ITEM	PAGE	SECTION/PARAGRAPH	EPA COMMENT	RESPONSE
1		General	**Remedial Alternative Revisions.** EPA is reducing the number of alternatives being evaluated from 11 to 8 because the array of alternatives should be made up of Alternatives that are significantly different than the other alternatives. EPA is deleting Alternatives 3, 5 and 6 because they are too similar in cost and remedial results than the other alternatives. Revisions will also be made to the remaining alternatives, most significantly former Alternative 7 (new alternative, Alternative 5). Incorporating Alternative 5 is a mid-range alternative and will resolve the problem associated with the bimodal nature of the former array of alternatives. The new Alternative 5 includes several remedial technologies, one of which would require the solidification of shallow DNAPL-impacted soil containing greater than 2 feet cumulative thickness of DNAPL (in the top 20 feet.) EPA chose the target of greater than 2 feet of cumulative DNAPL because it addresses a large mass of DNAPL at the Quendall Site but does not constitute complete solidification or removal of DNAPL, as do the next alternatives but more DNAPL than the previous alternative. Please refer to EPA's General Comments for title and numbering of each alternative in the new array. The following changes are required: 1. Retain Alternatives 1 and 2. 2. Delete Alternative 3. 3. Retain Alternative 4, but modify to include the deep DNAPL in the vicinity of MC-1. 4. Delete Alternatives 5 and 6. 5. Retain Alternative 7 but expand to include (1) shallow DNAPL-impacted soil greater than 2 feet cumulative thickness (in the top 20 feet); and (2) deep DNAPL-impacted soil in the vicinity of MC-1 (consistent with Alt.4). DNAPL collection trenches can be removed since QP and MC DNAPL will be removed or solidified. Add off-shore sheet-pile containment for DNAPL removal in the T-Dock and nearshore areas. 6. Retain Alternatives 8 and 9 (switch order so solidification is before removal). Add offshore sheet-pile containment for DNAPL removal in the T-Dock and nearshore areas. 7. Retain Alternatives 10 and 11 (switch the order so solidification is before removal). Remove groundwater pump and treat from Former Alternative 11. Remove coffer dams for both alternatives and replace with sheet pile, for dredging of nearshore and T-Dock contaminated sediments.	In accordance with discussions with EPA at the May 14, 2013 meeting and EPA's resolution letter dated May 17, 2013, the changes were made, with the following additional adjustments (see May 14, 2013 meeting minutes for additional details): - Two new alternatives were added: one targeting DNAPL in sediments and soils adjacent to Lake Washington; and one targeting deep DNAPL-impacted soils, DNAPL-impacted soils greater than 4-foot cumulative thickness, and DNAPL-impacted soils in the QP-U DNAPL Area. - Alternatives involving dredging include sheet pile containment in the nearshore area only. Offshore areas will be dredged using hydraulic dredging techniques and silt curtains/oil booms for containment. - ENR for sediments was added to all alternatives.

ITEM	PAGE	SECTION/PARAGRAPH	EPA COMMENT	RESPONSE
2		General	Delete all reference to and text, etc referring to the Groundwater Restoration Tech Memo (GW TM. See EPA's General Comments on the GW TM. **Respondent's June 18, 2013 Clarification Request:** Resolution (per EPA letter dated May 17, 2013): *The GW TM cannot be included in the FS. If data or information from the GW TM is needed for the FS, Respondents may excerpt that information. For any material carried forward from the GW TM into the FS, the Respondents shall verify that there are no outstanding comments that EPA made based on their review of the GW TM. Those comments would require resolution before that information or data is used for the FS.* Need to discuss how information will be excerpted from the GW TM. Respondents will plan on discussing specific examples at the June 18th meeting. **EPA's June 28, 2013 Response to Clarification Request:** *EPA agrees with the Respondents' proposal to delete the GW TM as an appendix and as a reference document, and only bring forward relevant data or information from the GW TM that is needed to support the FS: the pump & treat analysis, the construction dewatering analysis, and the sensitivity analysis (low permeability layers in the deep aquifer) based on the GW TM version of the GW model. EPA understands the GW model used in the FS has been refined from the model used in the GW TM (more layers, modifications to allow more contaminant transport analysis). The GW TM model may be described/ qualified as "modeling that was done early in the development of the FS" (or similar language), to distinguish it and the GW TM modeling results from the FS modeling results. If there are outstanding comments made by EPA on data/information in the GW TM that are carried forward into the FS, they must first be resolved with EPA. EPA did not agree with the conclusions of the GW TM; therefore, they cannot be carried forward into the FS; the limited data/information from the GW TM must be presented objectively.* *EPA further clarifies that it is not necessary to re-run the GW TM modeling analyses described above that may be used to support the two most aggressive FS alternatives because results would not result in significantly more or better quality information to justify the added work.*	References to the GW TM were removed from the document.

ITEM	PAGE	SECTION/PARAGRAPH	EPA COMMENT	RESPONSE
3		General	**Groundwater Modeling.** The groundwater model will need to be re-run to address the changes in the alternatives listed above. In addition, there are several key issues related to the model, including: Documentation of DNAPL removal/stabilization scenarios. Several DNAPL removal/stabilization scenarios are discussed in Section 6, citing descriptions in Appendix A. The way the scenarios are depicted in the main text and Appendix A is inconsistent. For example, Section 6 discussed four DNAPL removal/stabilization scenarios; Appendix A includes no discussion in the text, but three "area" combinations are shown in Table A-3 and Figure A-2. These need to be reconciled. Assumptions about the plume volumes and groundwater flow under ISS alternatives. The FS model assumes that solidified material contributes to the calculated plume volumes. EPA does not consider solidified materials to be part of the aquifer; therefore the groundwater model needs to depict the "halo" resulting from leaching from the solidified block and not include the block in the plume volume. There is inadequate consideration of what happens to groundwater for alternatives that include solidification/stabilization. Assumptions about B[a]P in the Deep Aquifer. Respondents data indicates, while limited, that B[a]P is not present in the Deep Aquifer at concentrations exceeding MCLs. This is consistent with page 13 of the FS, which states "the estimated maximum vertical extent of cPAHs in groundwater is 7 feet below the maximum depth of DNAPL." EPA assumes that solidification or removal of deep DNAPL in the RR Area will result in no Deep Aquifer B[a]P plume. This is consistent with comments made by Respondents' to EPA's initial comments (dated August 8, 2011) on the Groundwater Restoration TM, where they stated: "The presence or absence of residuals does significantly alter the restoration timeframe relative to the simple base case. In the base case (i.e., no residuals), B[a]P would not exceed MCLs in the deep aquifer after construction is complete." The FS groundwater model initial conditions assume that B[a]P is present in the Deep Aquifer at a depth of approximately 70 feet in the eastern portion of the site (Figure A-10), 35 feet beyond the deepest known DNAPL. Therefore, the groundwater model needs to be re-run, with the initial conditions changed to assume B[a]P occupies the area indicated by DNAPL and empirical groundwater data. It is assumed, based on the statement above related to the GW TM, that following solidification or removal of DNAPL in this area, the model would predict that B[a]P would not exceed MCLs in the deep aquifer after construction is complete. Modeling Output. For each alternative, the model documentation should include predicted ranges for the volume of the plume, the percent reduction of the plume at 100 years, the estimated time to restore to MCLs, and the mass flux (over time if increasing or decreasing) of each COC estimated along a vertical plane at the shoreline. These types of measures are needed to adequately compare the effectiveness of the alternatives (also see next general comment).	The groundwater model was rerun for new alternatives and for alternatives in which remedy components were modified. Documentation of DNAPL removal/stabilization scenarios. The terminology in the main text and Appendix A discussing these scenarios has been reconciled. Assumptions about the plume volumes and groundwater flow under ISS alternatives. Per the resolution from the May 9, 2013 meeting as documented in EPA's May 17, 2013 letter, only the volume of groundwater exceeding MCLs outside the solidified materials was included in plume volume estimates. Assumptions about B[a]P in the Deep Aquifer. Per the resolution from the May 9, 2013 meeting as documented in EPA's May 17, 2013 letter, B[a]P initial conditions for the groundwater model were not modified. Text and figure annotations were added to the FS, documenting the difference between the modeled and empirically-estimated extents of B[a]P. Modeling Output. The model outputs for each COC were added to Appendix A. Per the resolution from the May 9, 2013 meeting as documented in EPA's May 17, 2013 letter, mass flux was calculated at the lake bed boundary. Per the minutes for the May 9, 2013 modeling meeting, the time-series output of the modeling results was not included in the FS.
4		General	EPA does not support a Site-specific replacement threshold of 27 mg/kg OC for cPAHs. EPA supports a background threshold value (BTV) of 17.5 mg/kg OC, based on the 95% gamma Upper Tolerance Limit (UTL) with 95% coverage (calculated by ProUCL). EPA also completed a replacement value exercise that differed from the Respondents' exercise as follows: 1. Instead of a randomly-generated variable from the background data set, the mean background concentration was substituted. 2. Instead of a t-test being run for each iteration, a non-parametric test (Wilcoxon Rank Sum test) was used. 3. No Monte Carlo simulation was run. The results for this exercise returned a value between 15.964 and 16.3 mg/kg OC, which is lower than the BTV of 17.5 mg/kg OC. Since the replacement value approach relies on the site data (which will change over time), EPA is choosing a BTV of 17.5 mg/kg OC, which is based solely on the background data. Selection of this BTV will affect the area of the sediment "footprint". EPA requires that Respondents revise the footprint based on the revised BTV.	The BTV was used to conservatively approximate the extent of offshore sediments that may require remediation in the revised FS. The appropriate text, tables, and figures have been revised to reflect the use of the BTV of 17.5 mg/kg OC, as required by EPA.

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5		General	Trustees voiced the following concerns as comments in their meeting with EPA on October 23, 2012: 1. Source control should be required to protect upland and aquatic shoreline habitat. 2. Caps in the aquatic areas should not be armored but instead consist of a fish-friendly surface comparable to the existing substrate (i.e., fine sandy material) with gentle sloping surfaces. 3. The efficiency of a remedy that relies on reactive caps or 1-foot sand and fine gravel nonreactive caps. 4. The aquatic area of the site is part of the Muckleshoot's Usual and Accustomed Fishing Grounds (U&A). The remedy should not include restrictions on fishing or hinder the Tribes ability fish in their U&A. **Respondent's June 18, 2013 Clarification Request:** Resolution (per EPA letter dated May 17, 2013): EPA noted no response is needed for Item 1; for Items 2 and 3, Respondents should point to other EPA comments where these issues are addressed. For Item 4, Respondents noted they will need to discuss with Trustees as part of NRDA. For Items 2 and 3, does this mean that the EPA comments are the response, or that the Respondents answers to those comments will be the response? Need to discuss whether the EPA comments adequately cover the issues raised by the Trustees in Items 2 and 3? **EPA's June 28, 2013 Response to Clarification Request:** *The Respondents may choose not to respond to these concerns identified by Trustees, at this time. Generally, these concerns are also concerns covered in comments by EPA on the RI/FS, or they will need to be addressed in remedial design phase of the cleanup. At this time, the Respondents' response to this comment, included by EPA for the Trustees, may be addressed by the following response: "Concern is noted".* *Regarding number 4, this concern was made in the context of CERCLA, not NRDA. Therefore, this concern will need to be addressed within the FS CERCLA process.*	1. Concern is noted. 2. Concern is noted. 3. Concern is noted. 4. Concern is noted.
6		General	Please note that the design specifications and the dredging protocols discussed in the draft FS are only for cost estimate purpose. The actual design specifications and protocols are developed in the remedial design phase.	Acknowledged.
7		General	No comments were made on the Executive Summary, as the main text will need major revisions. **Respondent's June 18, 2013 Clarification Request:** Request feedback regarding Executive Summary format, level of detail, content, etc., independent of main text changes. **EPA's June 28, 2013 Response to Clarification Request:** *The formatting and level of detail as presented in the Executive Summary is sufficient.*	Acknowledged.
8	1	1.0, 1st paragraph, last sentence	Remove "which incorporates revisions made by CH2MHill" and provide the correct date of approval. This comment applies to all such references throughout the FS and appendices.	Revision made as directed.
9	1	1.0, 2nd paragraph, last sentence	Change to "pursuant to CERCLA, the National Oil and Hazardous Substances Pollution Contingency Plan…"	Revision made as directed.
10	3	1.2, 2nd to last bullet	Delete Section 9.	Revision made as directed.
11	5	2.0, 4th paragraph, 2nd to last sentence	The U&A is for the Muckleshoot Tribe, not the Suquamish or Tulalip Tribes. Make these corrections throughout the FS.	Revision made as directed.
12	7	3.1, 1st paragraph, last sentence.	In Figure 3-2, there is a pipeline that runs between Baxter and the South Sump. Provide information about its use, what was transported, and the timeframe.	A portion of the specified information was provided in Note 3 on Figure 3-2. The pipeline was labeled and Note 3 expanded to fully address this comment.
13	7	3.1, 2nd paragraph	Either reference the RI Report (since Task 3 was never finalized) or delete reference and provide complete	The text was revised to reference Section 4.4 of the RI Report.

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			information here.	
14	8	3.1, 4th bullet	The first sentence states: "The former May Creek Channel, located south of the manufacturing plant and storage tanks, received wastes from several historical operations". Please identify all the historical operations.	Only two historical operations were identified in the RI Report—those described in the second sentence of this bullet. The word "several" was deleted from the first sentence and the second sentence was revised slightly to more closely conform to the first bullet in Section 4.4 of the RI Report.
15	8	3.1, 5th bullet	Please provide information regarding the materials that were placed in the South Sump and the whether the materials were removed before the sump was filled.	The first paragraph in Section 2.2.3 of the RI Report provides information regarding materials that were placed in the South Sump. This bullet was revised to more closely conform to that paragraph, and a sentence was added stating that there were no reports that any materials were removed from the South Sump before it was filled.
16	10	3.3, 4th paragraph, last sentence	Please explain in plain English what "advective travel time" is.	The sentence beginning, "The estimated advective travel time through the Deep Aquifer…" was revised to "Based on the observed hydraulic gradient, the estimated time for groundwater to travel through the Deep Aquifer…"
17	11	3.4, 1st paragraph	Also provide similar information for the lake area between the shoreline and the inner harbor line.	Section 3.4 was revised as follows: "From the shoreline, the lake bottom slopes gradually to the inner harbor line. At the sand spit, the elevation drop is generally 1:20 (i.e., 1 ft elevation drop over 20 ft run). At the former T-Dock, the bathymetry is approximately 1.5:20 (i.e., 1.5 ft elevation drop over 20 ft run). Between the Site inner and outer harbor lines, the lake bottom is relatively flat with a typical slope of 0.5:20 (i.e., 0.5 ft elevation drop over 20 ft run). Water depths at the outer harbor line range from 26 to 31 feet (as measured at the normal high water line). The maximum water depth between the Site and Mercer Island is approximately 70 feet (Retec 1997). The lake bottom substrate is typically a fine silt/mud, although there are several areas with a sandier bottom, including a sand spit north of the former T-Dock and sediment near the outer harbor line south of the former T-Dock. With the exception of a wood-debris area along the southern shoreline, aquatic vegetation is dominated by dense areas of Eurasian water milfoil."
18	12	3.5, 4th paragraph, 3rd sentence	From Figure 3-7, the arsenic plume from the Deep Aquifer appears as it may be coming from the Barbee site. Provide discussion of the source of arsenic in the Deep Aquifer.	The text was revised using information from Section 5.2.2.1 of the RI Report to address this comment.
19	13	3.5, 5th paragraph, last sentence	Delete this sentence ("Thus, based on these soil data…").	Revision made as directed.
20	13	3.5, 7th paragraph	See EPA's general comments on the cPAH background replacement threshold for sediment.	See response to EPA Comment 4.
21	16	3.6.2.2, 3rd paragraph, 2nd to last sentence	The Respondents have not proven that biodegradation is occurring. Revise "biodegradation from chemical and biological reactions in the sediment" to "degradation in the sediment." This type of comment applies throughout the FS and the Respondents shall revise accordingly.	References to biodegradation with respect to sediment were revised to "degradation" in the FS per EPA's comment.

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22	17	3.6.2.3, 2nd paragraph	The text in Section 3 states: "As discussed in Appendix B, the overall weight-of-evidence of empirical and modeling results reveal that bacterially mediated sulfate reduction processes (controlled by sulfate diffusion from lake water into surface sediment) currently results in roughly 1,000-fold reduction in BTEX and LPAH concentrations over the last several feet of the transition zone between Site groundwater and the surface water of Lake Washington." However, the last bullet of Section B3-2 of Appendix B states: "To evaluate potential remedial design opportunities to further optimize cap performance at the Site, the calibrated model was configured to evaluate the potential to increase the downward flux of sulfate from the overlying lake water into the sediment system, as bacterially mediated sulfate reduction was identified as a primary COC biodegradation/attenuation pathway under current Site conditions (see Section 3.6.2.3 of the main FS text)." This is circular logic. Revise the text to state that the UT model was used to simulate downward flux of sulfate from the overlying lake water, and that the results are consistent with the reduction in BTEX and LPAH concentrations over the last several feet of the transition zone, and that this may be occurring at the Site (even though there are no data to confirm sulfate reduction).	Discussion of sulfate reduction was revised per EPA comment to indicate it may be occurring at the Site.
23	24	4.1.1	Delete the remainder of this section starting with the sentence that starts with "The TI guidance indicates that the TI evaluation…" EPA has not decided to pursue a TI or not. EPA could decide that the remedial action constitutes a waste management area. Delete all further references to the TI waiver.	Revision made as directed.
24	29	4.3.2, last paragraph	This discussion is not necessary. Delete the portion of this paragraph that states that Ecology allowed a site-specific background concentration for Barbee, and that additional work would be needed to develop one for Quendall, and since the PRG is similar to background, they didn't develop one for the FS. This is not relevant to Quendall.	Revision made as directed.
25	32	4.4, 3rd paragraph	This section describes how areas containing DNAPL were differentiated (effect on GW quality, DNAPL mobility, and DNAPL depth). A fourth differentiator needs to be added: DNAPL volume (thickness). Former Alternative 5 (and new Alternative 4) use DNAPL cumulative thickness (mass) as a criterion for identifying targeted areas. **Respondent's June 18, 2013 Clarification Request:** See note for Comment #33. **EPA's June 28, 2013 Response to Clarification Request:** *See Response to Item 33.*	A fourth differentiator (DNAPL cumulative thickness) was added to this paragraph.
26	31	4.4, DNAPL Mobility bullet, 2nd to last sentence	The "e.g.," should include future development activities, particularly on the scale of that envisioned by the Respondents.	Revision made as directed.
27	32	4.4.1.1, list of bullets	Add a bullet stating that the site is fenced and access is prohibited.	Revision made as directed.
28	32 and 33	4.4.1.1 and 4.4.1.2	Specify what depth interval "surface soil" spans and what depth interval "subsurface soil" spans. Is it 0-5 feet as noted in the RI or 0-15 feet as noted in the risk assessment?	Revisions made as directed. ("Surface soil" spans 0–5 feet as noted in the RI.)
29	33	4.4.1.2, 4th bullet	The vertical extent of the Subsurface Soil and Groundwater Area along Cross Section D-D' is not shown on Figure 4-5.	The last sentence in this bullet was revised to read, "The vertical extent of the Subsurface Soil and Groundwater Area along Cross Section D-D' is approximated by the estimated extent of groundwater and porewater exceeding the naphthalene PRG on Figure 3-8."
30	33	4.4.1.3, 1st paragraph	Specify what depth interval "surface sediment" spans and what depth interval "subsurface sediment" spans.	Surface sediment spans 0–4 inches below sediment surface (bss) as described in the RI. Subsurface sediments are all sediments deeper than 4 inches bss. The text was revised accordingly.

