example for the reader.

7. In **Section 2**, Figures 2.4-1a-d cite that river dependent uses cover an estimated 72% of the occupied riverfront. The figures indicate that river-dependent cover is uniform throughout the four sections. Please describe any estimation methods used here, as it is highly unlikely that these percentages are exactly the same throughout.

8. **Section 3.1.1** (Human Health Risk Management Recommendations and Identification of COCs) states that: *The BHHRA intentionally incorporated conservative assumptions regarding potential frequency and magnitude of exposure, consistent with EPA guidance. It is not known whether the exposure scenarios evaluated in the BHHRA best represent exposures at the Site. Also, given the diversity of physical configurations, access, and resulting site uses, it is not known how exposures may vary across the Site in ways that would affect protectiveness and effectiveness of remedial alternatives. This is primarily due to the lack of Site-specific fish consumption surveys. For those scenarios that may actually be occurring, the true exposures are not known relative to the conservative exposures assumed in the BHHRA using EPA guidance.*

   Why was a site-specific fish consumption survey not considered as part of the decade long data collection? All BHHRAs use conservative assumptions as well, but this should not put in question whether the exposure scenarios best represent exposures at the site.

9. **Section 3.1.1** also states *COCs are not recommended for any of the other exposure pathways evaluated in the BHHRA. No chemicals are recommended as COCs for the beach sediment exposure pathway due to the low magnitude of risks and high degree of uncertainty in the exposure parameters for this exposure scenario. Similarly, no contaminants are recommended as COCs for the surface water pathway given the low magnitude of risks and high degree of uncertainty*

*associated with the direct contact exposure assumptions. No chemicals are recommended as COCs for the groundwater seep pathway because the BHHRA did not identify any contaminants potentially posing unacceptable risk for this pathway*A

Consideration should be given to evaluating every complete pathway and the COCs associated with that pathway, even in the presence of uncertainties. Uncertainties must be listed and explained, but they are not a means to negate assessing a pathway.

10. **Section 3.1.3** (Identification of Additional Contaminants for Consideration in the Draft FS) states: *On October 17, 2011, EPA approved new human health water)) w))))))) I P N) E criteria are slightly different than other existing Oregon water quality criteria in that EPA also specifically approved a site-specific background pollutant criteria provision to be used in conjunction with the numeric criteria and a revised process for requesting variances from the criteria, which is in addition to existing narrative provisions under Oregon rules that are applicable to all water quality criteria generally.*

    How is this fish consumption rate different from what has been assessed in the f t U) x)))))) U) u)))) confusing paragraph and requires more explanation.

11. **Section 3.1.3** also states: *A smaller group of ICs was identified for use as))))))) ”) pi) summarized in Table 3.1-3. The process by which they were identified is detailed in Appendix C (Section 3)*A

    Metals are still missing from the analysis.

12. **Section 3.2.1** (RAO Considerations) states: *This RAO is expected to contribute to the reduction, and possibly, elimination of Portland Harbor PCB fish consumption advisories.*

    u))))))))))) Executive Summary, which suggests that none of the alternatives will be able to make fishing at Portland Harbor occur.

13. **Section 3.2.1** also states *For the shellfish consumption exposure pathway, PCBs, dioxin/furans, and cPAHs are recommended COCs. However, the extent to which shellfish consumption occurs or will reasonably occur in the future within*

the Site is unknown. Significant uncertainties related to risk estimates for shellfish consumption include assumptions about the shellfish species consumed, exposure duration, ingestion rates, spatial scale of exposure areas, and use of undepurated tissue in risk estimates

Shellfish consumption surveys could have been conducted to resolve the lack of knowledge about shellfish consumption.

14. **Section 3.2.1** also states *Because of these upstream loads, Portland Harbor sediment remedies by themselves will not result in the achievement of surface water concentrations at the Site below these potential surface water ARARs. Other contaminant reduction efforts conducted under other regulations and programs within the Willamette River watershed would be necessary to achieve these surface water criteria.*)

    Could a determination about the sediment remedies be made based on the source control plans already in place?

15. **Section 3.2.1** also states *Although the BHHRA identified potential localized cancer risks exceeding 1 x 10^{-4}, based on the weight of evidence, potentially unacceptable risk from existing and likely future surface water exposures at the Site were not identified in the L n))) C*

    Every incident of cancer risk exceedance should be considered by risk management.

