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STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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January 28, 2005

Mr. Larry Romine  
Richland Operations Office  
United States Department of Energy  
P.O. Box 550, MSIN: A6-33  
Richland, Washington 99352

RECEIVED  
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EDMC

Dear Mr. Romine:

Re: Comments on Regulatory Draft "C" for 200-UW-1 Operable Unit Focused  
Feasibility Study and Proposed Plan

Enclosed are the Washington State Department of Ecology's (Ecology) review comments on Draft C of the 200-UW-1 Operable Unit Focused Feasibility Study and Proposed Plan. The United States Department of Energy (USDOE) should use the agreed comment resolutions to prepare a final Focused Feasibility Study for Ecology review and approval. USDOE should prepare an updated Proposed Plan, which Ecology will make available for the required public comment.

If you have any questions, please contact Brenda Becker-Khaleel at (509) 372-7882 or me at (509) 372-7921.

Sincerely,

John B. Price  
Environmental Restoration Project Manager  
Nuclear Waste Program

cc: Craig Cameron, EPA  
Dana Ward, USDOE/HNRTC  
Stuart Harris, CTUIR  
Pat Sobotta, NPT  
Russell Jim, YN  
Todd Martin, HAB  
Ken Niles, ODOE

**Administrative Record:** 200-UW-1, 216-U-12  
Environmental Portal



**Washington State Department of Ecology**  
**Comments on Focused Feasibility Study for the 200-UW-1 Operable Unit**  
**(DOE/RL-2003-23 Draft C)**

Index	Reference	Comment
1.	Global	This document precedes Ecology's requirement that COPC lists be generated on the basis of analytical methods. Due to this circumstance and the comments given below, this document shall not be used as a template for other FS documents for the 200 Area OUs.
2.	Section 1.4, Page 1-6	<p>Change text to read:</p> <p>"The Tri-Party Agreement addresses the need for the cleanup programs to integrate the requirements of CERCLA and RCRA, to provide a standard approach to direct cleanup activities in a consistent manner, and to ensure that applicable regulatory requirements are met. Details of this integration are provided in Article IV and Section 5.5 of the Tri-Party Agreement. Additionally, DOE/RL-98-28 provides a discussion on integration for the Central Plateau. Integration of CPP and RPP, and a RCRA TSD sites in this FFS streamlines the evaluation of remedial alternatives and provides a consistent approach for reaching and implementing remedial decisions, while satisfying the requirements of the different regulations.</p> <p>The 216-U-12 Crib, a TSD unit under RCRA, is incorporated into this FFS. The RCRA closure plan requirements for this TSD unit are identified in Table 1-2. <del>The analysis of the closure activities options for the TSD unit are based on documentation will be documented through the alternatives analysis found in this FFS, and the PP, and the administrative record.</del> Ecology <del>is</del> <u>will separately issue</u> <u>issuing</u> a draft permit modification for incorporation of the 216-U-12 Crib into the <i>Hanford Facility RCRA Permit</i>. <del>The modification would consist of two additions: a chapter in Part V, Unit Specific Conditions for Units Undergoing Closure, of the Hanford Facility RCRA Permit and an attachment. The Part V chapter would</del> <u>will</u> identify all permit requirements for the TSD unit <u>and is</u> consistent with the CERCLA ROD. <del>The attachment would consist of the enforceable sections from applicable CERCLA documents, or other supporting documents, that correspond to specific RCRA TSD closure plan requirements. The permit conditions in the Part V chapter and the attachment would become an enforceable part of the permit. Changes to the chapter and attachment would be subject to the permit modification process.</del></p> <p>Information supporting the closure of the 216-U-12 Crib TSD unit is included in this FFS, the PP, or other <u>existing administrative record</u> documents. Table 1-2 provides a crosswalk between the <u>information required in a RCRA closure plan information</u> and the location of the information <u>in the applicable CERCLA document.</u>"</p>