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31	33	4.4.2, general	Each of the DNAPL areas in this section need to be clear as to which DNAPL characteristics (from Section 4.4.1) are of concern for the particular area (effect on GW quality, mobility, depth, and/or thickness).	To address this comment, a sentence was added to the first paragraphs of Sections 4.4.2.1, 4.4.2.2, 4.4.2.3, 4.4.2.5, and 4.4.2.6.
32	35	4.4.2.1, 1st paragraph	It is very difficult to see these borings on Figures 3-1 and 3-5.	Inset maps were added to Figures 3-1 and 3-5 to improve legibility in the vicinity of these borings.
33	33 and 34	4.4.2, list of bullets	Add a bullet: DNAPL-impacted soil in former process areas. Add an associated subsection to Section 4.4.2 that describes this area as having significant thicknesses of DNAPL (defined as greater than 2 feet cumulative) in the vicinity of former process areas such as the Still House, the Boiler House, and the North and South Sumps. As with other subsections, describe the extent of this area, citing locations with the largest cumulative thicknesses. Also describe groundwater impacts, maximum depth of DNAPL, and any areas with potentially mobile DNAPL (including under future conditions). Figure 4.4-4 from the RI should be added to this section. **Respondent's June 18, 2013 Clarification Request:** Needs discussion. Propose including a discussion in section 4.4.2 of DNAPL distribution in the former "process area" consistent with other defined areas (e.g., Railroad Tank Loading Area). However, Respondents believe that the discussion of specific areas targeted for removal or treatment as a part of a specific remedial alternative (e.g., areas with 2- and 4-foot cumulative DNAPL thickness) belongs in Section 6 Development of Alternatives. Section 6 describes how remedial components/technologies are applied to each area of the Site as part of the detailed description of alternatives. **EPA's June 28, 2013 Response to Clarification Request:** *EPA is revising the comment as follows:* *"Add a bullet: DNAPL-impacted soil in former process areas.* *Add an associated subsection to Section 4.4.2 that describes these areas as having significant thicknesses of DNAPL in the vicinity of former process areas such as the Still House, the Boiler House, and the North and South Sumps."* *EPA does not want these areas to be treated differently than other areas targeted for remediation (RR, MC, and QP). The only differences in the way these areas are treated are: (1) no boundary will be put on the map in Section 4 showing the other areas; and (2) a Thiessen polygon figure will be substituted for the DNAPL contour figure to illustrate thickness.* *EPA agrees that the discussion of specific areas targeted for removal or treatment as a part of a specific remedial alternative (e.g. areas with 2- and 4-foot cumulative DNAPL thickness) should be presented in Section 6 Development of Alternatives.*	1. Discussion of DNAPL cumulative thickness as a fourth differentiator was added to Section 4.4.2.4 (Other Upland DNAPL Areas). Consistent with Section 4.4 of the RI, three "Other Former Process Areas" were called out: the Solid Materials Loading Area of the Railroad Property; the Still House; and the North Sump. 2. A new figure (Figure 4-6) was drafted to show DNAPL cumulative thicknesses throughout the Site. The new figure is similar to Figure 4.4-4 from the RI, but Thiessen polygons were depicted rather than the contoured shapes shown in the RI figure. Since these Thiessen polygons were subsequently used in remedial alternative development/ evaluation, the new figure provides for greater consistency within the FS report.
34	35	4.4.2.2, 4th paragraph	Add to this section the area around HC-7 (between the two areas currently included. The RI indicates there was 6.5 feet of DNAPL observed at HC-7.	Text revision made as directed. Figures 4-1 and 4-3 were also revised to reflect this change.
35	35	4.4.2.2, 2nd paragraph, 2nd to the last sentence and last sentence	Both of these statements are rather definitive statements. Soften these sentences to be assumptions or use wording like "may", "suggests".	Revision made as directed.
36	36	4.4.2.3, 1st paragraph, last sentence	The text states: "At these locations, DNAPL is trapped by low-permeability silt and peat layers that prevent downward migration". This statement is rather definitive. Soften this sentence to be an assumption, etc.,	Revision made as directed.
37	37	4.4.2.4	Revised this section to describe all other upland DNAPL areas not discussed in previous subsections. It is anticipated that it would include areas with cumulative DNAPL less than 2 feet in thickness (i.e., DNAPL stringers).	The first sentence in this section was revised to clarify that the category "Other Upland DNAPL Areas" comprised all upland areas where DNAPL was observed (at any thickness) outside of the previously discussed areas.

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38	45	5.3.1.3, 1st paragraph	"absorption" should be "adsorption"	Revision made as directed.
39		5.3.4.4, 1st bullet	The Respondents state that permeable reactive capping could be used to "limit DNAPL migration". Why would the cap not have clogging problems as the permeable treatment walls would? How would this work? This needs more explanation.	Reactive caps with certain media such as organoclay (OC) may have lower permeability but are not impermeable and do not "clog". Section 5.3.4.4 and Appendix C were revised to better describe the reactive caps. Details regarding permeability and ebullition in reactive caps, and specific final remedy site examples were added to Appendix C.
40	60	5.3.4.5, Dredging	There are other choices than clamshell buckets such as environmental buckets.	Section 5.3.4.5 and Appendix C were updated to include several other equipment types for mechanical dredging.
41	64	Section 6 Because Section 6.1 was deleted, all section numbers have been revised (e.g., Section 6.2 is new Section 6.1)	Refer to EPA's General Comments on use of GW TM in the draft FS. Comments on GW TM are relevant for all of the sections in the draft FS. For example, delete from the second paragraph to the end of Section 6.1. **Respondent's June 18, 2013 Clarification Request:** Clarification needed regarding excerpting information from GW TM (see Item #2 above) **EPA's June 28, 2013 Response to Clarification Request:** *See EPA response to Item 2.*	Per EPA Response to Respondent's Request for Clarification (June 28, 2013), references to the GW TM were deleted, including the example provided by EPA.
42	65	6.2 (New Section 6.1)	Biosparging was retained as an in-situ groundwater treatment technology in Section 5. However, none of the alternatives in Section 6 incorporate any form of in-situ groundwater remediation using biosparging. EPA is satisfied that it does not need to be included in the FS alternatives and believes it could be viewed in the future as a polishing step if needed. Please provide a rationale for why it is retained and not carried forward into an alternative for this FS.	The rationale for not including all technologies retained in technology screening, including biosparging, was added to the new Section 6.1, Assembly of Alternatives.
43	66	6.2, 1st full paragraph (New Section 6.2, 1st full paragraph)	A new table that precedes existing Table 6-1 needs to be developed that includes the name of the alternative (see below), the stated purpose), and the relationship to RAOs. Alt. 1 – No Action Alt. 2 – Passive Containment Alt. 3 (Former Alt. 4) – Targeted treatment of deep upland Principal Threat Materials (PMTs) via in-situ solidification/stabilization (ISSS), plus passive groundwater (GW) treatment Alt. 4 (Former Alt.7) – Targeted treatment of deep and shallow upland PMTs via ISSS, targeted treatment of offshore PMTs via removal/off-site disposal, plus passive GW treatment Alt. 5 (Former Alt. 9) – Treatment of upland PMTs via ISSS, treatment of offshore PMTs via removal/offsite disposal Alt. 6 (Former Alt. 8) – Treatment of upland and offshore PMTs via removal/onsite ex-situ thermal Alt. 7 (Former Alt. 11) – Treatment of upland and offshore PMTs and contaminated soil and sediment via ISSS and removal/onsite ex-situ thermal Alt. 8 (Former Alt. 10) – Treatment of upland and offshore PMTs and contaminated soil and sediment via removal/onsite ex-situ thermal, plus active GW treatment **Respondent's June 18, 2013 Clarification Request:** Request clarification. What is the purpose of this new table? How does the stated purpose differ from the name of the alternative? What does EPA mean by "relationship to RAOs"? **EPA's June 28, 2013 Response to Clarification Request:** *The new table that EPA is requesting is a table that indicates the relative degree, if any, that each alternative*	New table was added as 6.1 – Assembly of Alternatives – Anticipated Relationship to Remedial Action Objectives (RAOs) as directed. Former Table 6.1 – Assemble of Technologies and Process Options into Remedial Alternatives is now Table 6.2. The alternatives were titled as follows: • Alternative 1 – No Action • Alternative 2 – Containment • Alternative 3 – Containment with Targeted PTM Solidification (RR and MC DNAPL Areas) • Alternative 4 – Containment with Targeted PTM Removal (TD, QP-S, and QP-U DNAPL Areas) • Alternative 5 – Containment with Targeted PTM Solidification (RR, MC, and QP-U DNAPL Areas and ≥ 4-Foot-Thickness) and Removal (TD and QP-S DNAPL Areas) • Alternative 6 – Containment with Targeted PTM Solidification (RR and MC DNAPL Areas and ≥ 2-Foot-Thickness) and Removal (TD, QP-S, and QP-U DNAPL Areas) • Alternative 7 – Containment with PTM Solidification (Upland) and Removal (Sediment) • Alternative 8 – Containment with PTM Removal (Upland and Sediment) • Alternative 9 – Containment with Solidification and Removal of Contaminated Soil and Removal of Contaminated Sediment • Alternative 10 – Containment with Removal of Contaminated Soil and Removal of Contaminated Sediment

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			addresses each RAO. Refer to Section 4 of the RI/FS Guidance.1 *The purpose of each alternative should also be included in the chart. The purpose describes briefly how the alternatives are different from one another, in terms of focus. For example, some alternatives are more focused on preventing exposure and migration, some are more focused on treatment or removal of PMTs to various degrees, and some are focused on restoration of groundwater.*	
44	66	6.3 (New Section 6.2)	Add another subsection to Section 6.3, Common Elements, that addresses issues concerning both upland and aquatic habitat creation and maintenance, such as remedial actions that may need to be implemented or not to allow habitat to develop successfully. Also, state somewhere in this section that O&M and monitoring costs were estimated based on 100 years.	A new Section 6.2.2, Habitat Considerations, was added. One hundred (100) years was assumed for estimating O&M and monitoring costs. This is mentioned in a footnote in Section 6.2.4.1 and discussed in Section 7, which introduces cost estimates.
45	66	6.3.1 (New Section 6.2.1)	Another issue associated with site development is the limited access it could cause to remedial components or the ability to address remedial problems, such as remedy failure, after development has occurred. This is an issue that should also be considered when evaluating alternatives.	The following bullet was added to Section 6.2.1: "Site development would likely involve installation of structures, such as buildings and utilities, that may limit access to remedial components. If additional remedial measures are needed in the future, the presence of these structures may also limit the scope or type of remedial measures that can be implemented."
46	66	6.3.1, 2nd bullet (New Section 6.2.1, 2nd bullet)	The second bullet should not be included under the sub section entitled "Redevelopment of the Quendall Terminals Property". Add the following to the new subsection for Habitat: "Development of habitat pursuant to the CWA, the NRDA or the ESA will be included as part of the remedy and in no way is contingent on the timing of redevelopment." Remedial components shall not be included in the habitat areas including the aquatic habitat that require monitoring, maintenance, would impair the habitat or require any access to the habitat area. More consideration needs to be given to this issue when evaluating alternatives, for example, former Alternative 5 and any other alternative that relies on DNAPL collection trenches, PRB, or a reactive cap along the shoreline. Additionally, in the former Alt 7, the Respondents state that a disadvantage of ISS is that it "would require removal and disposal of a substantial volume of excess material. However, the Respondents acknowledge in the draft FS that significant re-contouring of the Upland shoreline area would be needed to create shoreline grade habitat. **Respondent's June 18, 2013 Clarification Request:** Resolution (per EPA letter dated May 17, 2013): EPA will revise the sentence to include only CWA and ESA. EPA will also mention that the Respondents and the Natural Resource Trustees could reach a separate settlement pursuant to NRDA that may include additional habitat restoration along the shoreline at Quendall. EPA and the Respondents are seeking to coordinate wetland mitigation and restoration pursuant to a Respondent and NOAA settlement. Respondents propose deleting any reference to NRD. **EPA's June 28, 2013 Response to Clarification Request:** *In the FS, the Respondents stated the following on page 73: "As discussed above, depending on the outcome of ongoing compensatory mitigation and NRD*	Revisions made as directed by EPA in its revised comment (EPA response, June 28, 2013). A new Section 6.2.2, Habitat Concerns, was added. For alternatives that include *in situ* solidification in the assumed future habitat area, excess material was assumed to be removed and placed further upland on the Site, not disposed of off site. The text of Alternative 6 (similar to former Alternative 7) was corrected.

[1] Guidance for Conducting Remedial Investigation and Feasibility Studies Under CERCLA, OSWER Directive 9355.3-01, October 1988.

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			restoration analyses that are occurring in parallel with the FS process, this cap would support a range of functional wetland and/or riparian habitats, and would remain undeveloped." Given that the Respondents themselves included the reference to NRDA in the FS, they are free to revise sentences in the FS to delete reference to NRDA. EPA revises its comment to remove NRDA to read as follows: *"Add the following to the new subsection for Habitat:* *"Development of habitat pursuant to the CWA, ~~the NRDA~~ or the ESA will be included as part of the remedy and in no way is contingent on the timing of redevelopment."* *EPA's comment regarding additional consideration of the habitat area when evaluating various technologies within an alternative is further addressed in Item 56.*	
47	67	6.3.1, 2nd paragraph (New Section 6.2.1, 2nd paragraph)	The statement "DNAPL in subsurface is not actively migrating" cannot be definitely proven at this site. The known presence of potentially mobile DNAPL is mentioned on page 35 and it's possible that DNAPL above residual saturation exists at other areas of the site as well that could be potentially mobile (if not stratigraphically trapped). In addition, most alternatives include provision for DNAPL collection trenches and indicate that DNAPL recovery will likely continue indefinitely. Modify this statement to something less definitive such as "DNAPL in the subsurface is not known to be actively migrating…" Also note that development construction could cause DNAPL to migrate.	The statement was modified as follows: "As discussed in the Site CSM (see Section 3), DNAPL in the subsurface does not appear to be actively migrating, likely because it is below residual saturation or is stratigraphically trapped."
48		6.3.2, first paragraph (New Section 6.2.3, first paragraph)	Delete "EPA believes that".	Revision made as directed.
49	72	6.4 (New Section 6.3)	In order to understand the effectiveness of each alternative on reducing the COC plumes in groundwater, appropriate figures from the groundwater model should be included to accompany each alternative in this section. **Respondent's June 18, 2013 Clarification Request:** Discuss which figures would be appropriate to include. **EPA's June 28, 2013 Response to Clarification Request:** *EPA is revising this comment, with the understanding that the groundwater model figures in Appendix A are only for comparative purposes and do not represent actual predicted results. Instead of figures, the following should be included in each description of alternatives: predicted ranges for the volume of the plume at 100 years (accounting for the range in half-lives), the percent reduction of the plume at 100 years, the estimated time to restore to MCLs for each COC, and the mass flux (over time if increasing or decreasing) of each COC when estimated along the lakebed.* *Quantitative information regarding the amount of contamination addressed by each alternative (such as volume of DNAPL removed or solidified), can be presented in Section 6, and effectiveness metrics (such as those GW modeling predictions described above) would be presented in Section 7.*	Per EPA revision to this comment (June 28, 2013), groundwater model figures were not added to Section 6. Quantitative information regarding the amount of contamination addressed by each alternative was presented in Section 6, and groundwater model predictions of effectiveness were presented in Section 7.
50	72	6.4.2 (New Section 6.3.2)	**Retain Alternative 2 – Passive Containment** Comments made on remedial techniques for Alternative 2 that apply to any other of the alternative should also be considered as a comment on that alternative. These are non-reactive sediment caps, upland caps, and ICs. Comments on these remedial components will only be stated once but will apply to all alternatives with these components.	Alternative retained, but with modifications as discussed with EPA (May 14, 2013 meeting at EPA). Revisions made to Alternative 2 components were applied to all alternatives where applicable. **New Alternative 2 Title: Containment.**

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51	72-73	6.4.2.1, (New Section 6.3.2.2) Non-reactive sediment cap (New Title: "Engineered Sand Cap")	The combined effects of capping and reduction of groundwater flow does not cause "natural degradation", instead it is attenuation—dilution—very different processes.	The term natural degradation has been deleted. The revised paragraph states that the sand cap would provide a clean bioturbation layer and reduce surface sediment porewater concentrations relative to deeper groundwater concentrations, without identifying a mechanism.
52	72-73	6.4.2.1, (New Section 6.3.2.1 & 6.3.2.2) Non-reactive sediment cap (New Title: "Engineered Sand Cap")	See EPA's previous comment on the replacement value threshold 27 mg/kg OC.	The replacement value threshold 27 mg/kg OC was replaced with the background threshold value per previous comments. See response to Comment 4.
53	72-73	6.4.2.1, (New Section 6.3.2.2) Non-reactive sediment cap (New Title: "Engineered Sand Cap")	How much natural degradation would happen, what is the % increase in natural degradation?	As noted in Comment 51, the combined effects of capping and reduction of groundwater flow do not cause natural degradation. The term "natural degradation" has been deleted from this paragraph.
54	72-73	6.4.2.1, (New Section 6.3.2.2) Non-reactive sediment cap (New Title: "Engineered Sand Cap")	Shoreline sections of the non-reactive cap would be armored to prevent erosion of the cap materials from wave energy and subsequently covered with beach gravel to provide a natural beach substrate. Appendix B provides additional details regarding FS-level cap stability design calculations and conceptual material specifications (e.g., armor material size) for various cap layers. Why do the Respondents believe that armoring is necessary? Also, Figure in B.4 shows cap above the bathymetry.	The analysis presented in Appendix B4 of the FS showed that waves can potentially cause erosion of the cap unless armoring is in place. If capping is selected as part of the preferred remedy, the need for armoring would be revisited during the design. In regards to the cap shown above the bathymetry, the cap armoring needs to extend above the water surface to protect against erosion associated with wave run-up. Capping restriction text was revised to provide more definition to this Alternative.
55	73-74	6.4.2.2, (New Section 6.3.2.4) Upland Cap	The first sentence states that the surface soil will be capped where PRGs are exceeded. We believe that the areas that would exceed PRGs would be rather small given all the site grading and wood bark debris that remains from former operations. Is that sentence in conflict with the fourth bullet? What is assumed in the modeling--was it assumed the impermeable surface would all be created by the development, building, sidewalks, etc? And if so, why? The impermeable cap does not seem to be part of the remedy unless the Respondents want to place an impermeable cap over the site as part of the remedy which would be implemented with the rest of the remedial actions.	The RI assumes surface soils across much of the Site exceed PRGs. As discussed (May 14, 2013 meeting at EPA), the remedy does not specify the cap as permeable or impermeable—either would be effective. For costing purposes, it was assumed that a permeable (soil) cap was implemented as part of the remedy, but for modeling purposes, a long-term condition in which the cap was primarily impermeable (except in the habitat area) was assumed, which is representative of the future condition following Site redevelopment. A paragraph was added to Section 6.3.2.4 to this effect.