16. Section 3.2.1 also states: *For direct exposures to surface water, only cPAHs resulted in a cancer risk estimate exceeding 1 x 10^{-4}. cPAHs in surface water are not recommended as COCs in the draft FS based on the limited spatial scale of the cancer risk exceedance and the high degree of uncertainty in the exposure assumptions.*

    Any cancer risk exceedance should be considered in risk management of the site.

17. **Section 3.2.1** also states: *The 95th percentile UPL upstream background surface water concentrations of mercury entering the Site as measured by the LWG exceed the Oregon chronic criterion for this contaminant, but not the EPA NRWQC.*[9]

    Why does the footnote that is cited at the end of this sentence discuss aluminum when the sentence preceding it is discussing mercury? A discussion of aluminum should be included if it is to be footnoted.

18. **Table 3.5-1**: Why does arsenic not have a sediment COC or RAL, but it does have an EPA Focused PRG? Why was it dropped in the final decision to not be included as a COC?

19. **Section 4.1** (RAL and FS Approach) states: *Because of these uncertainties, some SMA-specific refinements of RALs may be appropriate during remedial designs.*

    u))) tma))))))
    available for public comment.

20. **Section 4.1** also states: *For the purposes of the draft FS, a range of possible RALs is developed for bounding COCs considering the magnitude of risk reduction achieved (as measured by changes in average surface sediment contaminant concentrations) and the rate of anticipated natural recovery*A

    There needs to be solid, river-)))))
    recovery. MNR remains highly controversial and has not, to our knowledge, been demonstrated effective on a system such as the Lower Willamette.

21. **Section 4.1** also states *EPA provided comments requiring that the draft FS contain RALs for some additional contaminants (EPA 2011f); therefore, the LWG*)) .gt)))))))) *i wi*

    Metals should have been included as needed additional COC.?

22. **Section 4.3.4** (Sum-DDD and Sum-DDT RALS) states that: *Because the LWG did not propose RALs for these contaminants and the relatively recent timing of*) l xg))) .gt 9)) t n))))) l G)
    curves for these contaminants.

    When will the public be able to view the models for year 10 and 30 RAL curves for these contaminants? What follow-up document will they be found in?

23. **Section 4.3.5** (2,3,4,7,8-PCDF RALs) states that: *Because the LWG did not develop a model for PCDF and did not propose RALs for these contaminants, the LWG did not model year 10 and 30 RAL curves for these contaminants. EPA provided direction to include PCDF RALs too late in the process for a PCDF model to be developed in time for the draft FS.*

    When will the public be able to view the RAL curves for this contaminant? What follow-up document will they be found in?

24. **Section 4.4** (Summary of Selected RALS for the Draft FS6)) P)) *RALs proposed by LWG in Table 4.4-1 were selected based on the year 10 and 30 RAL curves, with consideration of the time zero curves. EPA has generally indicated that they made their RAL selections based exclusively on the time zero curves (EPA 2011f).*

    As these RALs are concentrations that determine active remediation, it is reasonable that they should be determined under a time zero scenario, not under a long term basis. Only the RGs are set to achieve protection over a long time span.

25. **Section 4.6** (RALs Conclusions) states that: *COCs with defined RALs are not the only contaminants that require remediation. Rather, focusing on the COCs with RALs provides a means to design a remedy to address all contaminants posing potentially unacceptable risk.*

    This may be a consideration in the lower RALs being recommended by EPA, i.e. the lower RAL will ensure more active remediation of co-occurring contaminants.

26. **Table 4.4-1**: Why is it necessary to use a superscript to describe the RALs for which LWG and EPA have come to different values? If the EPA directives are the RAL values to be used, it should be listed as such. In each case, the EPA has directed a lower value, which is also more protective of human and ecological health.

27. **Section 5.5.1.3** (Highly Mobile Hot Spots) states that: *[10]For example, with respect to mercury and zinc, only the Oregon chronic aquatic protection criteria were exceeded, and less than 5 percent of the samples exceeded those criteria.*

    The purpose of this footnote is confusing. Is this information meant to disregard the mercury and zinc exceedances?

28. **Section 5.6.2** (Erosion Due to Propwash) states that: *The results of the analysis in Appendix Fb indicates that, in the large majority of cases, propwash disturbance of surface sediments is expected to be to a depth of 30 cm or less, and that this represents the widespread and predominant condition at the Site. The results indicate that the heavier propwash areas are located in relatively shallower water areas of the navigation channel and near active docks (i.e., in future maintenance dredge areas where vessels routinely transit and moor at docks).*

The heavier propwash areas coincide with the areas identified as having more contaminated sediment and higher concentrations of contaminants. For this reason, a depth of greater than 30 cm may need to be considered.