Index	Reference	Comment
3.	Page 1-12, Table 1-2, Row 2	Reference to FFS Chapter 2, Section 2.5.1.2 should be corrected to reference Section 2.5.1.3.
4.	Page 1-12, Table 1-2, Row 5	Ecology would like to see the information in DOE/RL-2000-60, Section 3.4.1, moved into the FFS and this reference deleted.
5.	Page 1-12, Table 1-2, Row 7	Change text to read: "Closure actions and requirements described in FFS Chapters 5.0 through 7.0."
6.	Page 1-12, Table 1-2, Row 8	Since the 216-U-12 crib will not be clean closed, delete the text: "if needed when clean closure is not achieved."
7.	Section 2.5, Page 2-16, Line 33	Delete the text "many source" and insert "multiple waste."
8.	Section 2.5, Page 2-17, Line 1	Change text to read: "... representative sites are <del>extended to</del> <u>then apply applied</u> to other <u>waste</u> ..."
9.	Section 2.5, Page 2-17, Line 4	Change "can" to "will."
10.	Section 2.5, Page 2-17, Lines 8 and 9	Change text to read: "...on the <del>evaluation</del> <u>investigation</u> of the representative sites. Confirmation sampling of the analogous sites after remedy selection <del>may</del> <u>will</u> be required and is built into the remedial design planning to demonstrates ..."
11.	Section 2.5, Page 2-17, Line 20	Change text to read: "...at representative sites, <del>which include</del> a contaminant distribution model, and risk assessment, are..."
12.	Section 2.5.1.1, Page 2-18, Lines 22 through 27	This text describes the UPR-200-W-19 and should be moved to Section 2.5.1.5.
13.	Section 2.5.1.1, Page 2-18, Line 33	Replace "placed" with either "drilled" or "installed"
14.	Section 2.5.1.3, Page 2-19	Provide a figure showing the crib dimensions and a cross-sectional view of construction. Identify materials of construction.
15.	Section 2.5.1.3, Page 2-19, Lines 23 through 29	Add a reference to Plate 1 (located in a pocket at the end of the FFS)
16.	Section 2.5.1.3, Page 2-20, Lines 15 through 17	Add text explaining why the 216-U-12 Crib needed a vent riser.
17.	Section 2.5.1.3, Page 2-20, Line 24	Add text explaining why the 216-U-12 Crib is no longer in the 200-PW-2 OU and how it was added to the 200-UW-1 OU.

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18.	Section 2.5.1.5, Page 2-21	This text is not consistent with the description of the UPR-200-W-19 provided on page 2-18 lines 22 through 27. The description on page 2-18 states that “the area was surface stabilized by scraping the contaminated soil and consolidating it near the 241-U-361 Settling Tank ....” Delete contradictory text on page 2-18 and ensure Section 2.5.1.5 is accurate.
19.	Section 2.5.2, Page 2-22, Line 15	Delete “the 216-U-1 and 216-U-2 Cribs and”; they were already listed in Section 2.5.1.
20.	Section 2.5.2, Page 2-22	Modify text to read: “Along with the collection of surface and subsurface samples, radionuclide logging using the radionuclide logging system (RLS) was performed at several boreholes at selected sites. Contaminants detected with the RLS generally correlate well with data from sediment samples analyzed in the laboratory. Discrepancies in results between the <del>two analysis techniques</del> <u>RLS and laboratory analysis</u> are likely <del>are</del> the result of differences in the methods used. <del>Samples collected for laboratory analysis typically are high graded (e.g., large particle sizes are removed from the sample, resulting in a concentrated sample). Chemical sampling is not always representative of the entire borehole, because a limited number of samples are collected compared to the RLS, which monitors continuously.</del> Results from the RLS are biased, because inputs to the detector are averaged values 0.6 m (2 ft) above and below the tool. This represents an interval generally larger than the sediment sample interval.”
21.	Section 2.5.2.1, Page 2-22, Line 31	Delete “for this LFI”
22.	Section 2.5.2.1, Page 2-22, Line 40	“receives” should be changed to “received”
23.	Section 2.5.2.2, Page 2-23, Lines 17 through 20	Provide additional description of the “camera survey”. Clarify – were 14 surface and 14 subsurface soil samples collected, or a total of 14 samples?
24.	Section 2.5.2.3, Page 2-24	This section is confusing. Rewrite and provide more detail about the LFI and any RLS conducted at the site.
25.	Section 2.5.2.6, Page 2-25, Lines 24 and 25	This sentence is confusing. Clarify – was the integrity investigation (assessment?) conducted on the VCP or a different pipeline?
26.	Section 2.5.3, Page 2-25, Lines 36 through 38	Add text to clarify: How was the decay calculated (i.e., what was the starting time)? What was the starting value for the decay calculations? Was the maximum concentration used as a starting value or an average? Provide a reference to this information.
27.	Section 2.5.3.1, Page 2-27, Line 3	Are borehole numbers incorrect? Should they be 299-W19-95 and 299-W19-97? If so, correct; if not, explain when and where these boreholes were drilled.