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56	73-74	6.4.2.2, (New Section 6.3.2.4) Upland Cap	Assumptions regarding remedial actions that may be implemented to support habitat need to be considered further. It could be assumed that the upland habitat would all be marsh land. A reactive layer may or may not be appropriate. **Respondent's June 18, 2013 Clarification Request:** Request further discussion and clarification. **EPA's June 28, 2013 Response to Clarification Request:** *This comment was in response to the 1st bullet where it states "if wetlands are re-created in areas above existing DNAPL, a layer of relatively impermeable organoclay or other reactive materials would be placed…". EPA's point is that including a reactive cap in the habitat area may not be appropriate; i.e., DNAPL removal may be necessary in this area. EPA would like to see more discussion in the FS about the manner in which each alternative would impact the habitat area as part of the evaluation of alternatives, pursuant to CERCLA.*	The following was added to the new Section 6.2.2, Habitat Considerations: "Depending on the location of future wetland areas, the potential for contaminated groundwater to discharge into wetland habitat areas and impact biota would need to be evaluated and addressed. Potential actions could include placing impermeable reactive mats beneath wetland areas or additional overexcavation of contaminated materials."
57	73-74	6.4.2.2 (New Section 6.3.2.4) , Upland Cap	What re-contouring is anticipated and included in the alternative evaluation?	Specific topography will depend on habitat functionality (i.e., wetland vs. riparian) and locations. The FS assumed that the habitat area required an average overexcavation of 3 feet of soil and placement of 3 feet of clean fill. This assumption was provided in Section 6.3.2.4.
58	73-74	6.4.2.2, (New Section 6.3.2.4) Upland Cap	What is meant by "(d)epending on the future grade of the upland shoreline cap…"?	This sentence was deleted and replaced with the assumption noted in the response to Comment 57.
59	73-74	6.4.2.2, (New Section 6.3.2.4) Upland Cap	Activities that are associated with development should not be included in the summary of remedial activities. This makes it confusing when trying to determine what is being modeled and what is only being done to for remediation purposes.	Development activities were removed from the description of individual remedial alternatives.
60	73-74	6.4.2.2, (New Section 6.3.2.4) Upland Cap	EPA is not sure what is meant by "shoreline buffer". Habitat will be required for several reasons associated with the filling of wetlands and for damage to natural resources and perhaps the Endangered Species Act. Delete the reference to City of Renton when other references for mitigation/ restoration are mentioned. This makes the paragraph confusing. If asphalt is being assumed to be the impermeable surface, is this temporary until pavement is laid for development? **Respondent's June 18, 2013 Clarification Request:** EPA comment indicates that habitat will be required "for damage to natural resources" and in addition discusses restoration. Request that EPA clarify or revise this comment so it does not refer to NRD issues. **EPA's June 28, 2013 Response to Clarification Request:** *In the FS, the Respondents stated the following on page 73: "As discussed above, depending on the outcome of ongoing compensatory mitigation and NRD restoration analyses that are occurring in parallel with the FS process, this cap would support a range of functional wetland and/or riparian habitats, and would remain undeveloped." Given that the Respondents themselves included the reference to NRDA in the FS, they are free to revise sentences in the FS to delete reference to NRDA.* *The fourth bullet in Section 6.4.2.2, states the following: "For the shoreline buffer area, (an assumed 100-foot-wide strip along Lake Washington [approximately3.1 acres] expected to be required by the City of Renton for redevelopment." Delete "by the City of Renton for redevelopment". Alternatively, modify the sentence to include wording, such as "For the purposes of evaluating FS alternatives, in anticipation of the requirement to mitigate for filling wetlands, pursuant to CWA 404(b)(1), a 100-foot- wide strip all along the shoreline has been reserved for habitat mitigation". It is premature to determine what may or may not be required by the Renton SMP. Also, during the June 18, 2013 meeting, the Respondents agreed to delete all reference to*	"Shoreline buffer" refers to the habitat area: the term was revised to consistently refer to the "habitat area". Per response to Comment 55, the assumed cap for the remedy was permeable soil. References to asphalt cap were removed.

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			redevelopment of the site beyond site remediation. *Note that EPA's comments should include "not" as follows: "Delete the reference to City of Renton when other references for mitigation/restoration are NOT mentioned." It is misleading to only point out the City of Renton SMP as the reference and not include other statutes and regulations that will inform mitigation requirements for filling of wetlands.*	
61	74-75	6.4.2.3, (New Section 6.3.2.5) ICs, Monitoring	Refer to EPA's General Comments regarding ICs. Also, for example, the first bullet needs to be more specific about the ICs that would protect sediment caps.	The text was revised to expand on specific ICs to protect sediment caps.
62	74-75	6.4.2.3, (New Section 6.3.2.5) ICs, Monitoring	Note that bulk sediment will also need to be sampled to ensure that the appropriate PRGs are met.	The text was revised to include monitoring of surface sediment.
63	74-75	6.4.2.3, (New Section 6.3.2.6) ICs, Monitoring	Even though the monitoring intervals are for estimating cost, the intervals are very unrealistic. Assume, annual sediment cap sampling and analysis and annual dive surveys for all capped areas. Also, much more frequent monitoring will drastically affect cost for remedies that basically only involve ICs and capping. For remedies that rely less on capping and ICs would ultimately result in less frequent sampling.	The text was revised to include appropriate monitoring frequencies.
64	75-80	6.4.3 (New Section 6.3.3)	**Delete Alternative 3.** However, within the text for Alternative 3, EPA is only providing comments on remedial components described there and carried forward into other alternatives. These are: DNAPL collection trenches, permeable reactive barrier, and reactive sediment cap. Comments on these remedial components will only be stated once but will apply to all alternatives with these components.	Alternative 3 was deleted. Comments on DNAPL collection trenches, permeable reactive barrier, and reactive sediment cap were addressed in subsequent alternatives where applicable. The former Alternative 4 is now the new Alternative 3: Containment with Targeted PTM Solidification (RR and MC DNAPL Areas)."
65	75-80	6.4.3, Intro (New Section 6.3.3)	Although Alternative 3 is deleted, these comments may apply to other alternatives: 1. Is all DNAPL principal threat? State that somewhere and just use one term 2. Collection trenches do not remove "potentially mobile DNAPL", only DNAPL that is mobile. 3. How much faster is the recovery of lake sediments and porewater with the inclusion of a PRB? **Respondent's June 18, 2013 Clarification Request:** Need to discuss point #3? Sediment "recovery" depends on location; none where DNAPL source remaining. How to quantify 'recovery'. **EPA's June 28, 2013 Response to Clarification Request:** *EPA expects Respondents to provide an evaluation of the effectiveness of the PRB on groundwater quality (not sediment quality); therefore Number 3 of Item 65 is retracted.*	1. The following was added to Section 6.1: " PTMs for the Site include DNAPL, DNAPL-impacted soil, and DNAPL-impacted sediment (see Section 4.2). Upland PTMs include DNAPL and DNAPL-impacted soil located east of the shoreline. Sediment PTMs include DNAPL and DNAPL-impacted sediment west of the shoreline." 2. Text was revised (i.e., "potentially" was deleted). 3. EPA retracted this comment.
66	75-80	6.4.3.1, DNAPL collection trenches (New Section 6.3.3.2)	State which sites have implemented similar DNAPL collection trenches and provide a proper reference.	Revision made as directed.
67	75-80	6.4.3.1, DNAPL	Collection trenches shall not be placed in the Habitat areas.	As discussed in Section 6.2.2, the ability of remedial components to be placed in the habitat

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		collection trenches (New Section 6.3.3.2)		area will depend on the specific design of the habitat area and the remedy. For purposes of the FS, collection trench alignments were adjusted to be located outside the habitat area.
68	75-80	6.4.3.1, DNAPL collection trenches (New Section 6.3.3.2)	How will the trenches be keyed into the low permeability layers when the subsurface is heterogeneous? Will all DNAPL in the upper aquifer be caught in the collection trenches?	The following was added to the DNAPL Collection Trench description: "Because the soils in this area are heterogeneous, an impermeable liner would be placed at the bottom of the trench to prevent DNAPL entering the trench from migrating into adjoining permeable soil layers." As stated in the alternative description, the DNAPL collection trenches will be constructed to collect mobile DNAPL in the Shallow Aquifer and prevent migration towards Lake Washington; however, because of its low migration potential, it is expected that only a small portion of Site DNAPL will be mobile enough to be captured by trenches.
69	75-80	6.4.3.2, PRB (New Section 6.3.3.3)	PRB will not be placed on the habitat area.	As discussed in Section 6.2.2, the ability of remedial components to be placed in the habitat area will depend on the specific design of the habitat area and the remedy. For purposes of the FS, PRB alignments were adjusted to be located outside the habitat area.
70	75-80	6.4.3.2, PRB (New Section 6.3.3.3)	Which areas of contaminated groundwater are expected to be treated by the PRB?	Groundwater in the Shallow Alluvium to an approximate depth of 25 feet is expected to be treated by the PRB. The following sentence was added to the PRB description: "The treatment wall would be constructed to a depth of approximately 25 feet to intercept the majority of the Shallow Alluvium groundwater plume without extending into Deeper Alluvium."
71	75-80	6.4.3.3, Reactive Sed Cap (New Section 6.3.3.6)	Provide the data that indicates that biodegradation occurs in the organoclay portion of the cap.	The text was revised to clarify that biodegradation was not anticipated to occur in the organoclay portion of the cap. The reactive cap will not rely on biodegradation as a remedial mechanism.
72	75-80	6.4.3.3, Reactive Sed Cap (New Section 6.3.3.6)	If the organoclay cap reduces the potential for DNAPL to migrate, there is an implication that there could be some migration. How large will the organoclay cap be to account for potential migration?	The organoclay cap would be designed to prevent DNAPL migration through the cap. The FS will include an assumption regarding the required organoclay capacity.
73	75-80	6.4.3.3, Reactive Sed Cap (New Section 6.3.3.6)	It is unclear why a reactive cap is being proposed when Alternative 2 states that the non-reactive cap will achieve PRGs in perpetuity. If a reactive cap is necessary to prevent recontamination of a non-reactive cap due to dissolved constituents upwelling through DNAPL in the lake, then Alternative 2 should be cast as less protective.	A reactive cap was included in all alternatives where DNAPL in lake sediments was not removed. A non-reactive sand cap does not control DNAPL.
74	81-83	6.4.4 (New Section 6.3.3)	**Former Alternative 4 as New Alternative 3.** **Targeted treatment of deep upland Principal Threat Materials (PMTs) via in-situ solidification/stabilization (ISSS), plus passive groundwater (GW) treatment** Modify the alternative to include the deep DNAPL in the vicinity of MC-1. EPA is only providing comments on targeted solidification of DNAPL-impacted soil. Comments on this remedial component will only be stated once but will apply to all alternatives with this component.	Alternative revised as directed. The former Alternative 4 is now the new Alternative 3: Containment with Targeted PTM Solidification (RR and MC DNAPL Areas).
75	81	6.4.4	The rationale behind the selection of the four DNAPL solidification/ removal scenarios is not clear, as well as the reason why Scenario 1 was selected for inclusion in the alternative. Looking ahead to (former) Alternative	Section 6.3.3 (former Section 6.4.4) was revised to more fully describe the rationale used in defining a range of solidification scenarios. Solidification of deep DNAPL at MC-1 was added to

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		(New Section 6.3.3)	9, where presumably all DNAPL-impacted soil is solidified, and then looking at the assumptions in Appendix E (volume calculations), the two areas with deep DNAPL are BH-30C (part of the RR Area) and MC-1 (May Creek). As reflected in the general comments above, this alternative should also include solidification of the area in the vicinity of MC-1, to address deep DNAPL-impacted soil and impacts on the Deep Aquifer.	this alternative.
76	81	6.4.4, last paragraph (New Section 6.3.3.1)	The text states: "Modeling assumptions, a map showing the extent of each scenario, and model output as a percent reduction in contaminant plume volume are provided in Appendix A". There is no map showing the extent of each scenario listed in Section 6.4.4 in Appendix A. In addition, Appendix A is not clear in identifying the 4 scenarios referred to in 6.4.4.Table A-3 refers to 5 different "Areas" however there is no explanation as to whether these areas correspond to any of the 4 specific "scenarios" listed in this paragraph.	References were updated to refer to specific Appendix A figures and tables, and the terminology was clarified so Section 6 and Appendix A descriptions match.
77	81	6.4.4, last paragraph (New Section 6.3.3.1)	The text states: "The FS groundwater model predicts that removing or stabilizing the RR DNAPL Area provides a significant reduction in plume volume (66 percent)." However, Appendix A is not clear about which scenarios are modeled for Alternative 4, if the conclusion in this statement is based on information shown in Table A-3 and "Area 1" in Table A-3 refers to the RR DNAPL Area, then this statement is incorrect. According to Table A-3, removing DNAPL from Area 1 results in only a 34% reduction in the benzene plume; 66 percent of the benzene plume remains present. Section 6 needs to include text, tables, and figures that summarize the findings of this evaluation.	The text was corrected to reflect the reduction in plume volume of 34 percent. See response to Comment 49 (figures and tables of groundwater modeling results were not included in Section 6). References to specific figures and tables of Appendix A were added for clarity.
78	81	6.4.4, last paragraph (New Section 6.3.3.1)	The text states: "Additional removal of DNAPL further west results in proportionally less reduction in groundwater contaminant plume volume". If this statement is based on Table A-3 from Appendix A, it is incorrect. Table A-3 shows that additional removal of DNAPL results in proportionally greater reduction in groundwater plume volume, not less reduction in plume volume. **Respondent's June 18, 2013 Clarification Request:** Clarify response with EPA. Add column showing proportions? **EPA's June 28, 2013 Response to Clarification Request:** *Based on discussion at the June 18, 2013 meeting, EPA understands that the point of this statement is to note that the proportion of plume volume versus soil removed is less, for additional DNAPL removal further west. However, Table A-3 indicates the percent of plume remaining, not the percent of plume reduction. EPA prefers that the last two sentences of the paragraph focus on correctly reporting the results from Table A-3.*	This statement was clarified in Section 6.3.3.1 as follows: "The FS groundwater model predicts that removing or stabilizing the RR DNAPL Area provides a significant reduction in plume volume (34 percent). Additional removal of PTMs further west results in additional reduction in groundwater contaminant plume volume, but the reduction is not proportional to the amount of soil treated. Including Areas 2 and 3 involves solidifying more than double and triple the amount of soil when compared to solidification of Area 1 but is predicted to reduce the plume volume by only an additional 8 and 14 percent, respectively." To support this analysis, the estimated volume of soil treated and the model-predicted percent reduction in contaminant plume volume were added to Table A-4.
79	83	6.4.4.1.2, 2nd paragraph (New Section 6.3.3.1.2, 2nd paragraph)	Have the effects of the stabilization on groundwater 8 years ago at the former Baxter site been evaluated? Can any meaningful information regarding the response of Baxter site groundwater to soil stabilization be extracted for assisting in evaluating the Quendall site? For example, to what degree over the past 8 years have groundwater COC concentrations declined due to soil stabilization? **Respondent's June 18, 2013 Clarification Request:** Note lack of relevant data to answer these questions. Further discussion necessary. **EPA's June 28, 2013 Response to Clarification Request:** *EPA accepts Respondents' explanation at the June 18, 2013 meeting that the remedy at the former Baxter site did not include wells near the solidified area, but at the point of compliance along the lake; concentrations before and after the remedy have been in compliance.*	The remedy at the former Baxter site did not include monitoring wells near the solidified area. There is no empirical data available for the Baxter site to evaluate the effect of stabilization on groundwater.
80	84	6.4.5 (New Section 6.3.4)	**Delete Alternative 5.** The Respondents included the following in their Monthly Progress Report No. 69 (Monthly Report) "recommended to EPA that an additional site-wide remedial alternative be added to the range of alternatives being evaluated in the draft FS, predicated on EPA's approval of a time extension on the submittal date. EPA approved a 6-week time extension on the draft FS submittal date to allow time to incorporate the additional alternative." "Continue work on the draft FS, including evaluation of an additional remedial alternative involving solidification of DNAPL to 15 feet in the railroad, north sump, Quendall pond, and May Creek areas."	As discussed (May 14, 2013 meeting at EPA),a variant to EPA-modified Alternative 4 that is similar to former Alternative 5 was included in the range of alternatives. Former Section 6.4.5 is now Section 6.3.4 that describes the new Alternative 4: Containment with Targeted PTM Removal (TD, QP-S, and QP-U DNAPL Areas).

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			EPA agreed to the extension only because EPA wanted to include an alternative, as described in the Monthly Report, included in the analysis of alternatives. The new alternative would represent a mid-range alternative, which was missing from the array included in the draft FS. However, the Respondents did not include the alternative described in the Monthly Report , instead the new alternative, called Alternative 5, was created to only target areas in the Uplands with a minimum of 4 cumulative feet of DNAPL for solidification. In all the workgroup meetings EPA and the Respondents held concerning remedial alternatives, an alternative like Alternative 5 was never mentioned. EPA would have rejected an alternative such as Alternative 5. As a result, EPA revised the Respondents Alternative 5 to include solidification of more areas of DNAPL and tailoring it to be a mid-range alternative.	
81	86	6.4.6 (New Section 6.3.5)	**Delete Alternative 6.** Although Alternative 6 is deleted, EPA is only providing comments on remedial components described there and carried forward into other alternatives. These are: targeted removal of DNAPL-impacted sediments and sediment treatment and disposal. Comments on these remedial components will only be stated once but will apply to all alternatives with these components.	Former Alternative 6 was deleted. Former Section 6.4.6 is now Section 6.3.5 that describes the new Alternative 5: Containment with Targeted PTM Solidification (RR, MC, and QP-U DNAPL Areas and ≥ 4-Foot-Thickness) and Removal (TD and QP-S DNAPL Areas).
82	86	6.4.6, Targeted Removal of DNAPL-impacted sediment (New Section 6.3.4)	EPA believes that sheet pile can be used to encircle the sediment areas to be dredged, in the nearshore area as well as areas further out in the lake past the T-Dock. These would be more effective in reducing sediments than oil booms and certain silt curtains. EPA requires that the sheetpile wall option be considered in alternatives that include sediment dredging.	Refer to EPA's May 17, 2013 resolution letter.
83	87	6.4.6.1.2, Sediment Removal Methods (New Section 6.3.4.7.2)	The Respondents state that a number of dredge elements were developed for this FS. Where are these design elements? The type and size of the bucket should be determined in design; however, if necessary for cost estimates the assumption of a small bucket is acceptable.	The FS did not contain a dredge design but did include assumptions as needed to support FS-level cost estimates and alternative development.
84	88	6.4.6.1.3, Sediment Treatment/ Disposal (New Section 6.3.5.8)	Permits, such as NPDES discharge permits, are not required for sediment treatment methods. Activities under CERCLA are exempt from obtaining permits. Instead, EPA determines the substantive requirements in lieu of obtaining permits.	The text was clarified.
85	90	6.4.7 (New Section 6.3.6)	**Former Alternative 7 as New Alternative 4.** **Targeted treatment of deep and shallow upland PMTs via ISSS, targeted treatment of offshore PMTs via removal/off-site disposal, plus passive GW treatment** Expand the alternative to include (1) shallow DNAPL-impacted soil greater than 2 feet cumulative thickness (in the top 20 feet); and (2) deep DNAPL-impacted soil in the vicinity of MC-1 (consistent with Former Alternative 4).DNAPL collection trenches can be removed since Quendall Pond and May Creek DNAPL will be removed or solidified. Add off-shore sheet-pile containment for DNAPL removal in the T-Dock and nearshore areas. Within the text for the former Alternative 7, EPA is only providing comments on targeted removal of DNAPL-impacted soil. Comments on this remedial component will only be stated once but will apply to all alternatives with these components.	In accordance with revisions of the range of alternatives discussed in the May14, 2013 meeting and approved in EPA's May 17, 2013 resolution letter, this alternative was revised as directed and is now Alternative 6. Former Section 6.4.7 is now Section 6.3.6 that describes the new Alternative 6: Containment with Targeted PTM Solidification (RR and MC DNAPL Areas and ≥ 2-Foot-Thickness) and Removal (TD, QP-S, and QP-U DNAPL Areas.

