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TO Kristine Koch, U.S. Environmental Protection Agency, Region 10

FROM Gail Fricano, Tom Fredette, Rita Cabral, and Rachel DelVecchio, IEc

SUBJECT Comments on Section 4 of the Portland Harbor Feasibility Study

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This memorandum provides comments on behalf of the Five Tribes[1] on EPA's draft Section 4 of the Portland Harbor Feasibility Study (FS), dated August 18, 2015.

The intention of Section 4 is to provide a detailed analysis of remedial alternatives. In this section, the alternatives developed in Section 3 are evaluated against EPA's two threshold criteria and five balancing criteria. The two modifying criteria (state acceptance and tribal consultation and coordination, and community acceptance) will be evaluated at an appropriate future time.

Under this same correspondence, we are also sending a redline version of EPA's draft Section 4. This latter document includes comments that are more editorial in nature. The comments provided in this memo are separate and distinct from the comments and edits in the redline version of Section 4.

Below we present our comments by topic.

GENERAL COMMENT

(1) The Five Tribes find Section 4 to be largely inadequate. The evaluation of the alternatives against the criteria required in the National Contingency Plan (NCP; 40 CFR §300.430(e)(9)) is superficial, subjective, and primarily qualitative in nature. We strongly urge EPA to adopt a more quantitative, rigorous evaluation of the alternatives. Given the importance of the decision that this evaluation will be based on, EPA's draft analysis is insufficient. In particular, a quantitative analysis should be applied to (1) estimate natural recovery post-remedy, (2) more explicitly compare the risk reduction at construction completion (T=0) across the alternatives, (3) evaluate the adequacy of the remedy in addressing non-focus contaminants of concern (COCs), and (4) integrate benthic toxicity data in a more robust manner.

While we understand that a more detailed review of data, including new sampling data, and remedial technologies will occur in Remedial Design, a rigorous, quantitative analysis of alternatives is crucial in the FS. Without such an analysis, we do not feel that EPA can adequately evaluate the merits of each alternative. Further, the Five Tribes will be very limited in our ability to assess the appropriateness of EPA's Proposed Plan.

[1] The five tribes are the Confederated Tribes of The Grand Ronde Community of Oregon, the Nez Perce Tribe, the Confederated Tribes of Siletz Indians of Oregon, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation of Oregon.

Lastly, a weak evaluation of alternatives leaves EPA more vulnerable to attacks from the potentially responsible parties and the public that EPA did not select the most appropriate alternative.

SUBSTANTIVE COMMENTS

(2) One of Section 4's biggest flaws is the lack of a numeric model to estimate natural recovery post-remedy. Without such a tool, there is no support for the assertion that the site will achieve preliminary remediation goals (PRGs) over time. Assuming that the site does achieve PRGs at some point in the future, there is no means to compare this timeframe across the alternatives. This is a crucial gap in our understanding. EPA asserts that Alternatives B through G are expected to protect human health and the environment. Assuming for a moment that all alternatives are protective, a key difference between them is the time to achieve protectiveness. Without a quantitative assessment, there is no means to compare the time to achieve protectiveness. We can fairly reasonably assume (as EPA did in Section 4) that Alternative G will achieve protectiveness sooner than Alternative B. Beyond generalities such as these, we cannot know whether, for instance, Alternative G will achieve protectiveness in 5 years or 100 years, or whether Alternative B lags behind Alternative G by 10 years or 75 years. Answers to these questions are essential in allowing for selection of the appropriate alternative.

The Five Tribes understand that LWG's hydrodynamic and sediment transport (HST) model was flawed and that it was not able to predict with any accuracy sediment deposition as measured by a series of bathymetry surveys. For this reason, we agree with EPA's approach to eschew this model. We also understand that EPA's SEDCAM model was similarly flawed and could not be used. The hydrodynamics of the Willamette River are complex, which contributes to the challenges of modeling it. Further, EPA was working under a tight and inflexible schedule to release Section 4, and it is our understanding that the decision to abandon the SEDCAM model was made soon before the Section 4 release date, with no time to redo the model. We believe, however, that due to the critical role of such a model, EPA should take the time needed to develop a more reliable model. The tool will no doubt be imperfect, but predicting natural recovery with some level of confidence seems preferable to not predicting natural recovery at all.