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28.	Section 2.5.3.1, Page 2-27, Lines 10 and 11	Provide text explaining what pipeline was surveyed, where it is located, and what it connects. Is this pipeline included in this OU? If not, where will it be addressed? Line 16 states that "The exterior of the pipe as well as the surrounding soil showed no radiological activity." Add an explanation as to how an in-line camera survey would take these measurements.
29.	Section 2.5.3.2, Page 2-27, Lines 29 through 36	Add the following information: the borehole number; the total depth of the borehole; Line 31 states that "Elevated levels of contamination extended ...." Include a list of contaminants.
30.	Section 2.5.3.2, Page 2-28, Lines 23 through 30	Add text to clarify: Is 197 ft the total depth of the borehole? Has Sr migrated to groundwater?
31.	Section 2.5.3.2, Page 2-28, Line 33	Revise text to read "contaminants of potential concern"
32.	Section 2.5.3.3, Page 2-29, Lines 11 through 13	This text states that "Although soil chemistry data are not available to evaluate contamination directly beneath the 216-U-12 Crib, DOE/RL-95-13 and DOE/RL-95-106 suggest that the site is highly analogous to the 216-U-8 Crib. These sites received the same type of waste and are located relatively close together." Provide text explaining how the similarity between the cribs was established. If the sites received the same type of waste, why do they have different COPCs? Provide text explaining the differences.
33.	Section 2.5.3.4, Page 2-30	Add the following information: the borehole number, the total depth of the borehole, a summary of the analytical results.
34.	Section 2.5.3.5, Page 2-30	Add text explaining why the 216-U-1/216-U-2 cribs and the 241-U-361 Settling Tank have U contamination but the UPR-200-W-19 (an overflow of the same material) does not.
35.	Section 2.5.3.5, Page 2-31, Lines 4 through 6	Delete sentence starting on line 4 and ending on line 6. In Section 2.5.1.5 this contamination was attributed to insect intrusion.
36.	Section 2.5.4, Page 2-31	Section 2.5.4 needs the following revisions: <ul style="list-style-type: none"> <li>• Add the major GW plumes to the Plate 1 map (located in the pocket at the end of the document)</li> <li>• Add a reference to the 2004 Annual GW Monitoring Report for additional information.</li> <li>• Add a reference to the 200-UP-1 Interim Record of Decision for additional information.</li> <li>• Add a reference to the 200-UP-1 Remedial Investigation/Feasibility Study Work Plan, DOE/RL-92-76 for additional information.</li> <li>• Delete Section 2.5.4.4</li> <li>• Delete Section 2.5.4.4.1</li> <li>• Delete Section 2.5.4.4.2</li> <li>• Delete Section 2.5.4.4.3</li> <li>• Delete Section 2.5.4.4.4</li> </ul>