29. **Section 5.6.2** also states: *For RM 6, large exceedances of the MQ are indicated by a few samples in this area. Closer examination of the dataset reveals that these few samples are all older USACE data that is included in the draft FS further investigated during remedial designs in this river mile as needed.*

    The remedial design and the further investigation of RM 6 needs to be available for public comment.

30. **Section 5.7.1** (Aquatic Life Potential ARARs) states: *Regarding exceedances in unfiltered TZW samples, these results suggest that the potentially unacceptable risk from DDx compounds in TZW may be lower than indicated by the maximum concentrations in unfiltered samples due to lower bioavailability of the particulate bound fraction of the contaminant. For these two reasons, and the fact that this location is included in Alternative F, Alternatives B through E were not expanded to incorporate TZW sample areas exceeding WQS and NRWQC freshwater chronic aquatic life values total DDx.*

    Aquatic organisms often feed on the detritus and sediment particles, giving them a direct route of exposure to the particulate bound fraction of the contaminant. Alternatives B through E should be expanded to incorporate TZW sample areas with total DDx exceedances.

31. **Section 5.7.2** (Fish/Shellfish Consumption Potential ARARs) states: *However, given the scattered distribution of these TZW exceedances and the substantial uncertainties in the clam consumption scenario (see Section 3), it was determined that the SMA boundaries should not be expanded based on TZW samples exceeding of fish/shellfish consumption WQS.*

    Uncertainties should not preclude a complete exposure pathway from being considered.

32. **Section 6:** Considerably more explanation, lines of evidence, site studies, and other relevant studies are described for MNR and EMNR than any other technology in this section. This section lacks studies that support active remediation, such as dredging, and gives an unbalanced view of the considered technologies. The importance of removal technologies, and the permanent, long-term protection they provide, needs to be better represented. For example, a

study by Choi (2006) measured serum PCB levels in 720 newborns living around New Bedford Harbor, Massachusetts from 1993 to 1998. The contaminated harbor was dredged from 1994 to 1995. The study found that children born before or during dredging had higher cord serum PCB levels than children born after dredging which suggests that difference in PCB availability affect exposure risks potentially associated with the site.

33. **Section 8.2.1** (Evaluation General Approach) states that: *Thus, modeling of these select COCs using a range of conservative degradation assumptions also provides a good representation of the range of potential outcomes for the entire list of contaminants presenting potentially unacceptable risk. The COC 2,3,4,7,8-PCDF, which has RALs for some alternatives, is a surrogate for overall dioxin/furan potentially unacceptable risks and is not specifically modeled.*

    Is there a complete list of the selected COCs and which chemicals they are))) U) x)))) coc) sal))) site?

34. **Table 9.0-1** (Summary of Comparative Analysis of Alternatives): Why is the outcome uncertain pertaining to Surface Water RAO 3 for Overall Protection of h) h))) e U)) t) G A F A E) *Therefore, remedial alternatives do not need to be evaluated relative to this RAO [3], because the RAO is already being achieved.*) a :))) sao) L) U) 4 deal) sao) E with human health specifically. This is confusing to the reader.

Appendices Comments

Appendix A (Background Level Development)
The background level development for surface sediment relies on the background analysis that is described in this appendix and detailed in the Remedial Investigation, t) M A) u)))) *estimate the levels of chemicals that would exist in environmental media at the site in the absence of CERCLA-related releases of hazardous chemicals from the site or releases from other point sources of contamination within the site.*

1. Section 1.2.4.1 f)))))))) were averaged to provide a single reported value for each chemical constituent. This was done to avoid introducing spatia))))) -)))))) This method is often used, but

is best expressed in terms of the % difference between the samples and the degree of difference that the field duplicates represent.

2. Sec) E A F A H A G) *Non-detects were included at one-half of the reporting limit for those analytes that were detected at least once in the))) 5 C) R 6 C) …))))) assessments*:)) :) cific) doc)ument is cited. This treatment of non-detect analytes is standard and used in the baseline risk assessment, but needs a reference or precedent.