(3) EPA asserts that Alternatives B through G are each expected to achieve protection of human health and the environment. However, EPA does not present sufficient evidence to support this assertion. With no estimate of time to reach PRGs, we do not have confidence that all alternatives will ever achieve PRGs, let alone in a reasonable timeframe. According to EPA's analysis for Alternative B, reductions in surface-area weighted average concentrations (SWACs) on a site-wide basis compared to the no-action alternative are only 42 percent for PCBs, 37 percent for TCDD, and 24 percent for PeCDD, and residual risks from consumption of fish and shellfish and for nursing infants are higher than EPA and DEQ's acceptable levels of 1×10^{-6} lifetime excess cancer risk for individual carcinogens and a hazard index of 1 for non-carcinogens. Better enforcement of fish consumption advisories may mitigate these risks, but they will do nothing to mitigate ecological risks, which exceed EPA's acceptable levels. Further, there are a large number of locations with demonstrated unacceptable benthic toxicity that

would not be actively remediated. We do not understand EPA's rationale for determining that this alternative is protective of human health and the environment. These concerns are less pronounced for each successive alternative but still relevant.

(4) On p. 4-67, EPA asserts that Alternatives B through G "will attain their respective Federal and State ARARs [applicable or relevant and appropriate requirements]". For chemical-specific ARARs, we do not believe that this statement is supported by the evaluation. Post-construction non-sediment COC concentrations are not estimated, but it is highly unlikely that chemical-specific ARARs (which in many cases form the PRGs for non-sediment media) would be achieved post-construction. Similarly, EPA predicts that post-construction COC concentrations in sediment will not meet cancer and non-cancer risk standards under the Oregon Environmental Cleanup Law ORS 465.315(b)(A) and Oregon Hazardous Substance Remedial Action Rules OAR 340- 122-0040(2)(a) and (c), 0115(2-4). There is no information to support the extent to which sediment or non-sediment COC concentrations would decrease over time. Thus, we do not believe that it is accurate to say that all alternatives will comply with ARARs. We believe that it is more accurate to say that Alternative G is more likely to achieve ARARs than Alternative B.

(5) Benthic risk is not adequately addressed in the evaluation of alternatives. Section 4.1.6.1 states that benthic risk is "evaluated by determining the percentage of measured or predicted benthic toxicity points addressed by the construction of the alternative." We did not see any such evaluation in the text. We are disappointed that EPA is not using benthic risk more explicitly in their cleanup decisions. Toxicity testing and benthic risk modeling add important and distinct information to the focus COC concentrations approach upon which EPA currently relies. Benthic risk data provide information on bioavailability and the toxicity of the entire suite of contaminants in a given sample, not just the focus COCs. The fact that a large number of benthic risk points fall outside of the sediment management areas (SMAs) is evidence that these data provide important information on environmental risk that is complementary to and not redundant with the focus COC remedial action levels (RALs). Toxicity testing is not a perfect indication of benthic risk, as it often does not use appropriately sensitive test organisms. Further, toxicity testing exposure durations are typically significantly shorter than the durations that organisms are exposed to contaminants in situ. However, without better information, we strongly urge EPA to more rigorously incorporate the benthic risk data into their evaluation of alternatives.

(6) As noted above, there are a number of potential quantitative comparisons that would bolster the detailed comparison of alternatives in Section 4. One of these comparisons is the change in SWAC or risk reduction that occurs from one alternative to another. These reductions are provided for each alternative, but they are not compared in tabular or graphical format. This comparison could also be placed in context of the relative monetary cost associated with greater reductions to get a better sense of where diminishing returns are occurring. In comparing alternatives, it would also be useful to create an analysis where the Alternative B values are set to unity (1), and values for all other alternatives are expressed as a multiple of B. Thus, it would be much easier to assess how increasing the cost of Alternative B by some factor changes the level of protectiveness.

(7) Section 4 evaluates the impacts of the alternatives on non-focus COCs by calculating post-construction SWACs. This exercise is helpful in determining the extent to which the alternatives achieve non-focus COC PRGs. What is lacking is an easy way for the reader to determine whether any targeted active remediation outside of the current SMAs would result in significant reductions in non-focus COC concentrations. The series of graphs that depict SWACs or risk on the Y-axis and river miles on the X-axis are helpful in elucidating where the concentration peaks are. However, we are not aware of a clear method to match up these peaks with the SMAs to identify hot spots (for either focus or non-focus COCs) that are not currently proposed for active remediation.