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37.	Section 2.6, Page 2-35, Line 19	Change the word "grouped" to "subdivided."
38.	Section 2.6, Page 2-35, Lines 29 and 30	Revise text to read: "...Area incorporates waste sites from several waste category groups, the analogous site concept <del>is has been further defined refined</del> to appropriately <u>regroup these categories waste sites</u> . The following general conclusions can..."
39.	Section 2.6.2.1.3, Page 2-41, Number 1	Provide in the text the characteristics of the impermeable barrier overlying the coarse layers in cribs U-16 and U-17.
40.	Section 2.6.2.1.3, Page 2-41, Number 2	The U-12 crib had a release volume to soil pore volume of roughly 107. The last sentence of this paragraph states that U-16 came close with 25 times the soil to pore volume. Clarify.
41.	Section 2.6.2.1.3, Page 2-41, Number 5	Provide a reference in the text that corroborates the statement that there was little lateral spreading for mobile contaminants, or delete the third statement of this paragraph. Note that Figure D-5 shows lateral spreading for nitrate.
42.	Section 2.6.2.3, Page 2-43, Number 1	<p>Change this statement as follows: "<del>This criterion is not applicable, because the</del> The unplanned release <u>has a different configuration than the septic systems because the unplanned release is not an engineered structure and was not compared to the septic systems that were designed- built</u> to accept sanitary effluent."</p> <p>The criterion, waste site configuration and construction, is an important one for comparison of representative and analogous sites and applies in all cases.</p>
43.	Section 2.6.2.3, Page 2-44, Number 3	Describe in the text the nature of UPR-200-W-19. This included a known release of contaminants. Describe what is known about the release.
44.	Section 2.6.2.3, Page 2-45, Number 2	Revise this statement as follows: " <del>This criterion is not applicable because</del> UPR-200-W-19 had relatively low effluent volume and the solid waste group sites received only solid waste."
45.	Section 2.6.2.4, Page 2-45, Number 6	<p>Revise this statement as follows: "<u>It is hypothesized that the potential for contaminant impacts on groundwater is low for these sites, This criterion is not applicable</u> because of the shallow nature of the representative and analogous sites, ..."</p> <p>Note that this hypothesis does not change required soil cleanup levels or PRGs for these sites. The PRGs are the values given in Table 3.1 at these sites.</p>
46.	Section 2.6.2.5, Page 2-46, Number 6	<p>Revise this statement as follows: "<u>It is hypothesized that the potential for contaminant impacts on groundwater is low for these sites, This criterion is not applicable</u> because of the shallow nature of the representative and analogous sites."</p> <p>Note that this hypothesis does not change required soil cleanup levels or PRGs for these sites. The PRGs are the values given in Table 3.1 at these sites.</p>

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47.	Section 2.6.2.6, Page 2-47, Number 2	Revise as follows: <del>“This criterion is not applicable, because the</del> The representative site and the analogous site in this grouping are unplanned releases, ...” The criterion is applicable.
48.	Section 2.6.2.6, Page 2-48, Number 6	Revise this statement as follows: <u>“It is hypothesized that the potential for contaminant impacts on groundwater is low for these sites</u> <del>This criterion is not applicable</del> because of the shallow nature of the representative and analogous sites.” Note that this hypothesis does not change required soil cleanup levels or PRGs for these sites. The PRGs are the values given in Table 3.1 at these sites.
49.	Section 2.7.1, General	A previous Ecology comment was to be addressed by adding text in this section. The comment was “Crib 216-U-12 is considered a representative (model) site according to Table 2-1. There is inadequate discussion about this site in Section 2.7.1. Consequently, no risk assessment information is provided for sites 216-U-5, U-6, U-15, U-16, and U-17. Also, since a closure plan has been submitted for this crib there should be a detailed discussion about its risks. Add a discussion about risks associated with these sites (including crib 216-U-12) to this section.” The response to this comment was “Comment Accepted. A detailed risk discussion was not included in this section because no radiological constituents were identified as COPCs. The text will be revised to indicate this.” Explain where the new text has been placed, or add the text if it has not been added.
50.	Section 2.7.1.2, Page 2-52, 2-53 and throughout document	Since UPR-W-163 and 200-W-42 VCP are considered to be one site always refer to the site as 200-W-42 VCP/UPR-W-163 in the document.
51.	Section 2.8, Page 2-59, Line 12	Delete the word “in” and remove the period after the word “column.”
52.	Section 2.8, Page 2-59, Line 15	Modify the text to read: “...requirements for using <u>an alternative</u> fate and transport models.”
53.	Section 2.8, Page 2-59, Line 23	Provide a description, or reference, for “baseline conditions.”
54.	Section 2.8, Page 2-59, Lines 23 through 28	This section is not clear. As written, the last sentence implies that the 216-U-1 and 216-U-2 cribs were <b>not</b> considered potential threats to groundwater.
55.	Section 2.8, Page 2-59, Line 29 through 31	In the PP 216-U-1 and 216-U-2 are counted as separate waste sites. Based on that information, revise the text to read: “Results of the modeling indicate there are <del>three</del> <u>four</u> sites (216-U-1/2, 216-U-8, and 216-U-12) with contaminant inventories sufficient to pose a threat to groundwater above MCLs— within a thousand years. <u>The modeling results ...</u> ”
56.	Section 2.8, Page 2-60, Line 1	Change “amay” to “may”.