3. Section 1.3.1.2 states that EPA and LWG disagree on certain outliers in the dataset analyzed to establish background levels. Therefore, the background analysis in the RI presents separate estimates using the LWG and EPA datasets. It is unclear, however, if it was the EPA or LWG estimates that are used to establish PRGs in the FS. Please specify this information.

Appendix C (Water Screening Against Potential ARARs and Selection of Indicator Chemicals for Draft FS Evaluations)
Surface water and transition zone water data are compared to water quality criteria that have been identified as potential applicable and relevant or appropriate requirements (ARARs). From these results, potential contaminants posing unacceptable risks have been identified in Section 3.1 of the draft FS.

4. Section 2.2 states that TZW samples collected above the depth of 38 cm were screened against values for human consumption and ecological health. Please explain the significance of the specific 38 cm depth.

5. Section 3.0 states that a mobility evaluation cannot be conducted for dioxins and)) *difficulty in modeling this group of contaminants and due to relatively limited availability of analytical data for dioxins/furans*A) x)))) limited amount of data on dioxins and furans relative to data on other COCs?

Appendix Da (Remediation Goal Development)
This appendix explains the process for developing numerical site cleanup goals for contaminants of concern. Reaching remediation goals is expected to achieve remedial action objectives. Goals are established for both human and ecological health exposure.

6. Tables 1 through 4, as listed in the Table of Contents, are not included in this appendix. Please include these tables as they present pertinent information, which is otherwise not listed.

7. a))) t) G A C) *contaminants were not evaluated in the draft final BERA using the tissue or dietary LOEs* A) p))) why benzo(a)anthracene, benzo(b)flouranthene, benzo(k)flouranthene, chrysene, dibenzo(a,h)anthacene, indeno(1,2,3-cd)pyrene, TPH(total), and TPH (residual) were not evaluated.

8. Section 3 states that the tributyltin ion (TBT) toxic reference value was revised,))) ubu)) psg)))))))) E A) a)))) ubu)))))) a recal)))))) hr))) E :) should be calculated again for all species.

9. a) E))))) *could not be calculated in some cases because no biota-sediment accumulation regression (BSAR) or biota-sediment accumulation factor (BSAF) was identified for the particular contaminant-species combination.*) u) F)) L))) BSARs could not be developed for a number of contaminant-species combinations because there is no significant linear and log linear relationship between sediment and tissue concentrations. A more appropriate and nuanced model should be applied to derive PRGs for these combinations. Otherwise, it appears that exposure risks associated with these contaminant-species pairs will not be further considered.

Appendix Hb (Documentation for the Dynamic Bioaccumulation Model)
This appendix describes the bioaccumulation model used to develop remediation goals in the FS. The model predicts contaminant concentrations in wildlife tissue under the current condition and under the different remedial alternative scenarios. The model relies on water and sediment contaminant concentration estimates derived from the fate and transport model.

10. Include a more detailed explanation about why smallmouth bass was the only modeled species whose tissue concentrations were considered under the) A) i)))) *the most commonly consumed species from the Lower Willamette River*)) brown bullhead, and crappie, in addition to smallmouth bass. Please indicate if and why the smallmouth bass serves as an appropriate representative species.

11. Include a discussion explaining how these final fish tissue values compare to fish target levels? How will fish consumption at the end of the 45-year period affect human health?

12. t) G A H) *The Lower) Willamette River food web model (FWM) working group established a performance goal [for the model] of [a] predictive capability within a factor of 10*:)))))) may acceptably be ten times greater than the predicted tissue concentration. This discrepancy in values may greatly under estimate the fish tissue concentrations modeled for remedial alternatives. The disparity between model-predicted and empirical concentrations can be seen in Table 3-6, in which predicted concentrations are largely well above empirical concentrations.

13. In Section 5.1, following Table 5-E :))) *Alte)rnative) F-r has the highest average estimated tissue concentration (9G G) (W E)) 6 h)igher))))) v) g) g) 5 P) RxG) (W)E)) 6 C)* taken from? These numbers are not in Table 5-1. Additionally, the average estimated tissue concentrations over the first 30 years in Table 5-1 and 5-2 do not agree.

Appendix Ib (Evaluation of Dredge Residuals Management)
This appendix explores the effectiveness of two different dredge residuals management strategies. The first strategy involves placing a cap over the dredged area. The second strategy involves placing a cap over the dredge area after conducting a single additional dredge pass. The evaluation follows USACE guidance. The evaluation determined that both strategies were effective. The second strategy is more effective than the first in areas of higher contamination.