(8) We are unclear on the types and degree of flexibility that LWG and EPA will be able to exercise during Remedial Design compared to the alternatives as defined in the FS. We appreciate that EPA needed to make somewhat coarse assumptions in the FS (e.g., the technology matrix and flow charts). EPA has indicated that these assumptions were made for the purpose of developing costs. However, we do not understand where flexibility is built in. For instance, if during Remedial Design, LWG collects data or performs modeling that they assert indicates that capping or enhanced monitored natural recovery (EMNR) would suffice in an area previously designated as dredging, might this change be allowed? What criteria would be used to evaluate this proposed change, and to what extent would memorandum of understanding (MOU) partners be involved in the decision-making process? What sorts of departures from the Proposed Plan during Remedial Design would require a Record of Decision (ROD) amendment? Similarly, for the Proposed Plan, what sorts of departures from the FS would require another round of tribal consultation and revisions to the FS? Answers to these questions need not be outlined in the FS. However, a better understanding of these issues would help inform the Five Tribes' review of the FS and subsequent documents.

(9) The rationale for sediment decision unit (SDU) selection is not always clear. As one example, PCB concentrations in the navigation channel at RM11 are as high as or higher than those in RM5.5E and RM6.5E SDUs. Table 1.1-1 indicates that selection of these latter SDUs was driven by PCBs. Thus, we do not understand why RM11 in the navigation channel is not also an SDU.

(10) EPA states that the protectiveness of remedial action objective (RAO) 1 (beaches) will be qualitatively evaluated. First, we do not see even a qualitative evaluation of RAO 1 (beaches) in the FS. Second, we do not understand why EPA doesn't feel that a more quantitative evaluation is possible. Does EPA define beaches as above the high tide line or some other water-based or vertical datum, and this area is outside of the scope of active remediation? If so, what is the relationship between beaches and riverbanks (i.e., are beaches a subset of riverbanks)? What would be the mechanism for risk reduction on beaches (e.g., riverbank capping, upland source control, deposition of cleaner material from the remediated Willamette River sediment bed during high tide events)? These points should be clarified in the text.

(11) As we noted in our comments on Section 3, we believe that the construction duration for each alternative is significantly underestimated. It seems very unlikely that the

adjacent communities would tolerate dredging 24 hours per day. We suggest using more realistic estimates to allow for a more accurate comparison of alternatives.

(12) Reliance on the optimistic production estimates from Schroeder and Gustavson (2013; Section 4.1.8 of FS) likely underestimates construction durations for the alternatives, and therefore the cost. Schroeder and Gustavson do not provide sufficient rationale for their estimates; thus, we consider them to be unreliable. Data from the Willamette system could be used to create a far more reliable predictor than the non-regional projects used in the Schroeder and Gustavson estimates. If EPA continues to use the Schroeder and Gustavson estimates, the uncertainty associated with these numbers should be noted.

(13) The discussion of system recovery in Section 4.3.1 does not sufficiently consider the interplay of the components affecting recovery time. Under the optimistic assumptions of the FS, Alternative B would be completed 14 years sooner than Alternative G, while Alternative G would be much more disruptive to the system in terms of direct physical impact and residual releases. All of these factors need to be considered in the proper temporal context.

(14) Please provide citations that demonstrate the value of the "Precautions and controls" identified on p. 4-32. Factual support for the effectiveness of such methods is scant in the remediation literature. Implementation of these methods may not increase protectiveness and could decrease overall performance (for instance, in terms of construction duration and cost).

(15) EPA notes in the discussion of Adequacy and Reliability of Engineering and Institutional Controls for Alternatives D, E, F, and G that "Additional O&M [operations and maintenance], ICs [institutional controls], and monitoring would be required than [the previous alternative] due to the increase in the acreage of caps." This statement is misleading as written. More intensive alternatives may require fewer ICs and less monitoring of certain types. For instance, more intensive alternatives may have fewer, shorter, or less comprehensive fish consumption advisories than less intensive alternatives. More intensive alternatives may also have less monitoring because PRGs may be reached sooner. We assume that the statement as written refers to ICs and monitoring directly associated with capping. However, that point should be clarified. One suggestion is "Additional cap-related O&M, ICs, and monitoring would be required as compared to…"

(16) On p. 4-41 and elsewhere, EPA asserts that fish tissue COC concentrations will increase during construction, but that they will remain elevated only during the construction windows. We agree that dredging and other sediment handling are likely to resuspend contaminated sediments, potentially increasing fish tissue COC concentrations. However, we are unsure that fish tissue COC concentrations will decrease outside of the construction periods, as many COCs, such as PCBs, are not readily metabolized. We suggest that EPA clarify this point and provide the technical basis for their assertion, if any.

(17) The graphical use of the pie charts in Table 4.3-2 is misleading. Following on a

purely subjective analysis, the results are presented with symbols that intuitively suggest a quantitative magnitude difference.

DISCREPANCIES BETWEEN TABLES/FIGURES AND TEXT

(18) We did not cross-check all figures and tables against the text. However, our spot checking indicates that there may be a number of discrepancies. We request that EPA carefully compare all figures and tables against the text and resolve any discrepancies.