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57.	Section 2.8, Page 2-60, Line 6	Text states that contaminants “will not impact groundwater within a 1000 years” which leads the reader to believe it will impact groundwater after that. Add text to clarify what may happen after 1000 years.
58.	Section 2.8, Page 2-60, Lines 7 through 10	Include in this paragraph an explanation of how the modeling results support the choice of the remedies for the 216-U-8 and U-12 cribs, 216-U-4/U-4A well and drain, and 200-W-42 VCP/UPR-W-163.
59.	Section 2.8, Page 2-60, Lines 8 and 9	The text states that groundwater concentrations will be below the MCLs for the “constituents listed” but it is not clear which constituents are being referred to or where they are listed.
60.	Section 2.9, Page 2-60, Line 16	Replace “O” with “Order”
61.	Figure 2-3, Page 2-71	Explain why this figure has been changed relative to that in Figure 2-4 in Draft A. The figure no longer indicates that the cross sections include well 299-W19-43.
62.	Figures 2-4, 2-5, and 2-6, Pages 2-72 through 2-74	Switch the y-axis to show BGS values. Add the waste site locations to these cross-sectional views.
63.	Figure 2-7, Page 2-75	Number 4 states that little lateral spreading is believed to have occurred, though Figure D-2 indicates spreading for nitrate. Correct the wording for #4 to make it consistent with Figure D-2.
64.	Figure 2-8 and 2-9, Page 2-76 and 2-77	Numbers 4 state that lateral spreading is only expected in association with the Cold Creek Unit and upper Ringold. However, Figures D-4 and D-5 show lateral spreading in the Hanford formation for Tc-99, nitrate, uranium, and arsenic.
65.	Figures 2-12 through 2-15, Page 2-80 through 2-85/86	<p>Delete the groundwater figures and associated text. It is not well integrated with the rest of the document and it is not clear what the purpose is for this new information – Draft A did not have this information. Also, there is a risk that it conflicts with the RI/FS in progress for UP-1/ZP-1.</p> <p>However, the figures do reveal an interesting problem in the vadose zone. It appears that several wells (ex. 299-W19-29, 299-W19-19, 299-W19-23, 299-W19-24, 299-W19-30) went dry. Just prior to drying out, the Tc-99, and in some cases U, concentrations in the groundwater were well above MCLs. This indicates that contamination probably exists in the vadose zone in the vicinity of the wells. Provide the operable unit to which this contamination will be assigned.</p>

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66.	Figure 2-16, Page 2-87/2-88	<p>For the row with the box having the text “risks associated with analogous site may significantly exceed representative site risks”, note that the text in the 2<sup>nd</sup> box after this states “Minimal because representative sites are worst case, upper bound”. These two boxes conflict. Correct this.</p> <p>Ecology previously made the following comment about this figure:  “First, the starting point on the figure is not clearly indicated – is it the diamond-shaped polygon? Add a symbol or arrow to indicate the starting point on the figure. Second, in the case that data are not sufficient for analogous site risk calculations, there is an abrupt progression from ‘severe for risk’ (consequences) to ‘minimal because representative sites are worst-case, upper bound’ (likelihood of wrong decision), while two rows down there seems to be some concern about cost. Change the ‘minimal because representative sites are worst-case, upper bound’ box in the top row to read ‘moderate because upper bound may not be adequately established.’ There is a known case of this type of error: UPR-200-W-163.”</p> <p>The response to this comment was “Comment Accepted. The figure will be modified to clarify the starting point, and the other suggested changes will be incorporated.”</p> <p>The starting point on the graph has been clarified, but the other changes were not made as indicated. Change the “minimal because representative sites are worst-case, upper bound” box to read “moderate because upper bound may not be adequately established.”</p>
67.	Tables 2-3, 2-4, 2-5, 2-6 and 2-7, global	The Rationale columns in these tables repeat much of the text given in Sections 2.6.1.1 – 2.6.2.6. Comments have been made above about necessary changes to be made in the text in Sections 2.6.1.1 – 2.6.2.6. Make the same changes in the tables so that they are consistent with Sections 2.6.1.1 – 2.6.2.6.
68.	Table 2-3, Page 2-97/2-98	The contaminant inventory is given as 4E03. Is this for uranium? Add column headings to the table for the inventory.
69.	Table 2-5, Page 2-115/2-116	Site 216-U-15 will be remediated by RTD. However, its exact location is unknown, there are no markings, and no radioactivity has been detected at this site. The SAP should address how this site will be located for remediation. This site should be somewhat distinguishable visibly because it has solid waste such as activated charcoal and diatomaceous earth. Also, add TBP to the COC list for this site for verification samples.
70.	Table 2-5, Page 2-117 and 2-118	The document indicates that lateral spreading occurred at this site (216-U-16), all of the way to the U-1 and U-2 cribs across the street. The extent of contamination may not be known here. This is an MNA site. More sampling is needed to determine the extent of contamination here. Discuss additional samples for this site in the SAP.
71.	Table 2-7, Page 2-125/2-126	In the waste site configuration column, Draft A of the document discussed an overflow of organic waste at this site (200-W-19), including TBP. This statement has been removed from the document since Draft A. Put the statement back in the table or explain why this statement has been removed. Also, add TBP to the COC list for this site for verification samples.