14. It is stated several times throughout the document that the one pass and cover)))))))) *for)) draft FS purposes only*A) o))) ng the r)emedial design stage. Please include language to ensure that any chosen strategy will be at least as protective as the one pass and cover strategy.

Appendix Ic (Air Pollutant and Greenhouse Gas Emissions Inventory)
Standard calculation methods were used to determine greenhouse gas (carbon dioxide, methane, nitrous oxide) and air pollutant (nitrogen oxides, sulfur dioxide, carbon monoxide, hydrocarbons, volatile organic compounds, particulate matter less than 10 microns in diameter, and particulate matter less than 2.5 microns in diameter) emissions

from short-term remedial actions. It was found that emissions are most greatly associated with dredging and transportation for upland disposal.

15. This inventory does not include indirect emissions and certain direct emissions due to a lack of design details. These emissions, however, need to be accounted for, using at least a range of reasonable and supportable estimations, to ensure that the overall emission amounts are not significantly underestimated.

Appendix N (Green Remediation)
To satisfy EPA Region 10 requirements, this appendix presents green remediation opportunities related to potentially-selected remedial technologies. The green opportunities are assessed for their applicability and feasibility to the remedial alternatives in the FS. The alternatives were evaluated against five green remediation core elements:

Total Energy and Renewable Energy Use
Air Pollutants and Greenhouse Gas (GHG) Emissions
Water Use and Impacts to Water Resources
Materials Management and Waste Reduction
Land Management and Ecosystem Protection

Based on the evaluation, the alternatives were ranked according to the size of their environmental footprints.

16. p)) :)))) t *this analysis does not yet utilize footprint calculation procedures recently released from EPA (Draft Methodology for Understanding and Reducing a Project's Environmental Footprint, published by the EPA on September 16, 2011.*

Appendix P (Comprehensive Benthic Approach)
This appendix details the methods for determining Comprehensive Benthic Risk Areas. LWG methodology, developed under EPA guidance, was used to identify areas potentially posing unacceptable risk to the benthic community.

17. t) E A E)))))) F) G) A) p)) specific numerical threshold or provide an appropriate reference.

Appendix T (Long-Term Monitoring and Contingency Program Outline)

This appendix describes general descriptions of long-term monitoring plans for all of the remedial alternatives presented in the FS. Sampling plans and cost estimates are discussed.

18. Several times throughout the Appendix, it is stated that RAOs and remediation ere be A x opportunity for public input during the RAO modification process? Also, will there be any reassessment to ensure that the revised RAOs and remediation goals are protective of human and ecological health?

19. Section 3.3 states that decision makers may Is there a protocol established for alternative reassessment to ensure that decision makers are making uniformly reasonable decisions?

20. Section 3.4.2.3 expresses favor for hydrographic surveys over diver surveys to monitor capped areas, although EPA suggests diver surveys to be conducted every 10 years. For a thorough monitoring effort, both hydrographic and diver surveys would be appropriate because divers may be better able to collect visual evidence of damage to the cap.

Appendix U (Additional Analysis to Support Comparative Evaluation of Alternatives) This appendix provides additional detailed information to support the comparative evaluation of alternatives (Sections 7 through 10 in draft FS main text).

21. t G A I *It is beyond the scope of this draft FS to model and estimate the natural attenuation of each specific groundwater plume in SMAs 9U and 14.* a effectiveness as a treatment should be as fully characterized as possible. It is then reasonable to expect that modeling and estimating the natural attenuation of groundwater plumes is within the scope of the FS.

22. Section 3.5 states that in areas where source controls and natural attenuation epa) *that it is not technically practicable to meet MCLs in a reasonable timeframe in some of these areas.* h what point in the cleanup process would this technical impracticality be established?

23. When determining potential sediment recontamination, as described in Section 4.2, it is stated that averaging areas for BaP did not extend as far downstream as

the averaging areas for PCBs and DDx. Please explain the discrepancies among the averaging areas.

24. Under the conservative assessment to evaluate the certainty/uncertainty of MNR in remedial efforts, described in Section 5.2, Category 1 areas (uncertain) and Category 2 areas (less certain) are assumed to experience no natural recovery. How will Category 3 areas be handled? Would it be assumed that MNR is 100% effective in these areas? Is an assumption like this appropriate for a conservative evaluation?

References

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