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86	91	6.4.7.1.1, Areas and Volumes of Soil to be Removed (New Section 6.3.4.7.1)	Given that alternatives with PRB and collection trenches will be placed on the east side of the Habitat area, if there is any DNAPL west of the PRB to the shoreline, will that also be removed?	DNAPL in the QP-U DNAPL Area west of the PRB would be removed in Alternatives 4 and 6. Thinner occurrences of DNAPL west of the PRB that are located north and south of the QP-U Area and in the MC Area will remain in place. For all alternatives that employ PRBs, treatment gates will be located to reduce groundwater flow through residual DNAPL areas as possible. The following language was added to the PRB description in Section 6.3.3.3: "Because groundwater velocities would be highest directly downgradient of the gates, gates would not be placed in areas upgradient of PTMs to avoid mobilizing contamination."
87	93	6.4.7.1.4, First set of bullets (New Section 6.3.4.1.4)	Revise the bullets on treatment and discharge of groundwater removed during dewatering as follows: • To the City of Renton sanitary sewer system, under a City of Renton and/or King County Metro sewer discharge permit. Discharged water would be treated by the King County sewer treatment plant or pretreated at the site per the sewer discharge conditions. • To groundwater via a new Underground Injection Control (UIC) well (Class V well) installed on the Site. Treatment of dewatering water will achieve compliance with WAC 173-200 Water Quality Standards for Groundwaters of State of Washington. • To Lake Washington after treatment. The substantive requirements of a temporary NPDES discharge permit would need to be defined with the Department of Ecology and could potentially allow for a mixing zone.	Revision made as directed.
88	97	6.4.8 (New Section 6.3.8)	**Former Alternative 8 as New Alternative 6** **Treatment of upland and offshore PMTs via removal/onsite ex-situ thermal** Note the order of former Alternatives 8 and 9 is switched so that solidification is before removal. In addition, offshore sheetpile containment should be added for DNAPL removal in the T-Dock and nearshore areas.	Alternative order switched as directed. Former Alternative 8 is also new Alternative 8: Containment with PTM Removal (Upland and Sediment). As discussed {in the May 1st meeting with EPA, sheet pile containment was added for nearshore areas, and silt curtain containment was maintained for offshore areas since those will be dredged hydraulically.
89	102	6.4.9 (New Section 6.3.7)	**Former Alternative 9 as New Alternative 5** **Treatment of upland PMTs via ISSS, treatment of offshore PMTs via removal/offsite disposal** Note the order of former Alternatives 8 and 9 is switched so that solidification is before removal. In addition, offshore sheetpile containment should be added for DNAPL removal in the T-Dock and nearshore areas.	Alternative order switched as directed. Former Alternative 9 is New Alternative 7: Containment with PTM Solidification (Upland) and Removal (Sediment). As discussed in the May 1st meeting with EPA, sheet pile containment was added for nearshore areas, and silt curtain containment was maintained for offshore areas since those will be dredged hydraulically.
90	104	(New Section 6.3.10)	**Former Alternative 10 as New Alternative 8** **Treatment of upland and offshore PMTs and contaminated soil and sediment via removal/onsite ex-situ thermal, plus active GW treatment** Note the order of former Alternatives 10 and 11 is switched so that solidification is before removal. Remove the coffer dam and replace with sheetpile containment for dredging of nearshore and T-Dock contaminated sediments.	Alternative order switched as directed. Former Alternative 10 is also New Alternative 10. Alternative revised as directed.
91	104	6.4.10 (New Section 6.3.10)	The introductory text for this alternative should be similar to that for other alternatives and simply describe the objectives and general strategy for the alternative. It should not include all of the discussion regarding the Groundwater Restoration TM and the TM's findings (not supported by EPA—see earlier comments) that even the most aggressive alternative will not meet MCLs. It should be acknowledged that this alternative has the greatest potential of meeting MCLs in a reasonable timeframe – and is predicted to meet MCLs for benzene and naphthalene in less than 30 years. **Respondent's June 18, 2013 Clarification Request:**	Introductory text revised and references to Groundwater Restoration TM removed as directed. Text was added to reflect that Alternative 10 has the greatest potential to meet MCLs in a reasonable restoration timeframe. As described in response to Comment 49, groundwater model predictions, including predicted restoration timeframes, are discussed in Section 7.

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			Further discussion is needed regarding inclusion of information from Groundwater Restoration TM (similar to item #2 above). **EPA's June 28, 2013 Response to Clarification Request:** *See EPA's response for Item 2.*	
92	106	6.4.10.1.1, 2nd bullet (New Section 6.3.10.1.1)	The estimated area of benzo(a)pyrene exceeding its MCL described in Section 3.4 and shown on Figure 3-8 is different than what was assumed for the modeling in Appendix A (see general comment above).	In accordance with EPA's May 17, 2013 resolution letter, notes were added to Appendix A figures explaining that the model-predicted vertical extent of B[a]P is believed to be greater than reality due to model artifacts.
93	113	6.4.10.3.1, last paragraph (New Section 6.3.10.2.1)	Include the assumptions for how long the pump and treat system would be operated, and maintenance/replacement frequency.	The following sentence was added to Section 6.3.10.2.1: "For cost estimating purposes in the FS, the assumed duration of pump-and-treat system operation is 100 years." The costs for equipment maintenance and replacement were estimated as a percentage of capital costs (see Appendix D). A schedule for equipment replacement and maintenance was not developed for the FS.
94	114	6.4.11 (New Section 6.3.9)	**Former Alternative 11 as New Alternative 7** **Treatment of upland and offshore PMTs and contaminated soil and sediment via ISSS and removal/onsite ex-situ thermal** Note the order of former Alternatives 10 and 11 is switched so that solidification is before removal. Remove the coffer dam and replace with sheetpile containment for dredging of nearshore and T-Dock contaminated sediments. Remove groundwater pump and treat from this alternative (only retain for new Alternative 8).	Alternative revised as directed. Former Alternative 11 is now new Alternative 9.

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95	118	Section 7, General	EPA disagrees with conclusions in Section 7. The information presented in Section 7 fails to present a detailed evaluation of each alternative, individually. The evaluation using the 9 Criteria should include a critical analysis of an alternative including the advantages, disadvantages and key highlights. Refer to EPA's General Comments for more EPA comments regarding the purpose and objective of individual analysis of each alternative. The first paragraph of Section 7 should be better written to make it clear that the evaluation should include the advantages and disadvantages of each alternative. For a further explanation to aid in the re-write of this entire section, refer to the NCP and the RI/FS guidance (*Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, OSWER Directive 9335.2-01, October 1988). EPA has already provided some language about the topic in General Comments and in comments below. For example, see EPA's comment on subsection 7.1.2 (3) Sections 6.2.2 through 6.2.4 of the RI/FS guidance (text, tables and figures) provide a lot of detail about the meaning and purpose of each criterion and factors to consider when evaluating each alternative, individually. The Respondents evaluation of individual alternatives would be greatly improved by using this guidance and referring to the tables in Section 6 of the RI/FS guidance. The first paragraph states "Section 7.2 presents the detailed evaluation of alternatives with respect to the NCP evaluation criteria in tabular format (Tables 7-1 through 7-10), supplemented by supporting analyses in the text." The detailed analysis should be in text by alternative and the tabular format (see Table F-1 in the RI/FS Guidance) should be used to point out the significant aspects of each alternative (in one table).	Section 7 was revised as directed to include a detailed evaluation of each alternative with respect to the NCP criteria and a critical analysis of the advantages, disadvantages and key highlights of each alternative. The text of this evaluation was moved from the tabular format to the text and the tabular format was used to point out significant aspects of each alternative. The RI/FS guidance was reviewed with respect to the meaning and purpose of each criterion and factors to consider when evaluating each alternative. In the revised text, subheaders for evaluation of the first three balancing criteria are taken directly from Figure 6-2 of the RI/FS guidance document.
96	119	7.1.1	The Respondents should review this section to ensure that the criteria and RAOs are correctly described.	Section 7.1.1 was reviewed and edited to address this comment.
97	119	7.1.1(2) (New Section 7.1.1.2)	In the first sentence, add "Compliance with Other Criteria, Advisories and Guidance" These are considered as "To Be Considered" (TBC)s and may be considered in the analysis of alternatives if it helps ensure protectiveness or is otherwise appropriate to use in a specific alternative. These TBC materials should be included in the detailed analysis. Why is ESA specifically pointed out? Why not NRDA, CWA 404(b)(1), etc. Is it because Respondents think these will be especially difficult to comply with? And why? There should be a presentation/analysis,etc., that demonstrates that all ARARs can be addressed by each alternative and if not why?	First sentence in Section 7.1.1.2 was edited as directed. The revised paragraph references all ARARs; ESA is not specifically pointed out.
98	120	7.1.1(2) 2nd to last sentence (New Section 7.1.1.2)	The sentence mentioned a detailed analysis and that compliance with all ARARs was considered. The Responded continued that ""(a)lthough compliance with all ARARs was considered in the *detailed evaluation of alternatives*". Where is the "detailed evaluation"?	None of the alternatives are expected to achieve groundwater MCLs (under the Safe Drinking Water Act) for all COCs within a reasonable restoration time frame. In the Draft Final FS, evaluation of remedial alternatives with respect to compliance with ARARs focuses on the progress likely to be made under each alternative toward achieving MCLs. As stated in Section 7.1.1.2 of the revised document, the alternatives (with the exception of No Action) are expected to comply with all other ARARs because the required engineering design and agency review process will include steps to ensure compliance. These other ARARs may affect implementation, but they do not have a significant effect on whether an alternative is fundamentally viable. The means of compliance with other ARARs will be documented in the remedial design, remedial action work plan components, and other preconstruction documentation. Based on the Respondents' review, this treatment of ARAR compliance is consistent with recent FS's prepared for EPA Region 10 for other high-profile sites.

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99	120	7.1.2 (Change made to Table 8-1)	The first sentence states: "*Balancing criteria are used to highlight the tradeoffs associated with different remedial alternatives consistent with the overall objectives of CERCLA and the NCP*". EPA could not find where the "trade-offs" were highlighted either in the text or tables. The Respondents need to identify "highlights" as they stated they would.	Trade-offs are discussed in Section 8 and new Table 8-1 highlights the tradeoffs associated with different remedial alternatives.
100	120	7.1.2(3) (New Section 7.1.2.1)	Review Section 6.2.3.3 of the RI/FS Guidance. This subsection provides additional factors/issues to consider when assessing this criterion or any of the 9 criteria. This additional language would provide the reader with a better understanding of the purpose of this criterion and the other criteria. Also, PRPs can make sure that they have adequately and completely addressed the purpose of this criterion (refer to the text and tables). This comment also applies to all the other evaluation criteria. Why are only the source-control RAOs being used to evaluate various alternatives by Long-Term Effectiveness and Permanence criteria? This is an example of a situation where the Respondents need to provide more explanation. **Respondent's June 18, 2013 Clarification Request:** Further discussion needed regarding evaluation of individual alternatives with respect to the NCP criteria. **EPA's June 28, 2013 Response to Clarification Request:** *EPA has referred the Respondents to the RI/FS Guidance where additional details can be found and explained. Also, EPA has encouraged the Respondents to refer to other recent FS documents for ideas about how other Respondents have conducted their evaluation of alternatives.*	The factors/issues listed for each of the balancing criteria were edited to be consistent with Figure 6-2 of the RI/FS Guidance. Text stated that "source control RAOs were <u>part of</u> the long-term effectiveness and permanence evaluation…" Protectiveness RAOs are also considered, however, the detailed discussion for each alternative is provided under the Overall Protection of Human Health and the Environment. Text was revised to provide further clarification.
101	120	7.1.2(4) (New Section 7.1.2.2)	Regarding the criterion "Reduction of Toxicity, Mobility, or Volume Through Treatment", EPA suggests that Respondents read the RI/FS Guidance for the same reasons stated in EPA's comments on Subsection 7.1.2 (3). Also, in the first sentence, the Respondents failed to include the qualifiers "permanently and significantly" before "reduce, toxicity…" The evaluations of alternatives for this criterion should also address the permanent and significant aspects. The Respondents' evaluation would also benefit greatly by indicating the percentage of reduction due to treatment as it applies to each alternative, residuals that remain after treatment, degree to which treatment reduces the inherent hazard posed by PT, etc.	The factors/issues listed for this criterion were edited to be consistent with Figure 6-2 of the RI/FS Guidance. The first sentence indicates that this criterion assesses "the degree to which an alternative reduces toxicity, mobility…" The factors discussed evaluate whether toxicity/mobility/volume are reduced permanently (i.e., irreversibility of the treatment process) and significantly (i.e., amount treated). Section 7 text was revised to include the indicated topics in evaluating this criterion.
102	121	7.1.2(6) (New Section 7.1.2.4)	EPA disagrees with the last sentence. Nothing in the NCP or EPA guidance indicates that this single metric is an adequate measure of "implementability. In fact, to assess "Implementability" many factors should be considered (see to Figure 6-2 and Table 6-4).	The indicated text was revised and the evaluation of Implementability in Section 7 includes the factors stated in the RI/FS Guidance. (Introduced in Section 7.1.2.4, and alternative-specific evaluation in subsequent Sections 7.3.6, 7.4.6, etc.).
103	122	7.1.2(7) (New Section 7.1.2.5)	Define the life of the project (100 years). Is Net Present Value the same as Present Worth Analysis as mentioned in the RI/FS guidance? If not, explain why the Respondents are using a different factor.	The text was revised as directed. Net Present Value is the same as Present Worth Analysis, which is consistent with the RI/FS guidance
104	122	7.2	Refer to the General Comments in EPA's cover letter and at the beginning of this chart regarding the Detailed Evaluation of Alternatives.	See responses to the General Comments.
105	123	7.2	Section 7.2 must be re-written to be consistent with the purpose of assessing each individual criterion. Therefore, EPA is only making general comments on Section 7.2 as presented in the above EPA's General Comment Section and detailed comments as needed to provide some examples to illustrate EPA's comments. However, NOTE while EPA provides examples, that <u>does not</u> mean that the examples are the only comments EPA may have on Section 7.2. EPA does not want to do a detailed line-by-line review when the text is going to be re-organized and re-written. If EPA did a full detailed line by line review, the result would be a re-write or redline by EPA. Instead, EPA is	Section 7 was revised to be consistent with the purpose of assessing each individual criterion.

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			providing more generalized comments on issues that EPA is encountering in its review. Also, EPA believes, when the Respondents closely reviewing Section 6 of the RI/FS guidance, their review would greatly aid the Respondents in their revisions of both Sections 7 and 8. If the Respondents also used the tables, listing factors to consider when evaluating alternatives, the evaluation would be more pointed in including advantages, disadvantages, and key highlights associated with any particular alternative. For example, the assessment of effectiveness of alternatives, including removal technologies, should include amount of mass reduction, contaminant flux, the need for monitoring in perpetuity, etc. **Respondent's June 18, 2013 Clarification Request:** See note for Item #100. **EPA's June 28, 2013 Response to Clarification Request:** *See EPA's response to Item 100.*	
106	123	7.2	As mentioned in EPA's General Comments, the analysis of alternatives needs to be a balanced discussion. The Respondents go to great lengths to discuss the production of residuals while dredging. However, such "issues" with other technologies are barely mentioned if at all. This section needs to be re-written to be less biased. It is generally known that dredging can result in troublesome residuals, however residuals can be reduced by following BMPs, etc.	Section 7.2 was revised per EPA's General Comments in the cover letter and this comment table regarding the analysis of alternatives.
107	123	7.2	Refer to EPA's General Comments. Much of Section 7 is devoted to describing various aspects of various technologies, criterion-by-criterion of the 9 criteria. However, the technologies were more of a description of each alternative, but not an evaluation. Remedial technologies were already assessed in the Remedial Alternative Summary done in Section 6. Also, refer to EPA's comments regarding the manner in which the alternative analysis should be conducted.	Section 7 was revised to provide detailed evaluation of the alternatives with respect to NCP criteria, and new Table 8-1 provides a comparative analysis of the alternatives based on that evaluation.
108	123	7.2, 1st paragraph	Refer to EPA General Comments.	See responses to the General Comments.
109	123	7.2.1, 2nd paragraph	Why is the 2nd paragraph critical to the analysis of alternatives?	The Respondents assume this comment referred to the 2nd paragraph of Section 7.2, which began, "Selected topics that are critical to the evaluation…" Section 7 text was revised to comprehensively address the NCP criteria.
110	123	7.2.1.1	All anticipated ICs should be included in the list in detail. Some ICs are more effective than others and where appropriate that should be included in the analysis of each alternative. Also, ICs may vary based on alternative and some may be more problematic to implement. Regarding monitoring, the degree of monitoring should be included in the alternative evaluation by "low, medium, high". Monitoring will not be limited to just groundwater. Why is the following sentence included here? "Thus, effective institutional controls are already in place within the Site area to prevent consumption of contaminated groundwater and/or surface water, and these controls provide adequate overall protection to human health associated with the groundwater and surface water consumption pathway" What is the IC for surface water consumption? How do we know it is providing "adequate protection"? There is no IC for dermal exposure while wading in the nearshore area. Delete this sentence unless the Respondents can explain the purpose. Last paragraph: EPA does not accept the use of ICs as a remedy without also including an active remedial action. EPA does not believe that ICs, by themselves, are effective as other remedial technologies and for that matter some ICs are not effective at all. The purpose and meaning of this section is not clear.	ICs for each alternative were listed in a new Section 7 table (Table 7-3) and evaluated in the revisions to Section 7. The degree of monitoring in each alternative was categorized as low, medium, or high in the Section 7 revisions, and the text was revised to address these comments. The sentence "Thus, effective institutional controls… water consumption pathway" has been deleted. In the revised Section 7, the effectiveness of ICs is evaluated for each alternative as a factor under the long-term effectiveness criterion (adequacy and reliability of controls).

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111	124	7.2.1.2, 3rd paragraph (New Sections 7.3.3.2, 7.4.3.2, 7.5.3.2, 7.6.3.2, 7.7.3.2, 7.8.3.2, 7.9.3.2, 7.9.3.2, 7.10.3.2, and 7.11.3.2 discuss cap protectiveness for each respective Alternative)	If the cap needs to be armored to protect the cap and smaller rock, suitable for habitat, is placed on the top of the armor, why wouldn't the smaller rock erode? What is meant by "steady state"? EPA disagrees with the last paragraph. ICs in an aquatic environment are unreliable because they are difficult to enforce. Therefore, it is hard to believe that ICs would protect the cap for the long-term. This discussion makes no mention of the reactive cap technology.	Text was revised to clarify the need for cap armoring (based on an evaluation of Site conditions) and the effectiveness of specific ICs to protect sediment caps. It was also revised to include discussion of reactive caps. Based on the analyses presented in Appendix B4, wave action may cause erosion of "smaller rock" along the shoreline. Cap monitoring will be required and monitoring of the shoreline areas will be one focus. Adjustments to the cap design may be warranted if erosion is observed or more habitat-friendly material may need to be replenished. The use of smaller particle sizes may be possible if confinement is provided, for example by placing the surficial cap material in geocells (also known as geoweb). Steady state occurs when the contaminant concentration in the porewater phase and solid phase (cap material) come to equilibrium throughout the cap profile. Before that time, sorption to the clean cap material retards the movement of the contaminant front through the cap. Initially there is no contaminant flux to the surface as virtually all is absorbed. At some point measurable concentrations reach the surface water and ultimately at a later time there is no further sorption by the cap, and the concentration in the porewater leaving the cap reaches a constant value. In regards to ICs, monitoring is required for subaqueous caps. ICs will protect the cap to some degree but monitoring of the cap integrity will be needed and the cap will be repaired, if necessary. The protectiveness of the reactive cap is discussed in the revised FS.
112	125	7.2.1.3 (New Sections 7.5.4, 7.6.4, 7.7.4, 7.8.4, 7.9.4, 7.10.4, and 7.11.4 discuss effectiveness of removal technologies for Alternatives including removal)	This is an example of the lack of balance in the evaluations on Section 7 and 8. There needs to be a balanced discussion of the effectiveness of removal technologies, including reduction of mass, contaminant flux, the need for monitoring in perpetuity, etc. This is another example of only discussing limitations and not discussing the positive aspects of removal technologies. EPA has noticed that the limitations associated with capping have not been discussed to the same extent as dredging?	Sections 7 and 8 were revised to address this comment.
113	125	7.2.1.3 (New Sections 7.5.4, 7.6.4, 7.7.4, 7.8.4, 7.9.4, 7.10.4, and 7.11.4 discuss effectiveness of removal technologies for Alternatives including removal)	A lot of effort is spent on the issue with the production of residual from dredging sediments. There are many practices that can be incorporated into the dredging effort to mitigate residuals. Most of these practices were used at the Todd Shipyard Operable Unit at Harbor Island where a 2-year dredging effort succeeded in meeting cleanup numbers and without having to apply a sand cover. This dredging project appears in the NRC 2007 study but receives little attention from the anti-dredging crowd. Delete most of this section. It is commonly known in the dredging community that residuals can be a problem with dredging. And, as noted in this section, sand covers can be used to manage residuals. An advantage not mentioned is the removal of DNAPL, a PT material. If a removal remedy failure occurs, much less contaminated material would be released, than when a cap fails. In some of the Quendall alternatives, dredging in the nearshore area will occur to accommodate the placement of caps where there is a need to maintain existing bathymetry and much of these areas are contaminated.	The text was revised to be a more concise discussion of residuals and to include best management practices that can be used to reduce residuals. For example, this section indicates that the removal alternatives include capping (includes backfilling/residuals covers) to manage residuals.
114	126	7.2.1.3, 1st and 3rd bullets	Are rocks, cobbles, and a hard bottom present at Quendall? Again, what is the relevance of this discussion to the Site versus a general argument against dredging? Actually a hard, smooth surface can facilitate dredging and minimize residuals by "squeegeeing" the sediment surface with the dredge bucket.	Reference to rocks, cobbles, and a hard bottom has been deleted from the evaluation of dredging effectiveness in the revised Section 7.