(19) The second to last paragraph on p. 4-16 indicates that for Alternative B, RAO 2 residual carcinogenic risks are less than 3×10^{-3}; however, risks in western portion of the river are graphed in Figure 4.2-2 as significantly greater than this level. Does EPA only cite the risks for the whole river (east, west, and navigation channel combined) because this is the most appropriate risk area? If so, that should be clearly stated. Otherwise, it appears that the text understates risk.

(20) The text references figures in Appendix H, but no figures are provided in this appendix. The Five Tribes are interested in seeing these figures.

(21) It appears that Figure 4.1-1a-ac mistakenly includes graphs for chromium. The remainder of the graphs represents COCs that have sediment PRGs; it is our understanding that there are no sediment PRGs for chromium.

(22) We also noticed several discrepancies between tables and text. For instance, the RAO 5 paragraph on p. 4-15 indicates that cadmium, dieldrin, and TBT meet the PRGs for Alternative A. However, Table 4.2-7 indicates that copper, lead, mercury, and zinc also meet the PRGs. The following RAO 6 paragraph indicates that the PRG for DDx is met. However, Table 4.2-9 indicates that the PRGs for PeCDD and TCDD are also met. Another example is the RAO 6 paragraph for Alternative B on p. 4-34, which states: "In addition to the PRGs met under Alternative A, the PRGs for PeCDD and TCDD are met under this alternative." It appears that these PRGs, as well as DDx, were also met under Alternative A.

EDITORIAL AND CLARIFYING COMMENTS

(23) We assume that EPA will conduct a thorough editorial review of this chapter. Any editorial comments that the Five Tribes provide either in this memo or in the companion redline document are incidental to our content review and should not be taken as comprehensive.

(24) The FS should more clearly state the purpose of SDUs and how they are used in the analysis. Page 4-2 introduces the concept of SDUs. We suggest stating the purpose of the SDUs at the start of the paragraph. This information is buried in the last sentence of the paragraph, and the sentence does not clearly state that the primary purpose of the SDUs is to compare post-construction SWACs to PRGs.

(25) The Overall Protection of Human Health and the Environment section for each alternative should remind readers of the acceptable risk thresholds/ranges to facilitate comparison to risk levels expected at T=0.

(26) For the series of figures with SWACs or risk on the Y-axis and river miles on the X-axis, it would be helpful to mark the site boundaries.

(27) For Figures 4.2-1 and 4.2-2, it would be helpful to see the maximum extent of risk. Often, the peak is cut off. We suggest using a broken axis to show these peak values. It would also be helpful to indicate acceptable risk levels on the graphs; due to the challenges in the scale, EPA could include acceptable risk levels in a call-out box or legend.

(28) For Figure 4.2-1 and 4.2-2, we are uncertain what the lines in the Swan Island Lagoon graphs represent. There is only one line in each of these graphs, not one for each alternative, and the color does not seem to match the colors of any of the alternatives.

(29) The shading in Table 4.2-2 and similar tables should be explained. Is the shading intended to represent exceedances of the PRGs? If so, the shading for PCBs in Table 4.2-2 does not appear to be correct.

(30) Figures 4.2-7 through 4.2-10 should be better explained. For instance, it should be noted why upstream sediment trap concentrations are plotted. Are these concentrations meant to represent background concentrations? Also, the scale of the graphs is problematic: for instance, for PCBs, one cannot tell which alternatives exceed RAOs 2, 5, and 6.

(31) We appreciate the analysis shown in Figure 4.1-5a-h and think that it is very important and telling. The figures and discussion are a bit confusing though. For instance, the text states that there are 10 different potential pairs, yet it appears that only four are presented. We suggest that the text be clarified to state that the first survey, January 2002, is compared to each of the subsequent four surveys. Also not clear is the inclusion of the full-sized figures, which appear to be a comparison of June 2009 and January 2002. If those are important to include, they should be referenced in the text with an explanation of why they are included.

(32) The statement that SWACs decrease the least under Alternative B is misleading (p. 4-66). They actually decrease most under Alternative B with smaller subsequent incremental decreases. The statement has potential to create confusion and should be rephrased, perhaps by discussing SWACs only instead of reductions in SWACs.

(33) Based on a spot checking of costs provided in the text against Appendix G, it appears that the total periodic cost provided for Alternative B ($337,522,000) does include 5-year reviews, whereas the text on p. 4-37 indicates that it does not include the 5-year reviews.

(34) We do not understand why O&M costs are listed as $0 in Table 4.3-1.