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72.	Table 2-7, Page 2-127/2-128	In the Site and Discharge History column for this site (200-W5 septic tank) new text has been added indicating that a portion of the tile field was decontaminated by scraping off surface soil. It also indicates that the source of the contamination is not clear. The system was only recently abandoned or is still in use. The remedy here is MNA. MNA could be acceptable until the site is taken out of use, but thereafter RTD may be an appropriate remedy at this site. If MNA remains the remedy then sampling should be performed to determine the nature and extent of contamination at this site.
73.	Table 2-7, Page 2-131/2-132	Site 200-W-57 dump was rejected by the MP-14 process. Previous meetings between Ecology, DOE, and contractors discussed that this would be left in the FFS with explanatory text in the PP. Why not just add a statement in the table to indicate that this site has been rejected through the MP-14 process?
74.	Table 2-7 Page 2-133/2-134	Site 200-W-71 is an MNA site. However, its nature and extent are not well known. It may be a burn pit, or may be a uranium disposal area, or may have been a laydown area. Sampling is needed to determine the nature and extent of contamination at this site.
75.	Table 2-7, Page 2-141/2-142	In the Waste Site Configuration column of this table text has been removed since Draft A, which described a jumper transfer from a truck to a railroad. Put the text back in the table or explain why this text has been removed.
76.	Table 2-7, Page 2-153/2-154	This site (200-W-89) is an RTD site, which is appropriate. However, it will be necessary after RTD to verify successful cleanup. This site will need COCs. PCBs, uranium, and a set of radionuclides should be COCs. Radionuclides in the groundwater beneath this site are I-129, Tc-99, and uranium. This site is near a former groundwater injection area.
77.	Table 2-8, Page 2-159	Change the second row of the table to read "Does the site meet <u>Direct Contact</u> Human Health PRGs?"
78.	Table 2-8, Page 2-159	For 216-U-4, 216-U-4A, and 216-U-1 and U-2 cribs, it appears that U currently exceeds screening levels in the vadose zone, and it will exceed PRGs in groundwater in the future. Change the NA in the "What constituents exceed?" rows to uranium.
79.	Table 2-8, Page 2-159	Change the "Predicted to exceed standard (calendar year)" cell to read "Predicted to exceed <u>groundwater</u> standard (calendar year)".
80.	Table 2-8, Page 2-159	Change the cell that reads "Does the Site meet Groundwater Protection PRGs?" to read "Does the site meet gw protection PRGs <u>in the next 1000 yr</u> ?" Some contaminants, such as nitrate and uranium, are predicted to reach groundwater in later years. Also, it is not clear in the text of the document that the PRGs only apply to the next 1000 yr. Add clarifying text to the document regarding the time frame for the PRGs.