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115	126	7.2.2 (Addressed in New Section 7.1.1.2)	The evaluation of alternatives should include a discussion or table that indicates, alternative by alternative, whether an alternative would meet ARARs. All ARARs, location-specific, chemical-specific and action-specific shall be considered in the FS while evaluating alternatives to determine whether the ARAR threshold criteria will be met.	See response to Item 98.
116	126	7.2.2.1 (See response for new section locations.)	However, it should be mentioned the extent that the plume can be reduced for each COC. Also, mention that the restoration timeframe projected by the model should only be considered in a relative sense and not in an absolute sense.	Revisions made as directed. Projected plume reduction 100 years after completion of remedial action was evaluated. (Introduced in Section 7.3.2.1, and alternative-specific evaluation in subsequent Sections 7.3.2, 7.4.2, etc. See also Figure 7-1).
117	127	7.2.2.1, 1st paragraph	As noted in the general comments above, the summary of the Groundwater Restoration TM needs to be revised to reflect EPA's disagreement with the confidence of the findings of the TM. Description of the most aggressive alternative (former Alternative 10) should acknowledge the possibility that MCLs could be met in a reasonable timeframe assuming residuals were managed adequately. A discussion needs to be added regarding what can be accomplished in terms of groundwater quality (for benzene and naphthalene). **Respondent's June 18, 2013 Clarification Request:** See note for Item #2. **EPA's June 28, 2013 Response to Clarification Request:** *See EPA's response for Item 2*	See EPA's response for Item 2.
118	127	7.2.2.2, 2nd to last sentence (Addressed in New Section 7.1.1.2)	This sentence is incorrect. A waiver is not needed while implementing the remedy. The Biological Assessment and 401 water quality certification are required for dredging and are handled by EPA. Those are the substantive requirements, pursuant to the Clean Water Act and Endangered Species Act, which the Respondents would be required to comply with.	Text was revised to clarify that compliance with these ARARs will be addressed during remedy design. Refer to Section 7.1.1.2 and response to Item 98.
119	127	7.2.2.3	Regarding compliance with ESA, it is understood this ARAR will be met. The discussion here is procedural and not considered appropriate here. **Respondent's June 18, 2013 Clarification Request:** *Clarification requested. Is EPA asking that the ESA discussion be removed? Need to clarify what is meant by the statement "it is understood that ARAR will be met".* **EPA's June 28, 2013 Response to Clarification Request:** *Refer to EPA's comment for Item 115. EPA's response is made in the context of EPA's comment on Item 115 of EPA's comments on the draft FS. Draft FS Tables 4-1 through 4-3 include a list of ARARs but the tables lack information about how each ARAR will be addressed.* *EPA was wondering why only 3 ARARs were chosen for discussion in the text for Section 7.2.2—"Compliance with ARARs"? EPA understands that ESA will need to be addressed by any remedy selected for implementation at Quendall. The discussion in the text is incorrect in that EPA would finish its consultation with Trustees by the time the ROD is final.* *A detailed discussion of the ESA process is not necessary at the FS stage, only a determination that the ESA ARAR can be met is needed at the FS stage. The implementation of the ESA ARAR will occur during RD/RA. See EPA comment Item 115 and the following text would probably be sufficient for the purposes (of noting how the ARAR will be addressed) of the FS: "EPA consults with Trustees; BA submitted after RD is complete. Approved BO is issued." See RI/FS guidance 8.2, Appendix E, etc.*	This discussion was excluded from the Section 7 revision. See also response to Item 98.

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120	128	7.2.3 to the end of Section 7	Because all of Section 7.2 will be substantially revised, where each alternative will be evaluated individually, using the 9 criteria, RAOs, NCP, the RI/FS Guidance, EPA will withhold further review until the revision is submitted for EPA review. The Respondents need to take a hard look at Section 7 to ensure that a balanced assessment is made in line with the level of detail presented in Section 6 of the RI/FS Guidance. Also, EPA requires that a new table that is consistent with Table F-1 in the RI/FS Guidance will be prepared to replace the previous tables (Tables 7-1 through 7-10). Therefore, EPA will withhold further review and comment until a revision is submitted for review. See EPA's General Comments for further information about how to present information in Section 7.	Comment acknowledged.
121	129	7.2.3.3, 2nd bullet (Addressed in New Section 7.4.3.1)	Based on this statement about oily inclusions being formed within the amended matrix, discuss why solidification should only be considered in areas with oil-coated DNAPL, and oil-wetted (above residual saturation) DNAPL be excavated only. The clause "solidification can be inhibited by high water content in lake sediments (Stolzenburg undated)" should be removed because it is not relevant to Quendall (no lake sediment is being considered for solidification" and previous comments on the Groundwater Restoration TM questioned the reference (provided in the reference list, but unclear whether publically available).	Solidification was considered for heavily contaminated portions of the Site, including oil-wetted soil. A paragraph was added after the referenced bullets to clarify the uncertainties mentioned previously in the text (refer to Section 7.4.3.1). The indicated clause was removed from the text.
122	129	7.2.3.3, 1st paragraph (Addressed in New Section 7.4.3.1)	There needs to be more discussion about what stabilization would accomplish. Are the only data for this based on the 1989 study? EPA commented on the use of this study for supporting the Groundwater Restoration TM, noting that more recent field or bench studies are needed to support claims of ongoing leaching of benzene and LPAHs. The last sentence in this paragraph speaks generally about amendments; more detail should be provided about why amendments are not included for Quendall FS alternatives or discussed in terms of a treatability study.	The referenced 2004 Environment Protection Agency document provides a more current review of available studies on solidification, including leaching. As discussed in the revised text (Sections 7.4.3.1 and 7.4.4.4 of the Quendall draft Final FS), amendments have been shown to reduce but not eliminate leaching, and thorough testing is required to evaluate interactions between contaminants and solidification amendments.
123	130	7.2.4.1 (See response for new Section locations)	It is not entirely clear whether reactive sediment caps are necessary, given the discussion of the protectiveness of non-reactive caps. If there is potential for DNAPL to migrate into the isolation layer of the cap, then Alternative 2 should not be considered protective. It is good to note the secondary benefit of reducing the flux of COCs into the isolation layer as well, but again, is this needed? Discuss the downsides of organoclay caps in this environment and failure due to ebullition or other mechanisms.	EPA approved the reactive sediment cap alternative (May 17, 2013 resolution letter). Appendix C and Section 5 were revised to include more detail on reactive sediment caps (i.e., organoclay caps). Sections 6 and 7 were revised to clarify that reactive caps can control NAPL migration even if there is ebullition or other mechanisms.

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124	134	8.0, General	The comparative analysis is weak, ill balanced and is not acceptable. The comparative analysis need to build on the individual alternative analysis. To improve Section 8, the Respondents need to improve Section 7 according to the NCP and the RI/FS Guidance. The comparative analysis greatly relies on the Respondents belief that use of ICs ensure that the remedy is protective and can be relied on. EPA strongly disagrees that use of ICs confers reliable protectiveness to a remedy. In fact, the NCP is built on the principals echoed in Expectations for remedial actions. Engineering controls and ICs are at the bottom of the list in preference. Additionally, the Respondents have not shown how ICs and caps are as reliable in risk reduction as are removal actions. The reliability and protectiveness of ICs and caps is merely assumed. There is no discussion regarding the fact that these remedial technologies fail and the resulting consequences, however, the Respondents go into great detail regarding the disadvantages of dredging even as they acknowledge that using a thin cover reduces surface contamination from residuals. When referring to ICs and caps the terms “protectiveness” and “reliability”, however, there is no discussion about how the degrees of protectiveness and reliability are determined, other than from the fact that all alternatives will have caps and/or ICs to prevent exposure, as needed. Again EPA does not believe that all ICs and/or caps are equally protective and reliable. For example there is no long-term data on the success of permeable reactive caps of the type proposed for Quendall. This comment is applicable to all the criteria evaluated in this FS. Specific comments focused on the theme of this comment are not repeated or made below criterion-by-criterion because EPA believes that the re-write of Section 7 and 8 will result in a more balanced and fact-based analysis.	Section 8 was revised to provide a stronger and more balanced comparison of the alternatives. Note that the specific ICs to protect sediment were defined in Section 6 and are evaluated with respect to NCP criteria in Section 7 (refer to Sections 7.3.3.2, 7.4.3.2, etc.). Discussion of differences in IC reliability, the need for monitoring, and the potential need for corrective action are discussed as part of long-term effectiveness in Section 8.3.2.
125	134	8.0, General	The NCP and RI/FS Guidance provide a number of very specific factors to consider while evaluating individual alternatives as well as comparing alternatives. The alternative analysis performed by the Respondents is essentially based on just 1 or 2 factors instead of multiple factors as may be appropriate. (Refer to EPA’s General Comment in the cover letter and at the beginning of this chart, as well as the tables in Section 6 of the RI/FS Guidance). As a result, the Respondents approach has resulted in a narrow and unbalanced evaluation	Sections 7 and 8 were revised to address this comment (e.g., in the revised text, subheaders for evaluation of the first three balancing criteria are taken directly from Figure 6-2 of the RI/FS guidance document).
126	134	8.0, 2nd paragraph, 1st sentence	The Respondents have not explained in sufficient detail the criteria for assigning numerical ratings for the degree which a particular alternative compares with the other alternatives. Numbers are no usually used, especially on a scale of 1-10. What is the difference between any 2 numbers that are in sequence with each other, such as 7 and 8? Qualitative rating seem more realistic, the scale could go from very low, low, medium, high, very high or just plain low, medium, high.	The numerical ratings were replaced by the qualitative ratings low, moderate, high (refer, for example, to Tables 8-1 and 8-2).
127	134	8.0, 2nd paragraph, fourth sentence	Please refer to EPA’s General Comments on the GW TM.	Refer to response to EPA’s General Comments on the GW TM.
128	134	8.0, 2nd paragraph, 5th sentence	Please refer to EPA’s General Comments on the GW TM.	Refer to response to EPA’s General Comments on the GW TM.
129	134	8.0, 3rd paragraph, 2nd sentence and the remaining portion of the paragraph	Please refer to EPA’s General Comments on the GW TM.	Refer to response to EPA’s General Comments on the GW TM.
130	135	8.1 (See response for new Section locations)	Refer to EPA’s General Comments in the cover letter and at the beginning of this chart regarding the comparative analysis of alternatives, also in Section 6 of the RI/FS Guidance. The overall evaluation of protectiveness does not meet the objectives described in the first sentence. How do remedial actions based on elimination, reduction, or control achieve “adequate” protectiveness over the long-term /short-term? Some alternatives/technologies will be better at preventing exposure than others. This	Section 8 was revised to address this comment. Note that the specific ICs to protect sediment caps and appropriate alternative-specific monitoring were defined in Section 6 and evaluated with respect to NCP criteria in Section 7.

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			needs to be discussed more. Use of caps and ICs may not be as likely to control exposure above PRGs as removal remedial actions The details involved can be elaborated on in the balancing criteria analysis. This approach to using PRGs makes sense to an extent. However, there is no discussion of how and when compliance with PRGs will be made and how frequently compliance will be monitored. Surely some remedial technologies require more diligence in determining PRG compliance than others such as capping vs removal.	
131	135	8.1 (See response for new Section locations)	The Respondents frequently refer to Institutional Controls and remark on their effectiveness. However, specific ICs are not listed for each alternative and so are not evaluated. All necessary ICs that are relied on for "protectiveness" need to be identified. Refer to EPA guidance on ICs. Institutional controls can be effective if they are enforced and would eliminate the exposure pathway; however, the source still remains, and institutional controls require continual enforcement to maintain effectiveness. Also, what are the ICs for surface water?	Specific ICs are listed in new Table 7-3 and evaluated in the revisions of Sections 7 and 8 (e.g., in Section 7 refer to Sections 7.3.3.2, 7.4.3.2, etc., In Section 8 refer to 8.3.2).
132	136	8.2 1st sentence	EPA does not know where the assessment is. However, a selected remedy shall meet all ARARs unless a TI waiver is granted or the remedy meets the definition of a waste management area.	Comment acknowledged.
133	136	8.2, 1st paragraph (See Response for new Section locations)	Refer to EPA's General Comments regarding the GW TM, cost-effectiveness and TI waivers. This discussion in the first paragraph does no point out that for some COCs could be expected to meet MCLs in a reasonable time period. The modeling predictions do not represent actual restoration timeframes but rather relative timeframes.	Sections 7 and 8 were revised to address this comment. The ability of alternatives to achieve the MCLs of individual COCs is introduced in Section 7.3.2.1, with alternative-specific evaluation in subsequent Sections 7.3.2, 7.4.2, etc. See also Figure 7-1 and Section 8.2)
134	136	8.2, 2nd paragraph	Exceedance of ARARs during remedy implementation do not require a waiver, however, other requirements must be substantially complied with such as CWA 401. Restrictions may be required, pursuant to ESA, to allow for potential short-term takings—this would not prohibit dredging. Also, dredging would occur during the season when salmon are not in the area.	This discussion was excluded from the Section 7 revision. See also response to Item 98.
135	137	8.2, 4th paragraph (See response for new Section locations)	Delete the reference to the Renton SMP. It is not an ARAR. Also, restoration will be driven more by mitigation for wetlands filled and for past damages. **Respondent's June 18, 2013 Clarification Request:** EPA letter dated May 17, 2013, states: The Respondents objected to the comment from EPA requiring that the Renton Shoreline Management Plan (SMP) should be removed from the text in the FS. Also, the Respondents stated that the SMP is an ARAR. Respondents asked EPA to clarify position (may need to schedule small group meeting), specifically: 1. How does guidance apply? 2. How does the Renton SMP apply? 3. Which Renton SMP applies (vesting issue)? Resolution: EPA has the goal to respond to the Respondents' letter by June 30, 2013. The Respondents' letter asks for clarification of the extent to which the CWA and the Renton SMP would apply to criteria for mitigation of wetlands. Request that the item 1 reference to "guidance" be clarified (i.e., the Department of Ecology Shoreline Management Guidance) in EPA's response. **EPA's June 28, 2013 Response to Clarification Request:** *EPA is modifying its goal to complete its response to questions the Respondents have identified regarding mitigation of filled wetlands to mid to late July. EPA regrets this delay caused by reduced resources as a result of budget cuts and the sequestration.*	The issue of whether the Renton SMP is an ARAR is discussed in Section 4.1.

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136	143	8.5 5th paragraph, 6th sentence (See response for new Section locations)	Assuming no in-water work beginning until year 10 of the project; discuss what work could be sequenced to begin in-water work first or at the same time as upland remediation.	The alternative timelines are defined in Section 6 and evaluated with respect to short-term effectiveness in Section 7. Conducting some work elements concurrently may be possible but would need to be determined during design because of the complexities in concurrent work to provide construction access, equipment staging, and materials handling/treatment, particularly for alternatives involving large volumes of soil and sediment removal or treatment. The following note has been added to Figure 7-5 (former Figure 8-5): The construction durations assume that upland work is completed prior to offshore work implementation. However, some upland and offshore work may be conducted concurrently.
137	144	8.6 (See response for new Section locations)	This section only speaks to the limitations of the most extreme alternatives. The other alternatives should be discussed in terms of implementability (other than duration). Section 6 of the RI/FS Guidance does not even include "duration" as a factor of the 9 factors listed to use in evaluating implementability.	Text was revised to address this comment (e.g., In Section 7 refer to Sections 7.3.6, 7.4.6, etc; In Section 8 refer to 8.6).
138	144	8.6, Administrative Feasibility	The PRPs overly dramatize the 401 and Biological Assessment/Opinion process – these agencies want to see cleanups happen. Why wouldn't the same level of BMPs be used regardless of dredge volume at a particular site if the point was to reduce residuals?	The administrative complexity of the 401 and Biological Assessment/Opinion process has been deemphasized in the revised discussions of implementability (e.g., Section 8.6). No distinction is made between requirements for larger versus smaller dredge volumes in the revised text.
139	147	8.8	Refer to EPA's General Comments on cost effectiveness.	Comment acknowledged.
140	146	8.8, 1st sentence	The first sentence is "The overall objective of the NCP is to develop efficient, coordinated, and cost-effective remediation response actions (EPA 1990, 1996b, and 2005). EPA is sure that those words appear in the references cited. However, the context with which they were made is missing and they are also in direct contradiction with Program Goals, Program Management Principles and Program Expectations in addition to Site RAOs and the results of evaluating site-specific factors against the 9 NCP criteria 300.430(a)(1) and the NCP Preamble discussion of this section. Revise the sentence and other text that is associated with the statement in the first sentence.	The referenced sentence has been deleted and associated text revised to address this comment.
141	146	8.8, 2nd sentence	The second sentence is "Comparing and contrasting the costs and benefits of the various remedies is part of the risk management decision-making framework." EPA agrees. Risk management decisions are made by EPA and are proposed and approved in the Proposed Plan and Record of Decision, respectively. It is not a topic for the FS.	Comment acknowledged.
142	149	9, Conclusions	Conclusions are not needed. Delete this section.	Revision made as directed.
143	Table 4-1	Chemical- specific ARARs	A chemical-specific ARAR for terrestrial ecological receptors per MTCA should be added unless the terrestrial; ecological evaluation (TEE) exclusion has been granted by Ecology for this site. The current MTCA chemical-specific ARAR in Table 4-1 does not reference TEE and associated cleanup levels. Add the following: *1) Chemical Guidance for Developing Ecological Soil Screening Levels* (OSWER Directive 9285.7-55), TBC *2)* " Terrestrial Ecological Evaluation Procedures" (WAC 173-340-7490) "Site-Specific Terrestrial Ecological Evaluation Procedures" (WAC 173-340-7493) "Priority Contaminants of Ecological Concern" (WAC 173-340-7494)	Revision made as directed.
144	Table 4-1	Chemical-specific ARARs	Update the SMS citation to reflect the soon-to-be promulgated regulation.	Revision made as directed.
145	Table 4-2	Action-specific ARARs	Well-related ARARs should also be added:	Revision made as directed.

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			1) "UIC Well Classification Including Allowed and Prohibited Wells" (WAC 173-218-040) and 2) Water Well Construction Act of 1971" (Chapter 18.104 RCW, as amended); "Minimum Standards for Construction and Maintenance of Wells" (Chapter 173-160	
146	Table 4-2	Action-specific ARARs	Additional WA air quality rules should also be included as follows: 1) WAC 173-460 Controls for New Sources of Toxic Air Pollutants and 2) WAC 173-470 Ambient Air Quality Standards for Particulate Matter	Revision made as directed.
147	Table 4-3	Location-specific ARARs	Add an additional fish and wildlife act which preserves and promotes conservation of non-game fish and wildlife and their habitats: Fish and Wildlife Conservation Act of 1980, "Nongame Act" (Public Law 96-366, as Amended; 16 U.S.C. 2901-2911)	Revision made as directed.
148	Table 4-3	Location-specific ARARs	If bald eagles are a concern for the property, add: Bald Eagle Protection Act (Chapter 77.12.655 RCW), "Habitat Buffer Zone for Bald Eagles—Rules"; "Bald Eagle Protection Rules" (Chapter 232-12-29 WAC)	Revision made as directed.
149	Tables 4-4 through 4-7	PRG Tables	Tables 4-4 through 4-7 are missing important footnotes that are only found in Table 4-8 regarding the source of the PRGs.	Revision made as directed.
150	Table 4-5	Development of PRGs for Groundwater	There are no yellow highlights indicating the selected PRG for fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, or naphthalene.	Revision made as directed.
151	Table 4-7	Development of PRGs for Sediment	Under the Human Health heading, additional columns need to be added for Fish/Shellfish Ingestion sediment PRGs, shown in mg/kgOC. Clarify that the other sediment PRGs for HH are for direct contact only. Include 6.2 mg/kg OC as the 90% UCL on the mean of the background data set and 17.5 mg/OC as the background threshold value (BTV) based on the gamma 95% upper tolerance limit (UTL) with 95% coverage of the background data set. Clarify that background values are based on B[a]P equivalents. These data are needed to demonstrate that RBCs based on fish/shellfish ingestion are below the BTV, supporting use of a BTV to draw the site boundary.	Revision made as directed.
152	Table 4-8	Summary of PRGs	PRGs in this table should reference May 2012 RSL tables. This is not expected to change any RSLs but would provide a more up-to-date reference.	Revision made as directed.
153	Table 4-8	Summary of PRGs	The Xylene PRG of 10,000 ug/L is an MCL; this should be noted in the table, similar to other MCLs.	Revision made as directed.
154	Table 4-8	Summary of PRGs	The ethylbenzene PRG is shown as 13 ug/L, based on risk-based criteria. But ethyl benzene has an MCL of 700 ug/L. Similar to how the PRG for xylenes and benzene were developed, the appropriate PRG for ethyl benzene would be 700 ug/L.	Revision made as directed.
155	Table 5-6	General	Effectiveness for arsenic is included, even though arsenic concentrations in most areas of the site (except for the Railroad Area) are near regional background concentrations. EPA expects arsenic concentrations in soil to be generally below levels that would require treatment. **Respondent's June 18, 2013 Clarification Request:** Clarify intent – remove arsenic effectiveness evaluation from table? **EPA's June 28, 2013 Response to Clarification Request:** *EPA is retracting this comment.*	Acknowledged (no revisions).
156	Tables 6-1, 6-2,	General	Refer to changes to the alternatives described in the general comment and revise these tables accordingly.	Table 6-1 has been revised and renumbered as Table 6-2.

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	and 6-3			Table 6-2 has been revised and renumbered as Table 6-3. Table 6-3 has been revised and renumbered as Table 6-4.
157	Tables 7-1 through 7-7	General	As noted above, one table is required for Section 7 (consistent with Table F-1 in the RI/FS Guidance). EPA is not making specific comments on the Section 7 because EPA anticipates that a very significant revision of the content of this section will occur. Also, please refer to EPA's General Comments regarding the evaluation of Alternatives.	Comment acknowledged.
158	Table 8-1	General	Refer to text comments in Section 8 regarding this table. Qualitative ratings (very low, low, medium, high, very high) may be used; the overall effectiveness score, overall balancing score, and overall cost-effectiveness quotient are to be deleted. Also, refer to EPA's General Comment on cost-effectiveness.	The numerical ratings were replaced by qualitative ratings. The overall effectiveness score, overall balancing score, and overall cost-effectiveness quotient were deleted.
159	Appendix A	General	Refer to the General Comments above regarding the groundwater model. The model will need to be rerun to reflect changes in the alternatives and also to address EPA's comments on modeling assumptions (e.g., initial conditions for B[a]P and how to depict plumes for solidification alternatives).	See response to Comment 3.
160	Appendix A	General	Make it clear that the groundwater modeling and the resulting alternatives evaluation based on the modeling is a relative analysis and does not necessarily represent actual outcomes. This will set the stage for the reader to better interpret and evaluate the subsequent results. Include in the Intro and again in Section A3.6 Remedial Alternatives Model Results (and elsewhere as applicable).	Clarification was added to Appendix A as directed.
161	A-3	A3 / 3rd sentence	Change text to "(constant groundwater concentration boundary based on existing site data)".	Revision made as directed.
162	A-3	A3 / 4th sentence	Change text to "downgradient pre-remediation groundwater concentrations".	Revision made as directed.
163	A-3	A3 / 5th sentence	Change text to "The hydrocarbon source (constant groundwater concentration boundary) of each…:	Revision made as directed.
164	A-3	A3 / 6th sentence	Change text to "was removed by setting the constant groundwater concentration boundary for each of the four primary COCs to zero…"	Pre-remediation concentrations of hydrocarbons are set to zero in areas replaced with clean fill and remain active in the model to produce the initial conditions. Source removal is simulated by removing the constant concentration boundary conditions; in the targeted removal area so that groundwater concentrations can be calculated. If the concentration boundary conditions were set to zero as the comment requested, then the concentration in those areas would be held at zero and potential recontamination of excavated areas would not be simulated. Mass entering that area would be removed from the model. The following revision was made instead: "For example, the hydrocarbon source (constant groundwater concentration boundary condition) was removed and the pre-remediation concentrations of each of the four primary COCs were set to zero…"
165	A-4	A3.2, 1st sentence	Initial conditions prior to running the model for 100 years need to be described, as compared to actual data (see next comment).	Revision were made as directed by EPA and described in response to Comment 166.
166	A-5	A.3.2, general	More detail is needed on how where the initial concentrations were inserted into the model for benzene, benzo(a)pyrene, and naphthalene. In other words, text and figures need to be added to describe the rationale and show what each of the COC plumes look like at time=0, and after the base case of 100 years.	New Sections A3.2.1 and A3.2.2 describe how the initial conditions were established. Figures were added to Appendix A comparing the plume extents inferred from Site data (as displayed in Section 3) to the pre-remediation plume extents estimated by the model. Plume extents for each COC are compared in plan view on new Figures A-4 through A-7 and in cross section view on new Figures A-8 through A-11. A discussion was added to Section A3.2.3 comparing the pre-remediation plume extents to plume extents inferred from Site data and presented in Section 3. A discussion emphasizing that model results should be interpreted relative to one another was included. Notes were added to B[a]P figures showing vertical extent, indicating the plume extent was

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				simulated deeper into the Deep Aquifer than expected as a result of model vertical discretization(see response to Comment 3).
167	A-5	Paragraph after "Zone" bullets	A figure needs to be added showing a cross-sectional view of the distribution and concentration of the hydrocarbon sources.	The figure was produced as directed and added as new Figure A-3.
168	A-5	Last bullet on page	Include a figure(s) showing the resulting hypothetical baseline dissolved contaminant iso-concentrations and discuss the similarity and differences with actual measured dissolved concentrations. Insert at an applicable location within Appendix A.	Eight figures were added as described in response to Comment 166.
169	A-6	A3.2.2	Provide basis for average arsenic concentration of 39 ug/L and why it is reasonable to assume the same concentration for the shallow and deep aquifer.	The average concentration of 39 µg/L and the empirical data it is based on were provided on Table A-2. The range and average concentrations of arsenic at wells in the Shallow and Deep Aquifers was similar (29 vs 47 µg/L); therefore, one average value was used. The rationale was added to Section A3.2.2.
170	A-7	A3.3, 1st bullet	The PRB described in Section 6.4.3.2 of the FS does not include any amendments that would address arsenic; therefore the assumption that the PRG would be met for arsenic as a boundary condition inconsistent with the PRB. Confirm whether or not arsenic can be addressed with additional amendments to the PRB.	Arsenic can be addressed by additional amendments to the PRB. However, for the purposes of the FS, it was assumed that the PRB would not be designed to treat arsenic. The model simulation did not assume arsenic treatment. The text of Section A3.3 (Funnel and Gate Treatment Wall bullet) was revised to indicate that arsenic was not treated by the PRB.
171	A-7	A3.3, 2nd bullet	Provide more rationale for the hydraulic conductivity and porosity values listed. These values can be literature based, but also selected based on what is needed to minimize leaching (achieve groundwater diversion); for example achieving hydraulic conductivity rates that are at least 2 orders of magnitude below the native materials.	The rationale for selected values, including additional literature references, was added to Section A3.3 and new Table A-4 presenting hydraulic conductivity values for solidification case studies was added.
172	A-8	A3.3, Pump and Treat	Include some discussion (where appropriate in this appendix) about the effectiveness of pump and treat as a polishing step, particularly for the Deep Aquifer. Analysis of P&T was discussed in Section 3.2.2.2 of the Groundwater Restoration TM, but was described as being of limited effectiveness due to low-permeability layers in the deep aquifer. How is restoration time-frame affected by P&T using the FS groundwater model (which does not include low-permeability layer assumptions)?	Model restoration timeframe results without pump and treat under FS model assumptions (no-low permeability layers) were added for comparison and discussed in Section 3.4. Restoration time frames with and without pump and treat under homogeneous and heterogeneous aquifer assumptions were added for comparison and discussed in new Section A5.1.1.
173	A-8	A3.3, Pump and Treat	Evaluate and discuss placement of extraction wells in areas where residual contamination is highest in addition to trying to fully capture the plume with wells along the shoreline.	Model restoration timeframe results with an additional pumping well located in the area of highest initial concentration was added for comparison and discussed in Section A3.4.
174	A-8	A3.4, last paragraph on page	Evaluate and discuss potential for the solidified block(s) to induce lateral and downward spreading and controls such as an upgradient drains to manage the hydraulic head increase resulting from the solidified block(s).	Text was added to Section A3.4 that discusses the potential for solidified blocks to induce spreading. Added text includes that potential mitigation measures for mounding, such as upgradient drains, were not evaluated by the model because the amount of lateral and vertical spreading was not deemed significant.
175	A-11	A3.5, Alternative 9 bullet	Include the assumed hydraulic conductivity of the solidified material (like what is assumed for backfill).	Hydraulic conductivity for solidified soil is consistent across all alternatives that include solidification and is discussed in Section A3.3. Conductivity of backfill is discussed in Section A3.5 because it varies depending on the alternative.

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176	A-12	A3.6, 1st paragraph	As the transport model results were compiled on 3-year time intervals over 100 years, include figures showing the decline of each plume volume over time.	As discussed during the May 9, 2013 technical subgroup meeting, changes in COC groundwater concentrations were predicted on a 3-year time step to assess the restoration timeframe but concentrations from each time step were not compiled. Only the last time step was processed to produce plume volumes, mass, and mass flux. Per the May 9, 2013 meeting notes, time series figures of processed model results are not included in the FS.
177	A-12	A3.6	Add percent reduction of plume volume, percent reduction of plume mass, mass flux across a vertical plane at the shoreline, and percent reduction in mass flux metrics to the analysis for all alternatives. As noted above, exclude the volume of solidified material from the plume volume (only include the "halo"). Add to Table A-5 and the expanded Table A-8 (see following comment).	Per EPA's May 17, 2013 resolution letter, mass flux was calculated for the FS at the lake boundary condition cells rather than for a vertical plane at the shoreline. Solidified mass was removed from plume volume calculations; therefore, only the volume of the "halo" is presented.
178	A-13	A3.7& A3.7.1	Enlarge Table A-8 to include all the sensitivity results and put into a Table A-5 like format for all alternatives so that the plume volume, plume mass, and plume mass flux reductions can be compared and used in the evaluation of all the remedial alternatives. The same for Figures A-12, -13, -14, and -15. The concept is to combine the Table A-5 and Table A-8 results into one or more consistent tables for easy and comprehensive comparison of alternative.	Table A-8 (now Table A-11) was reorganized into a Table A-5 like format (now Table A-7) as requested. Several new tables, formatted similar to Table A-7 were also added in order to fulfill this comment as follows: • Sensitivity analysis results for each COC, as plume volume, plume mass, mass flux and restoration time frame are now presented in a similar format in Table A-10. Tables A-11 and A-10 show only sensitivity analysis results for alternatives for which sensitivity analysis was performed (Alternatives 1, 7, and 8). • Estimated sensitivity analysis results for the remaining alternatives (Alternatives 2, 3, 4, 5, 6, 9, and 10) are presented as aggregate plume volume in Table A-12, plume volume for each COC in Table A-13, plume mass for each COC in Table A-14, and mass flux for each COC in Table A-15. Figures similar to Figures A-12, A-13, and A-14 (now Figures A-22, A-23, and A-24) were produced for plume volume by COC (Figures A-26, A-27, and A-28), plume mass by COC (Figures A-29, A-30, and A-31), and mass flux by COC (Figures A-32, A-33, and A-34).
179	A-13	A3.7 & A3.7.1	The RI data do not show that the DO levels in the shallow aquifer are always zero. Because benzene is very susceptible to aerobic degradation, expand the sensitivity analysis range of half-lives (see Table A-1 comment).	DO does not need to be zero to have anaerobic conditions. As discussed with EPA, DO measurements on site support the assumption of anaerobic conditions. A discussion of Site data supporting anaerobic conditions and an expanded justification for selecting the range of half-lives used was added to Section A3.1.2. Per the EPA resolution letter dated May 17, 2013, the sensitivity analysis used the same range of half-lives as in the draft FS. The resulting range of plume volumes for the three alternatives directly evaluated by the sensitivity analysis was presented. The range of plume volumes for other alternatives was calculated by interpolation of the three sensitivity analysis alternatives.
180	A-13	A3.7.1, last paragraph	Explain why linear interpolation of the best and worst case estimates for Alternative 1, 8, and 9 is a valid way to estimate the variability of Alternatives 2 through 7 when the relationship between the plume volumes is not linear.	The linear interpolation was not based on a relationship between plume volumes. The linear interpolation assumed a linear relationship between base plume volume and sensitivity result. The linear interpolation was then used to estimate sensitivity results for models that did not undergo sensitivity analysis using their base case volume. Figures A-27, A-30, and A-33 show that the sensitivity analysis results fit close to their regression line and therefore a linear interpolation should provide a reasonable estimate for the best and worst case results for the remaining alternatives.

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				Additional explanation of the linear interpolation was added to Section A3.7.1 to improve clarity. R-squared values were added to the linear interpolation figures (A-27, A-30, and A-33) and discussion of the validity of the interpolation was also added to Section A3.7.1.
181	A-15	A4, second numbered item	This is the first time the Deep Aquifer has been described as semi-confined. This should be added to the main text in an appropriate location.	The requested description was added to Section 3.3 of the main text.
182	Table A-1		Table D-5 in the RI listed benzene anaerobic half-life of 112 to 720 days. The use of maximum half-life of 720 in Table A-1 is unacceptable unless full technical justification is given (especially in light of DO not always being zero in the shallow aquifer).	See response to Comment 179. Site data supported assuming anaerobic conditions. Field studies indicated degradation rates can be as low as zero (no degradation) under anaerobic conditions. Additional justification of half-lives was added to the text in Section A3.1.2.
183	Table A-1		Table D-5 in the RI listed the foc for fill at 0.29%. Use of 0.09% in Table A-1 is unacceptable unless full technical justification is given. The fill includes wood chips and other organic components (solid and dissolved), therefore 0.29% seems more reasonable.	Per the EPA resolution letter dated May 17, 2013, model results were not expected to be sensitive to foc of the fill; therefore, the foc of 0.09% for modeling purposes was maintained. This discussion was added to the text.
184	Table A-1		The fate and transport modeling values of logKoc, Kd, and Rf for benzene, naphthalene, BaP, and As reported in the RI, RI appendixes, and the GW TM (and FS) tables, table footnotes, and body text are not consistent. For example, GW TM and FS Tables A-1, footnote says logKoc are as follows: benzene=1.7; naphthalene=2.8. If these footnote values are used with the reported %foc then the following Kd are calculated: benzene= 0.145 and 0.045 L/kg for the shallow alluvium and deep alluvium (including fine layers), respectively. These do not match the values reported in the table (0.18 and 0.054 L/kg).	Log Koc for benzene, as reported in the table notes, is a typo; it is in fact 1.79 which gives the correct Kd values. The table notes were corrected.
185	Table A-3	Lower Table	The table indicates that the percent of the plume remaining is smaller for in situ solidification than excavation. Assume the labels are incorrect, please fix. Also, these results are not discussed in the text of Appendix A, but in Section 6.4.4 of the main text; please refer to those comments as well.	The labels in the table (now Table A-5) are correct. The smaller volume of plume remaining under solidification may be the result of a few factors: 1) solidification treats a slightly larger volume due to the addition of a solidified buffer around the DNAPL; 2) the solidified zone alters the flow field and reduces the groundwater flow through the DNAPL downgradient of the treated volume.
186	Table A-5		Why are the post-remediation plume volumes for BaP and arsenic greater than for pre-remediation, including Alternative 1 (No Action)? It is especially striking for arsenic, where the No Action plume volume is 55.2 MG, while the pre-remediation volume is 31.6 MG. Also, why is the restoration timeframe for BaP greater than 100 years for Alternative 10, when the Groundwater Restoration Tech Memo indicated BaP would not exceed MCLs in the deep aquifer after construction was complete (if residuals are not considered)?	The predicted B[a]P plume under the No Action alternative is larger because the source is contributing more mass than is flushing out of the model or degrading. This is expected given the high sorption and high half-life assumed. The arsenic plume is larger because of how the initial conditions were applied. Discussion of this effect has been added to Section A3.6 (see response to Comment 166). B[a]P model results for Alternative 10 will not be used. Instead the restoration timeframe will be reported as zero and it will be noted in appropriate tables and figures that Alternative 10 is assumed to reach restoration for B[a]P immediately after implementation of the alternative when residuals are not considered.
187	Table A-9		Include a note with the specific text location of the dewatering discussion and estimates for Alternatives 10 and 11 in Appendix D.	Per the June 28, 2013 clarification on EPA comments, Appendix D (the GW TM) was deleted. Relevant data and discussion including construction dewatering analysis was added to Appendix A. It will be noted that the dewatering analysis was done early in the development of the FS and differences in model construction will be described.
188	Figure A-3		1.4 ug/L in footnote 1 should be 5 ug/L.	Figure was revised as directed.
189	Figures A-8 and		Change the view to include the bottom of the plume boundaries.	Plume boundaries reach the bottom of the model (bottom of Deep Aquifer). The plume boundaries were completed to show this.