Index	Reference	Comment
81.	Section 3.1.1, Page 3-2	Change the text to “The DOE-selected use for the 200-UW-1 OU, documented through the land-use record of decision (ROD)(64 FR 61615, “Hanford Comprehensive Land-Use Plan Environmental Impact Statement, Hanford Site, Richland, Washington: Record of Decision) <u>that applies for at least the next 50 years</u> , is industrial (exclusive) for sites located within the exclusive-use boundary (core zone).”
82.	Section 3.1.1, Page 3-1, Line 38 through Page 3-2, Line 10	<p>Revise text to read: “...2002, and the 200 <u>East Areas</u> <del>are</del> <u>is</u> the planned disposal location for the vitrified low-activity tank wastes. Past-practice disposal sites in the 200 Areas are being evaluated for remediation <del>and are likely to</del> <u>which may</u> include institutional controls (e.g., deed restrictions or covenants) as part of the selected remedy. Other Federal agencies, such as the U.S. Department of the Navy, <del>also</del> use the Hanford Site 200 <u>East Areas</u> <del>nuclear waste</del> treatment, storage, and disposal (TSD) facilities. <del>A</del> <u>In addition, a</u> commercial low-level radioactive waste disposal facility, <u>is currently</u> operated by US Ecology, Inc., <del>currently operates</del> on a <del>portion of a</del> <u>100 acre tract of land at in the southeast corner of the</u> 200 <u>East Areas</u> leased to the State of Washington.</p> <p>The DOE-selected land use for the <del>200-UW-1-OU</del> <u>Central Plateau</u>, <u>is</u> documented <del>through in</del> the land-use record of decision (ROD) (64 FR 61615, “Hanford Comprehensive Land-Use Plan Environmental Impact Statement, Hanford Site, Richland, Washington: Record of Decision”), <u>is as</u> industrial (exclusive) for sites located within the exclusive-use boundary (core zone).”</p>
83.	Section 3.1.2, Page 3-3, Lines 3 through 37	Delete text.
84.	Section 3.1.2	This section does not adequately capture the “core zone” as defined during the 200 Area Central Plateau Workshops, the future land uses or land use scenarios presented in HAB Advice #132 or the “risk framework” transmitted in the Response to HAB Advice #132. Add text to present this information.
85.	Section 3-2, Page 3-6, Line 21	Revise text to read: “contaminant concentrations with <u>regulatory cleanup levels and</u> background, developing a set of data for use in risk assessment”
86.	Section 3.4, Page 3-7, Line 7	<p>The text should state that “The RAOs specific to the 200 Areas for soils, <del>solid wastes, sites and groundwater</del> were developed in the Implementation Plan (DOE/RL-98-28).”</p> <p>The RAOs from the 200 Area Implementation Plan should be inserted directly below this text (on line 8). Additional text should be added to explain that these upper level RAOs (from the 200 Area IP) were used to develop OU specific RAOs which are then provided on lines 8 through 27.</p>