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	A-9			
190	Figure A-10		The plume extent for Alternative 10 is missing; assumed because Alternative 10 results in no BaP exceedances following construction.	EPA's assumption is correct. A note was added as discussed in the response to Comment 186.
191	Figure A-13		The estimated base case volumes should be shown for all the alternatives on these panels. As noted above, it unclear why a linear interpolation would be appropriate given the nonlinear relationship of the alternative volumes to each other.	To clarify, the sensitivity analysis was performed on 3 alternatives. Sensitivity results for the other 7 alternatives were estimated by correlating the three modeled sensitivity alternatives. The linear interpolation assumes a linear relationship between the base plume volume and the plume volume under the sensitivity case. Base case volumes are the X value of each point and the sensitivity plume volume is the Y value. Figures A-27, A-30, and A-33 of the draft FS shows the interpolation line generated using sensitivity results from the three alternatives that underwent sensitivity analysis. These figures do not suggest that a more complex interpolation method would be more valid. R-squared values for linear regression were added to Figures A-27, A-30, and A-33 (see response to EPA comment #180). The base case volumes, sensitivity analysis result volumes, and estimated sensitivity analysis result volumes have been reported in tables and in bar graphs with brackets representing estimated and actual sensitivity values in Appendix A.
192	Appendix B	General	EPA has a number of comments on Appendix B and based on the Respondents' response to EPA's comments on this appendix, EPA may decide they need to revise or remove certain sections. **Respondent's June 18, 2013 Clarification Request:** Further discussion regarding expectations for Appendix B. **EPA's June 28, 2013 Response to Clarification Request:** *See EPA's response on other EPA comments made on Appendix B.*	Acknowledged. Revisions made as called for by other comments to Appendix B.
193	Appendix B1	General	This appendix is used to support the idea of needing a TI Waiver for SW criteria during dredging. However, there is no mention of 401 water quality monitoring requirements and how those requirements would establish the framework under which to conduct the dredging. A permit would not be required. A 401 water quality certification, to be developed by EPA, would permit temporary exceedances of water quality exceedances to accommodate the dredging. **Respondent's June 18, 2013 Clarification Request:** Requires discussion. Respondents propose eliminating Water Quality Impacts Calculation (Appendix B1) from FS**.** **EPA's June 28, 2013 Response to Clarification Request:** *EPA is not sure what purpose Appendix B1 serves. Water quality considerations will be taken into account pursuant to a Clean Water Act 401 water quality certification. If the purpose of this appendix is to show that exceedances of water quality standards could be a negative factor to be included in the evaluation of dredging as a remedial technology, the quantitative evaluation is misleading. This approach to quantifying the degree of exceedances of water quality standards is biased in that it only considers a portion of the factors that influence the occurrence of water quality exceedances during dredging activities.* *A qualitative discussion would be more appropriate referring to where short-term exceedances of water quality could be expected. There should also be included in the discussion of best management practices, etc., that can be implemented to minimize water quality exceedances. Short-term exceedances of water quality standards should also be weighed against leaving hazardous substances in place and the result of cap failure on the spread of contamination. If empirical data from other dredging projects are included in a revised version of Appendix B.1, the presentation should include a discussion of why that data can be considered to be*	Appendix B1 was removed per discussion with EPA. The main text was revised to include a qualitative discussion of short-term water impacts and discussion of best management practices, etc., that can be implemented to reduce water quality exceedances.

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			relevant to dredging operations that could occur at Quendall.	
194	B1-6	B1-3	The conclusion indicates that water quality exceedances of "secondary acute values" for naphthalene and benzo(a)pyrene (BaP). The calculations, as presented, likely overestimate these exceedances, particularly for BaP. The relationship in Equation 3, below, where = C_T is the total constituent concentration in water column (in mg/L), based on all the contaminant mass associated with particles in suspension. $C_T = (1 \times 10^{-9})\ (M_{constituent}\ \times TSS) + C_{back}$ This equation does not account for contaminants desorbing from the sediment and becoming freely dissolved. Dissolved phase contaminants are those that lead to risk and should be used for comparisons to the acute values. As described in the reference for the toxicity values (Suter and Tsao 1996, p. 35), "All of these benchmarks are based on toxicity tests conducted in the laboratory. Therefore, they should be compared to water concentrations that are as equivalent as possible to concentrations in test water which is nearly all dissolved." In these instances, engineering and operational controls should be employed to the extent practical. As mentioned in the Appendix, the DRET test would be useful for providing a site-specific estimate of releases. **Respondent's June 18, 2013 Clarification Request:** See note for Comment #193. **EPA's June 28, 2013 Response to Clarification Request:** *See EPA response for Item 193.*	Appendix B1 was removed. See response to Comment 193.
195	B1-6	B1-3	The (Suter and Tsao 1996) values are different from the PRGs for surface water listed in Table 4-6 of the FS. Add justification for their use and citation here.	Appendix B1 was removed. See response to Comment 193.
196	B2-4 and B2-5	Tables B2-1 and B2-2	The dredge plan does not appear to be consistent with its design of a maximum of 1-ft overdredge allowance in dredge areas DA-3 (Table B2-1) and DA-2 (TableB2-2). **Respondent's June 18, 2013 Clarification Request:** Needs discussion. Propose eliminating Residual Calculation (Appendix B2) from FS. **EPA's June 28, 2013 Response to Clarification Request:** *At the June 18, 2013 meeting, the Respondents proposed to remove the calculation for estimating residuals from dredging and replacing it with empirical data from other dredging projects. EPA stated that the empirical data was not needed because EPA recognizes that production of residuals from dredging activities can result in failure to obtain sediment cleanup numbers—that this is commonly understood and does not need to be substantiated. EPA also recognizes that dredging DNAPL can cause a greater residual problem than dredging other contaminants. EPA was uncertain whether dredging protocols were consistent among the cited dredging projects or different actions were used to minimize the production of residuals for each dredging project. Therefore, EPA questioned the value such data would provide other than what is already known—that residuals can cause exceedances of sediment cleanup numbers.* *EPA decided after consideration of the discussion regarding residuals in the meeting that Appendix B2 could be handled in one of two ways:* *(1) Remove Appendix B2 and include in the main text that the limitation of dredging is the production of residuals that may result in the exceedances of sediment cleanup numbers. In fact, the Respondents have already added a residual management sediment cover to alternatives that include dredging as part of the remedy.* *OR* *(2) Retain and revise Appendix B2 as proposed by the Respondents. Presentation of empirical data from other dredging projects should include a discussion of why that data can be considered to be relevant to dredging operations that could occur at Quendall. In this case, the Respondents shall include in the FS, an equally detailed analysis of the limitations using other site empirical data (comparable to the dredging residuals*	Appendix B2 was eliminated per EPA. The main text was revised to include that one limitation of dredging is the production of residuals that may result in the exceedances of sediment cleanup numbers. In fact, the Respondents have already added a residual management sediment cover to alternatives that include dredging as part of the remedy.

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			analysis) of all other remedy technologies included in the array of alternatives , including institutional controls, capping, permeable reactive barriers, funnel and gate technologies with and without PRB (as appropriate), biodegradation and sulfate reduction, and permeable reactive caps plus any other remedial technology incorporated in the array of alternatives. This response is also made in conjunction with other EPA comments regarding the Respondents failure to conduct a balanced, unbiased evaluation of alternatives for the FS. *In response to the June 18, 2013 meeting discussion concerning when substantiation of information/data is required, EPA stated that information that is commonly understood or is readily available does not require substantiation. EPA considering the production of residuals as commonly known information.*	
197	B2-4 and B2-5	Tables B2-1 and B2-2	The contaminant concentrations in both B2-1 and B2-2 should be clarified to indicate whether they represent the concentration in the dredge pass with the overdredge depth or without the overdredge depth. It appears to be with the overdredge depth but in the example calculations it is without the overdredge. **Respondent's June 18, 2013 Clarification Request:** See note for Comment #196. **EPA's June 28, 2013 Response to Clarification Request:** *See EPA response for Item 196.*	Appendix B2 was removed. See response to EPA Comment 196.
198	B2-5	Table B2-2	The table indicates that all of the dredge areas for Alternatives 10 and 11 have cleaner sediment in some dredge passes than in the cleanup pass that follows; it would appear that the dredge cut should be shallower. **Respondent's June 18, 2013 Clarification Request:** See note for Comment #196. **EPA's June 28, 2013 Response to Clarification Request:** *See EPA response for Item 196.*	Appendix B2 was removed. See response to EPA Comment 196.
199	B2-6	Table B2-3	The water contents in Table B2-3 do not appear to be correct in the increments transitioning from silt to sand; the table lists the water content of the top sand increment for DA-1, DA-2 and DA-3 to be nearly ten times as large as the other sand increments and higher in water content than the silt increments. As above, are these reported densities the average of the increment (dredge pass) or are they related to the dredge depth without overdredge as in Tables B2-1 and B2-2. The example calculations use the values as the average of the increment. **Respondent's June 18, 2013 Clarification Request:** See note for Comment #196. **EPA's June 28, 2013 Response to Clarification Request:** *See EPA response for Item 196.*	Appendix B2 was removed. See response to EPA Comment 196.
200	B2-9	Equations EQ-7 & EQ-8	Equations EQ-7 and EQ-8 provide estimates of the range of generated residuals thickness. EQ-8 inappropriately overestimates the maximum because it uses the thickness of the dredging prism instead of the thickness of the last dredge cut, assuming no generated residuals would be dredged in subsequent passes or resuspended and transported away. In addition, the expected thickness should be calculated by replacing tprism with tcut in EQ-8. Is there a basis for the assumption that the residuals will have a density of 75% of the in situ density? **Respondent's June 18, 2013 Clarification Request:** See note for Comment #196. **EPA's June 28, 2013 Response to Clarification Request:** *See EPA response for Item 196.*	Appendix B2 was removed. See response to EPA Comment 196.
201	B2-15	General Table B2-8	Table B2-8 summarizes the residuals evaluation, presenting a range of post-dredging residuals thicknesses and concentrations. The higher end of the presented range represents estimated conditions in the absence of a dredging cleanup pass. That is not realistic considering the dredge environment (e.g., bottom of prism having 740 ppm BaP). Whether or not to include a cleanup pass is a management decision. A cleanup pass is	Appendix B2 was removed. See response to EPA Comment 196.

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			anticipated, so it's not reasonable to estimate site conditions based on the absence of a cleanup pass. **Respondent's June 18, 2013 Clarification Request:** See note for Comment #196. **EPA's June 28, 2013 Response to Clarification Request:** *See EPA response for Item 196.*	
202	B2-15	Table B2-8	The residual thicknesses reported in Table B2-8 are not correct. The minimum values should have been calculated using a cleanup pass thickness of 0.5 ft in EQ-7 instead of a production pass thickness of 2 ft and the maximum value should have been calculated using a production pass thickness of 2 ft instead of the dredge cut thickness. Hence, the reported residual layer thicknesses are several times larger than they should be." **Respondent's June 18, 2013 Clarification Request:** See note for Comment #196. **EPA's June 28, 2013 Response to Clarification Request:** *See EPA response for Item 196.*	Appendix B2 was removed. See response to EPA Comment 196.
203	Appendix B3	General	References to the Draft Final 2004 Risk Assessment/Feasibility Study are not sufficient. Any data that is being relied on for this analysis must be presented in this Appendix.	This Appendix was revised to present all the data relied on for this analysis.
204	B3-3	B3-3.1	The discussion needs to expand on the reasons why a model calibrated on native sediments composed of silts and clay can be extrapolated for use in a gravel and sand cap.	The model has inputs for the cap material type and porosity. Entering specific material type (i.e., granular materials such as gravel and sand) causes the model to calculate the effective molecular diffusion coefficient as a function of porosity. This appendix was revised to present further discussion.
205	B3-6	B3-3.2.2	Using Appendix A Table A-1 data: benzene log Koc = 1.8 L/Kg. Why use 1.7 L/Kg which is "consistent with" rather than the accurate 1.8 L/Kg?	The log Koc is not an input parameter in the revised FS, therefore comment regarding 1.8 vs 1.7 is irrelevant. The log Kow is used in the model and the value (2.13) is consistent in both locations.
206	B3-6	B3-3.2.3.1	Text quote *"As such, the "typical" value cited in Reible (2012) of 24 cm/d is representative of more strongly sorbing chemicals than benzene and naphthalene."* This statement is not consistent with earlier text that the typical range is 1 to 20 cm/d. Also, it does not appear that Reible 2012 (at least as identified in the references) is available on the Reible Lab website.	It appears the 1 to 20 cm/day was based on Thibodaux 2001 (see Figure 2, Thibodaux 2001). Reible 2012 does include in the text that a value of 1 cm/hr is typical. Text was revised.
207	B3-7	B3-3.2.3.2	Text quote *"Degradation rates for benzene and naphthalene estimated through the calibration process are represented by half-life values of 21 days (range of 7 to 63 days for sensitivity cases) and 17 days (range of 7 to 84 days for sensitivity cases), respectively. These values are on the low-end (higher degradation rate) of literature-based values for anaerobic groundwater systems that have been depleted of sulfate (e.g., Aronson and Howard 1997)."* Danny Reible, University of Texas, states: "I am somewhat surprised at the calibrated degradation rate fairly deep in sediments. It's usually harder to degrade naphthalene and benzene under anaerobic conditions- I am presuming the lack of sulfate is the result of sulfate reduction. The relatively high rate, however, could easily be the result of poor estimates of other parameters (e.g. higher than actual upwelling rate which requires a faster degradation rate to fit the data)."	Agree that the values are on the more rapid (shorter half lives) end of the spectrum but not out of the range that has been observed. The interplay between seepage rate and subsequent degradation rate was evaluated.
208	B3-8	Table B3-3	Porosity of 0.75 may represent a reasonable value for lake surface sediments, but is not reasonable for the undisturbed underlying geologic sediments ranging down to the approx 4 foot sampling depth where a value on the order of 0.3 is more reasonable. Either change or present a sound, fully technical justification. [Note: this	Porosity value was modified to 0.4.

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			comment has been made prior to this FS.]	
209	B3-10	B3-3.3	Text quote *"The model calibration results reproduce the pattern of decreasing concentration as the porewater nears the surface, which is the result of dispersive mixing (including bioturbation) and exchange with the surface water. In general, the concentrations produced from the average calibration scenario (black line on Figures B3-3a through B3-3c) match the mean measured concentrations, with the exception of the surface concentrations, which the model under-predicts."* The issue with this statement, and the modeling outcome, is that the model performs well on 2 of 3 measured concentrations. The model does not match well with the surface value, which is the most important value. It would be helpful if the text could expand on the implications of the model results being outside the surface value.	Text was revised to expand on the implications of the model results being outside the surface value.
210	B3-10	B3-3.3	Include the RI conclusion that the reduction in contaminant concentrations is NOT a simple dilution with surface water as proved by the cation calibration (Figs B3-3 and B3-4).	RI conclusion was included.
211	B3-10	B3-3.3	Explicitly discuss exactly how the COC concentrations used as input to the Section B3-4 Capping Evaluation are calculated and add a Table summarizing the calibrated values that will be used.	The measured surface COC concentrations were used as input to the Capping Evaluation. A table summarizing the calibrated values and COC inputs was added.
212	B3-10	B3-4	Because most of the COC concentration decrease happens in the upper 10 cm of sediments (as demonstrated earlier in the discussion), what happens to the calibrated COC concentrations used as input when they are buried under 1.5 to 3 feet of cap material?	Most of the COC concentration decrease happens in the top 40 cm, not the top 10 cm. Modeled or calibrated COC concentrations were not used as inputs. Model inputs for the capping scenarios were based on measured porewater COC concentrations taken from the 0 to10 cm layer; these were used as the concentration of the quasi-infinite underlying COC source zone at the cap/sediment interface.
213	B3-11	B3-4.2.1, 2nd paragraph	In the 3rd and 2nd to last two sentences, change biodegradation to either "chemical/biodegradation" or just use the term "degradation". Scrub the entire Appendix B3 and change where applicable.	Changes made as suggested by EPA.
214	B3-12	B3-4.2.2.1	Coordinate with previous comment.	See response to Comment 213.
215	B3-14	B3-4.4	Add initial COC concentrations to the list of uncertainties/visibilities.	Initial COC concentrations were added to the list of uncertainties/visibilities as requested by EPA.
216	B3-15	Table B3-6	Calibrated naphthalene and benzene half-lives need to be coordinated with the previous comment regarding the applicability after cap placement.	Calibrated naphthalene and benzene half-lives were incorporated into the sensitivity analysis.
217	B3-17	B3-5, 1st paragraph, 2nd sentence	See previous comments regarding half-lives.	The discussion of sulfate reduction was revised to acknowledge the potential for this pathway only and eliminate the modeling element.
218	B3-17	B3-5, 1st paragraph	Explicitly explain and present basis for the statement that HC degradation is controlled by sulfate reduction.	The discussion of sulfate reduction was revised to acknowledge the potential for this pathway only and eliminate the modeling element.
219	B3-17	B3-5, 2nd paragraph	Discuss how the downward diffusive "velocity" can overcome the upward advective velocity (Darcy velocity/porosity).	The discussion of sulfate reduction was revised to acknowledge the potential for this pathway only and eliminate the modeling element.
220	B3-17	B3-5, 2nd paragraph	Change "quantify" to simulate.	The discussion of sulfate reduction was revised to acknowledge the potential for this pathway only and eliminate the modeling element.
221	B3-18	B3-5.1, 1st paragraph, 2nd and 3rd sentences	These are huge assumptions. Must give basis based on real site data. 0.9 is not near zero (only 5x lower than lake water).	The discussion of sulfate reduction was revised to acknowledge the potential for this pathway only and eliminate the modeling element.

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222	B3-18	B3-5.1, 1st paragraph, 3rd sentence.	Where in the RI are the data used to calculate 0.9 mg/L?	The discussion of sulfate reduction was revised to acknowledge the potential for this pathway only and eliminate the modeling element.
223	B3-18	B3-5.1, 2nd paragraph, last sentence	Need to explain the basis for the stated 4-fold reduction.	The discussion of sulfate reduction was revised to acknowledge the potential for this pathway only and eliminate the modeling element.
224	B3-18	B3-5.2, 2nd paragraph, 3rd sentence	Add supporting explanation and data for the assertion.	The discussion of sulfate reduction was revised to acknowledge the potential for this pathway only and eliminate the modeling element.
225	B3-18	B3-5.2, 2nd paragraph	Change to "…hydraulic controls could increase sulfate…"	The discussion of sulfate reduction was revised to acknowledge the potential for this pathway only and eliminate the modeling element.
226	B3-19	B3-6.3, 1st paragraph, 2nd sentence	Change to "…it can be assumed…" and delete "at least".	The discussion of sulfate reduction was revised to acknowledge the potential for this pathway only and eliminate the modeling element.
227	Appendix B4	General	Too little info is given to check the calculations about wind-generated waves. The wave heights appear low, but can't be fully and independently evaluated without more data. **Respondent's June 18, 2013 Clarification Request:** Discuss which specific parameters are missing. **EPA's June 28, 2013 Response to Clarification Request:** *If the only intended use of the screening analysis in Appendix B 4 is for estimating costs for alternatives that include capping or covers with armoring the current information is acceptable (.e.g., to estimate costs for armoring material). For the evaluation of alternatives containing capping or cover components it should be assumed that armoring will be required. Specifications for armoring can be used as those found in Appendix B 4 However, the screening analysis in Appendix B 4 will not be used in the evaluation of alternatives because the analysis is only a screening level analysis. A detailed impact analysis of possible erosion of any proposed cap or cover caused by caused by placement and drag of anchors, prop wash, lake currents, earthquakes,100-year storms, etc. will be required for cap design during remedial design.*	The Cap Armor Layer Evaluation (Appendix B-3 in the Draft Final FS) is a screening level analysis to inform the cost estimates of alternatives. No revision needed based on EPA response.
228	Appendix B4	General	EPA disagrees with the conclusion that because the wake waves are lower in height than the wind-waves, they are not of concern to capping stability. Vessels so close to the cap, even if they were to generate smaller waves than wind-induced waves, may cause much greater disturbance to the near-bed region and over the entire water column because they may change the nearby flow and circulation. So, vessel-induced disturbances could be very different than what would be caused from wind-waves in terms of their impacts on the area of interest. In general, vessel-induced disturbances can cause much greater problems (e.g., comparatively increased near-bed shear stresses to mobilize near-bed and sediments throughout the water column, induced higher forces on the cap, and alter the overall hydro-wave 2D/3D dynamics). Include more analysis and discussion to allow independent evaluation.	The Cap Armor Layer Evaluation (Appendix B-3 in the Draft Final FS) is a screening level analysis to inform the cost estimates of alternatives. No revision needed based on EPA response to Comment 227.
229	Appendix B5	General	The analyses and the basis of the inputs were not specifically reviewed. However, the results and the conclusions, indicate the importance of physical monitoring of the cap by bathymetry or settlement plates with contingencies stated for cap repairs, if needed. The use of a reactive core mat is also described and it's mentioned that the mat could increase cap stability. The placement of the mat over highly organic sediments should be evaluated for the potential effect of gas ebullition on cap integrity. Mats can become biofouled following placement, trapping gas underneath the cap. Upward forces in these situations have been known to disrupt caps placed on top of the mats. Finally, as described in the Appendix, cap placement would occur in thin, 6-inch lifts. The relatively slow, measured placement of capping material will limit mixing and resuspension and control the rate of porewater expression during consolidation.	Yes, cap monitoring will be needed. The reactive cap may have a low permeability but it will not be impermeable. Caps containing organoclay have been installed at a number of sites including several with ebullition. Discussion of this issue was added to the FS.
230	C-3	C.2.3.1, 1st paragraph	"absorption" should be "adsorption".	Revision made as directed.

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231	C-5	C.2.3.1, Mid-Temperature Heating, last paragraph	"*Because of the high cost of this technology compared to other treatment technologies (e.g., solidification), and uncertainty in effectiveness, this technology was not retained. These process options for this technology have been retained in this screening. A representative process option or combination of options will be identified during the development of alternatives based on discussions with thermal technology vendors regarding a specific treatment scenario."* The last two sentences in this paragraph conflict with the opening statement. Delete these sentences.	Revision made as directed.
232	Appendix D	General	Delete the Groundwater Restoration TM appendix. Please refer to EPA's General Comments.	Appendix was deleted.
233	Appendix E (New Appendix D)	General	To stress that these are Feasibility Study level estimates, include after the +50%/-30% accuracy range based on the total cost at the end of the estimate.	Table D-1 in Appendix D (formerly Appendix E) was revised to include the +50%/-30% accuracy range.
234	Appendix E (New Appendix D)	Cost and bid contingencies	These are not discriminated in the cost estimate although EPA (2000) appears to require this. **Respondent's June 18, 2013 Clarification Request:** Discuss; not clear that these are required. **EPA's June 28, 2013 Response to Clarification Request:** *EPA is retracting this comment.*	Comment retracted by EPA.
235	Appendix E (New Appendix D)	Ex-situ Thermal	Additional cost elements for ex-situ thermal technology could include treatment pad installation, sampling and analysis for process control, mobile equipment rental/leasing, utilities, as well as off-gas treatment. Additional details should be provided to support unit costs related to ex-situ thermal, including any potential materials credits following construction completion.	Additional details were provided to support unit costs related to *ex situ* thermal technology.
236	Appendix E (New Appendix D)	Upland Soil Removal	For alternatives that assume excavation of deep aquifer materials, instead of returning treated soil into saturated conditions near the deep aquifer, a lower hydraulic conductivity layer (instead of the proposed rock/geotextile layer) could be placed at the bottom of the excavation prior to backfill. **Respondent's June 18, 2013 Clarification Request:** Not sure why this is being suggested. **EPA's June 28, 2013 Response to Clarification Request:** *EPA is retracting this comment.*	Comment retracted by EPA.
237	Appendix E (New Appendix D)	Dredging	Costs for dredging BMPs could lead to a significant increase in per-cubic-yard cost for dredging. Respondents should describe how these are represented in the 25% contingency.	Dredging BMPs are included as a separate cost category in the cost estimate ("Sediment Environmental Controls" in the Draft FS and "Sediment Environmental Controls and Monitoring" in the Draft Final FS) and are not lumped as part of the 25% contingency. The dredging BMPs in the Draft Final FS are adjusted for each alternative based on the amount of dredging and other in-water work.
238	Appendix E (New Appendix D)	Treatability Studies	The Draft FS does not provide specific cost assumptions for required treatability studies, nor information on what was included in contingency costs, and should specify such detail.	The FS was revised to include assumptions for treatability studies and the basis for contingency costs.
239	Appendix	ISSS	EPA was unable to acquire the two reports regarding the neighboring JH Baxter site referenced in Draft FS Appendix D, Table 3-2. These references are: Wilk (2007) and Hainsworth (2011). These need to be provided	This appendix table was deleted as directed.

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	E (New Appendix D)		to EPA.	
240	Appendix E (New Appendix D)	ISSS	Missing information on prospective costs for treatability studies and information on monitoring over the last 9 years at the JH Baxter site could reinforce the effectiveness of S/S for the Quendall Terminals site, and reduce the Draft FS' statement of treatment uncertainty, as well as lend support to costs and contingency estimates.	Refer to response to Comment 79.
241	Appendix E (New Appendix D)	General	Given the change in the remedial alternatives, some of the cost tables will be eliminated and others will need to be updated. The comments below are based on the full set of alternatives presented in the August 2011 agency review draft.	Acknowledged.
242	Appendix E (New Appendix D)	Mob/Demob	Please note if the Mob/Demob also includes bonds and insurance? Note indicates mobilization, demob, & temp facilities.	A footnote has been added to clarify that bond and insurance costs <u>are</u> included in the Mob/Demob line item.
243	Appendix E (New Appendix D)	Sediment Environmental Controls	Under sediment environmental controls does this site need silt fencing, high visibility fencing, or wheel washes for trucks entering and leaving the site? If not explain why not.	These items would likely be needed, and their costs would be accounted for in the Mob/Demob line item. The new footnote (see Comment 242 response above) clarifies that temporary erosion and sediment control (TESC) measures are included in the Mob/Demob line item.
244	Appendix E (New Appendix D)	Upland Soil Cap	Non-Hazardous transport and disposal of waste from the habitat area is shown as $50/cy under Upland Soil Cap and $50/ton in all other locations. This is consistent throughout the various estimates. If this is intentional, please explain. If the non-hazardous soil can be placed in several clean earth borrow pits in the area without having to go to a Subtitle D landfill, this might account for the difference; but in that case this cost seems high.	The same non-hazardous transport and disposal was assumed here as in other locations. The *Quantity* shown in this line item was corrected from BCY to tons.
245	Appendix E (New Appendix D)	Upland Soil Removal	Sheet pile costs for shoring (based on Appendix G) seem high. Even with walers and bracing, $92/sf seems high in (former) Alts. 7 & 8. Similar comment for $72/sf in Alt. 10 and $61/sf in (former) Alt. 11. Add discussion or notes to clarify.	A reference to Appendix F (formerly Appendix G) has been added, which is the source of these unit costs.
246	Appendix E (New Appendix D)	Periodic Costs (PRB)	Provide a break out of the $572,145 periodic cost for the replacement of the permeable treatment wall.	A note has been added indicating that this total includes the mob/demob, excavation, and treatment media costs for Permeable Treatment Wall provided earlier in the worksheet, plus a $400/ton disposal fee for the spent media.

ITEM	PAGE	SECTION/PARAGRAPH	EPA COMMENT	RESPONSE
247	Appendix E (New Appendix D)	Offshore Sediment Capping Above DNAPL	The prospective transloading process (rail link or trucking plan) should be described in the FS. For example, for offshore sediment capping does the material cost include transporting the material to the barge for placement? Is the material barge delivered or truck delivered and then placed onto a materials barge? Add discussion/notes for clarity.	The description of alternatives was revised to include the description of potential transloading and transportation processes (i.e., trucks, barges, rail).
248	Appendix E (New Appendix D)	Offshore Sediment Capping Above DNAPL	Why is nearshore placement so much higher than barge placement, $17/ton versus $10/ton? (common to Alts. 3 thru 7) Barge costs would be expected to be higher due to additional equipment costs. Add discussion/notes for clarity.	The Draft Final FS cost estimate was revised to include equal costs for nearshore and offshore placement based on project experience.
249	Appendix E (New Appendix D)	Permeable Treatment Wall	The cost of the slurry wall at $8/lineal foot for a slurry wall up to 25 ft deep seems too low. Is this supposed to be a square-footage cost? Add discussion/notes for clarity.	The slurry wall unit cost of $8/lineal foot was a typo. The unit cost has been corrected to $188/lineal foot.
250	Appendix E (New Appendix D)	ISSS	Soil solidification costs for the 4ft auger are $90/cy, but the 8ft auger is significantly less at $70/cy. Add justification to clarify.	Clarification note added as directed (4-foot auger used to treat deeper soils, below 8-foot auger limit).
251	Appendix E (New Appendix D)	ISSS	EPA was unable to acquire the two reports regarding the neighboring JH Baxter site referenced in Draft FS Appendix D, Table 3-2. These references are: Wilk (2007) and Hainsworth (2011). These need to be provided to EPA.	See response to Comment 239.
252	Appendix E (New Appendix D)	ISSS	Missing information on prospective costs for treatability studies and information on monitoring over the last 9 years at the JH Baxter site could reinforce the effectiveness of S/S for the Quendall Terminals site, and reduce the Draft FS' statement of treatment uncertainty, as well as lend support to costs and contingency estimates.	See response to Comment 240.
253	Appendix E (New Appendix D)	Offshore Sediment Dredging	Indicate the assumed production for the dredging operation in notes. Silt curtains and oil booms are included in line item note but aren't these costs covered in Sediment Environmental Controls? Need to make sure these are not double counted by including these in dredging equipment costs since these are located elsewhere.	The assumed production rate was noted. The silt curtains and oil boom cost was evaluated to make sure that the costs were not double-counted.
254	Appendix E (New Appendix D)	Mob/Demob (former Alts. 10 & 11)	Mob/Demob costs typically run 6 to 8% of pre-tax and contingency total costs depending on project scope and size. Compared to the other alternatives, this % might be low (4.9%), based on the low Mob/Demob cost for the Offshore Sediment Dredging. Please provide rationale.	Mob/demob costs for all remedy components in all alternatives have been adjusted to generally conform to the range of 6 to 8% of pre-tax and contingency total costs, depending on project scope and size.
255	Appendix	Offshore Sediment	Include the cost source for the Cellular Cofferdam Unit and Dewatering Cell cost (e.g., is this based on a quote	Cofferdams are no longer a component of any remedial alternative.

ITEM	PAGE	SECTION/PARAGRAPH	EPA COMMENT	RESPONSE
	E (New Appendix D)	Removal	or discussion with a contractor, etc.) Also include the assumed size of the cofferdams. This is a major cost item and no source or notes are given.	
256	Appendix F (New Appendix E)	Engineering Calculation Sheets	Not reviewed.	Acknowledged.
257	Appendix G (New Appendix F)	Construction Shoring Design Considerations	No comments other than those noted above.	Acknowledged.

ITEM	PAGE	SECT/PARA	NOAA COMMENT	RESPONSE
1		General	NOAA is a trustee for aquatic habitats, fish, and other aquatic species in the coastal areas of the United States. The Lake Washington nearshore area adjacent to Quendall Terminals provides uniquely important habitat for juvenile salmonids, especially ESA listed Chinook. The shoreline at Quendall represents a significant portion of remaining privately owned, physically unaltered (i.e., not dredged, docked or bulkheaded) shoreline/nearshore habitat in Lake Washington. Therefore, NOAA is very interested in participating in the feasibility study process on the Quendall Terminals site to ensure that the remedy selected is protective of NOAA trust resources and is coordinated with natural resource damage assessment and restoration to the extent possible.	Comment acknowledged.
2			"The potential for acute toxicity in the dredging area may also be a factor in determining ESA compliance because the lake area within the Site is considered prime habitat for the rearing of juvenile salmonid stocks, including Puget Sound Chinook salmon, which are listed as threatened." (page ES-9). A coffer dam would “likely require an extended evaluation by the federal agencies to ensure that endangered species are not jeopardized by the cleanup.” This overstates the potential for conflict with ESA compliance. Coffer dams, silt curtains, and sheetpile containment to protect fish from contact with dredging equipment and resuspended sediments are all commonly permitted, and the area proposed for dredging in this FS is not large (2 to 6 acres). Dredging could be done in July-December when Chinook are not present. The FS argues that coffer dams or sheetpile containment would be detrimental because they would reduce the available shoreline habitat at the site temporarily during remediation. Given that the habitat in question is already degraded by contamination and consists of oil-soaked sediments and DNAPL, coffer dams excluding fish from being exposed to the contamination would actually be beneficial.	Text was revised to balance the potential short-term impacts with long-term effectiveness.
3			Table 4-7 Development of PRGs (Preliminary Remediation Goals) For Sediment—Since the units here do not appear to match the units that were used for deriving background, it is not clear where the ecological PRGs come from. Table 4-7 appears to use PAH sums rather than B(a)P equivalents; this should be clarified and the conversion given explicitly. Similarly, Table 4-7 appears to give dry weight concentrations while the background was derived on an OC-normalized basis: this conversion should be given explicitly.	Note added per NOAA comment.
4			Remediation alternative 2 says it will cap upland areas where surface soil exceeds PRGs. It appears that this is the entire upland portion of the site, based on Figure 6-1. Please clarify.	That is correct; for the purposes of the FS, it was assumed that the entire upland portion of the Site is capped.
5			The report presents organic carbon-normalized sediment contaminant concentrations. For context, please provide information on the levels of organic carbon observed in sediments on the site. (Presumably this is quite variable, if so, give a range.)	Range of organic carbon in sediments was added to Section 4.3.5.
6			The comparative analysis of alternatives gives poor "short term effectiveness" scores to the alternatives that dredge DNAPL-contaminated sediments on the basis that dredging will generate residuals that cannot be cleaned up and will result in higher surface concentrations than are currently present. Granted that dredging is not perfect, these problems are not insoluble. If mechanical dredging is not expected to work, would hydraulic dredging offer a better result? If the dredge depth is not great enough to get past the highly contaminated material, then dredge deeper. We can address the problem of dredge residuals by using the proposed cover layer in combination with silt curtains or other BMPs to control the spread of resuspended sediments.	Section 7.2 was revised per EPA’s General Comments in the cover letter and this comment table regarding detailed evaluation.
7			What is the point of including the No Action alternative as a "baseline for comparison" if it is not actually compared to the other alternatives in Table 8-1? It should be given numeric scores for the balancing criteria. This would help us assess whether dredging is really as harmful as it's made out to be. Alternative 10 is given a score of 1 out of 10 for short term effectiveness, indicating that the authors believe that the removal (in particular, the dredging) will be detrimental in the short term. There may be downsides to dredging, but it’s important to assess whether it is better than doing nothing at all (i.e. leaving the contamination in place).	The numeric rating system used in Table 8-1 was deleted. The new Table 8-1 uses qualitative descriptors (i.e., high, moderate, low) for rating the balancing criteria. These were applied to all remedial alternatives, including the No Action alternative.

ITEM	PAGE	SECT/PARA	NOAA COMMENT	RESPONSE
8			Section 7.2.5.2 Short-Term Impacts of Dredging—"It is not expected that the predominantly dissolved-phase release [of PAH due to dredging] can be effectively contained by any technology, including sheet pile walls, because neither technology can provide a water-tight barrier." (page 131). Even if the barrier allows passage of a little water, it will greatly *reduce* the flux of PAHs out of the dredging area. Barriers should be used when dredging DNAPL-contaminated sediments.	The main text was revised to include a qualitative discussion of short-term water impacts and discussion of best management practices, etc., that can be implemented to reduce water quality exceedances.
9			"Near-surface porewater and surface water column samples collected from the Site during the RI indicate that current conditions are generally below or very close to PRGs that would ensure protection of aquatic resources." page 131, section 7.2.5.2. It is difficult to reconcile this claim with the earlier statement that RBCs (risk-based concentrations) are very low (below background). Concentrations in sediment seem quite high and seem to warrant dredging.	This comment was addressed by updating the statement to accurately depict current Site conditions and COC concentrations.
10			How will EPA address wood waste? It is considered contamination under the State of Washington's Model Toxics Control Act.	This cleanup is being performed under CERCLA. CERCLA does not require removal or treatment of the site woodwaste.
11			Appendix B1 Water Quality Impacts Evaluation—Water quality impacts from dredged sediment resuspension seem overstated for the reasons described below: a. Are the flows realistic? 0.1 m/s sounds high, as this is in the range of Duwamish River flows (10-40 cm/s). b. Note that it assumes mechanical dredging—could perhaps do better with hydraulic? c. Impediments such as rocks can increase loss rates. Are there rocks or other impediments at Quendall? d. Cycle time of 90 seconds is conservatively fast. By going slower, we could reduce resuspension. e. Explain why DA1 and DA2 spread so much more than the other areas. Table B1-4a shows contamination at much greater distances from the point of dredging for DA1 and DA2. f. Given that Table B1-5 estimates up to 30 days (4 weeks) of water quality exceedances, explain the conclusion in section B1-4 that exceedances may persist for 5-6 weeks or longer.	Appendix B1 was removed. See response to Comment 193.
12			Formatting in Appendix B2 makes it nearly impossible to read the mathematical formulas. Please fix.	Appendix B2 was removed. See response to EPA Comment 196.
13			Explain how dredge depths were selected for Appendix B2 (refer to the relevant section in the main text if necessary).	Appendix B2 was removed. See response to EPA Comment 196.
14			Appendix B2 Dredging Residuals Evaluation—concludes by saying: "It is expected that some DNAPL will remain after dredging." What is the maximum depth of DNAPL? Dredge depths should be adjusted to get all of the DNAPL even if not all the remaining PAH can be removed.	Appendix B2 was removed. See response to EPA Comment 196. Dredge depths were evaluated to determine if they include all the DNAPL and are consistent within the FS.

ITEM	PAGE	SECT/PARA	NOAA COMMENT	RESPONSE
15			B3 Cap Layer Isolation Modeling—3.2.1.1 references the 2004 Risk Assessment/Feasibility Study for the thickness of the bioturbation zone. This document should not be referenced--according to EPA, it has been replaced by the more recent RI. The bioturbation zone should be 10 cm. Table B3-3 states that changing this number did not significantly affect the results, but it's not clear what range of numbers was tested. Please correct this to 10 cm and adjust results accordingly.	Reference to 2004 Risk Assessment/Feasibility Study was removed. Bioturbation zone was corrected to be 10 cm.
16			B3-5.1 Possible Biodegredation Enhancement Options— doesn't adequately justify the claim that a cap would enhance biodegradation of PAH. This claim should be removed. Other comments follow. a. What is the basis for the assumption that incoming deep groundwater has near zero sulfate? (This assumes that sulfate is the limiting factor but does not provide evidence.) b. Concentrations at depth (4 m) are estimated based on the shape of a curve that is calibrated to shallow data (down to 125 cm). There is no reality check for substrate material, depth of bedrock, etc. c. If sulfate is predicted to diffuse in from the surface, why does the model predict a greater increase in sulfate in deeper layers (top 12 foot average) than in shallower layers (top 3 foot average)? d. For significant sulfate utilization to occur, we need anaerobic conditions. Both the cited papers (Al-Zuhair and Sublette) mention the efforts they made to ensure anaerobic conditions. If oxygen is available, it will be the preferred electron acceptor as it's more thermodynamically favorable than sulfate. Are conditions in the Quendall sediments anaerobic? If we are relying on diffusion to bring in more sulfate, why wouldn't it bring in more oxygen as well? e. Al-Zuhair notes that sulfate utilization is inhibited in the presence of excess sulfate (above 5,000 g/m3). That appears to be the current concentration in near-surface porewater, so if additional sulfate is introduced to the system, it might actually have detrimental effects.	The discussion of sulfate reduction was revised to acknowledge the potential for this pathway only and eliminate the modeling element.

ITEM	PAGE	SECT/PARA	ECOLOGY COMMENT	RESPONSE
1		General	Provide information regarding wetlands disturbance and proposed restoration/mitigation.	Section 6.2 was revised to address habitat considerations as a “common element” of the remedial alternatives.
2			Demonstrate that the proposed restoration/mitigation meets no net loss of ecological function along the shoreline.	This demonstration is outside the scope of the FS.
3			Demonstrate that the proposed restoration/mitigation meets best available science (BAS) or is consistent with BAS.	This demonstration is outside the scope of the FS.
4			Armoring of the shoreline is not an option.	Armoring of the shoreline may be a necessary element of the remedy.

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