Index	Reference	Comment
87.	Section 3.4, Page 3-7, Lines 12 through 27	<p>Revise the text to read:</p> <ul style="list-style-type: none"> <li>• RAO 2 – Provide conditions suitable for future industrial land use and protect ecological receptors, respectively, by preventing exposure to radiological constituents at concentrations above a dose <u>rate</u> limit of 15 mrem/yr for industrial workers (EPA/540/R-99/006, <i>Radiation Risk Assessment At CERCLA Sites: Q &amp; A</i>, OSWER Directive 9200.4-31P) and to protect <u>populations of</u> ecological receptors based on a dose limit of 0.1 rad/day for terrestrial wildlife populations (DOE STD 1153-2002, <i>A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota</i>). A dose <u>rate</u> limit of 15 mrem/yr generally achieves the U.S. Environmental Protection Agency (EPA) excess lifetime cancer risk threshold, which ranges from <math>1 \times 10^{-6}</math> to <math>1 \times 10^{-4}</math>.</li> <li>• RAO 3 – Prevent migration of contaminants through the soil column to groundwater, or reduce soil concentrations below WAC 173-340-747, “Deriving Soil Concentrations for Ground Water Protection,” groundwater protection criteria so that no further degradation of the groundwater <u>results from contaminant leaching from 200-UW-1 OU waste sites soils or debris occurs</u>.</li> <li>• RAO 4 – Minimize the disruption of cultural resources and wildlife habitat and prevent adverse impacts to cultural resources and threatened or endangered species <u>during remediation</u>.”</li> </ul>
88.	Section 3.4, Page 3-7, RAO 2	<p>Add text to RAO 2 to make this consistent with Ecology’s version of RAO 2 in the Proposed Plan: RAO 2 – <u>For the next 150 years</u> provide conditions suitable for future...</p> <p>At the end of this RAO description, add the following: During the post-institutional control period (&gt; 150 years) provide conditions suitable for a residential land use and continue to protect ecological receptors.</p>
89.	Section 3.4, Page 3-7, RAO 3	<p>Modify RAO 3 as follows: Prevent migration of contaminants...so that no further degradation of the groundwater <del>occurs</del> <u>results from contaminant leaching from soils or debris 200-UW-1 OU waste sites</u>. <u>Soil concentrations for protection of ground water are determined using ground water cleanup levels established in WAC 173-340-720 for potable ground water</u>.</p>
90.	Section 3.4, Page 3-7, 3 <sup>rd</sup> to last bullet on page	<p>Modify this bullet to the following to be consistent with the proposed plan: “Total human health carcinogenic risks do not exceed <math>1 \times 10^{-5}</math>.”</p> <p>Note that risks for the ground water pathway are not calculated on the basis of industrial land use.</p>
91.	Section 3.4, Page 3-7, 2 <sup>nd</sup> to last bullet on page	<p>Modify this bullet to the following to be consistent with the proposed plan: “Human health noncarcinogenic hazard indices do not exceed 1.”</p>
92.	Section 3.4, Page 3-7, last bullet on page	<p>Modify this bullet to the following to be consistent with the proposed plan: “Soil concentrations of COCs do not exceed applicable thresholds for protection of ecological receptors.”</p>

Index	Reference	Comment
93.	Section 3.4, Page 3-7, Line 28 through Page 3-8, Lines 22	This text must be updated so that the criteria used to fulfill RAOs is <b>exactly</b> the same as documented in the PP.
94.	Section 3.4, Page 3-8, Lines 21-22	Modify this bullet to the following to be consistent with the proposed plan: The flux of contaminants into groundwater is reduced or eliminated, based on a continual decrease in the differences between the concentration of contaminants in up gradient and down gradient wells. Also, add an additional bullet for this RAO: The flux of contaminants into ground water does not result in exceedence of MCLs at the point of compliance.
95.	Section 3.4, Page 3-8, Lines 21 and 22	Modify this bullet to the following to be consistent with the proposed plan: Cultural and ecological reviews.... (e.g., bird nesting grounds) <u>and appropriate mitigative measures are implemented.</u>
96.	Section 3.5.1 and 3.5.2 Page 3-9 through 3-13, global	WAC 173-340-745(6) specifies that the hazard index, rather than hazard quotient, should not exceed 1. Change hazard quotient to hazard index throughout this section.
97.	Section 3.5, Page 3-9, Lines 3 through 13	<p>Modify text to read: "...below a hazard index (HI) of 1 for noncarcinogens. <u>Documentation of Aactual soil contaminant concentrations achieving these cleanup objectives would be presented in a cleanup verification package for the facility 200-UW-1 OU. The cleanup verification package would demonstrate how and where specific criteria have been applied and how the remedy protects receptors from the COCs identified for the waste sites describe the remediation activities completed, identify any significant contamination remaining, summarize the sampling and data analysis approach, and demonstrate attainment of cleanup levels.</u>"</p> <p>"In addition, PRGs have also been developed for the COPCs <del>screened out through the risk assessment process</del>. The purpose of this process is to identify those constituents that may pose an unacceptable risk. This screening process compared the observed constituent concentrations of the following:"</p>
98.	Section 3.5.1.1, Page 3-10, Lines 2 through 4	Delete the sentence that begins on line 2 and ends on line 4. "Therefore, the PRGs for individual nonradioactive contaminants in solid waste and particulate reflect the value that is greatest among risk-based standards, area background values, or PQLs."
99.	Section 3.5.1.2, Page 3-10, Line 25	Revise text to read: "...presence <u>or absence</u> of protected..."

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100.	Section 3.5.3.1, Page 3-13	Ecology previously made the following comment about this section: "Provide a discussion of all possible nonradiological COCs for these sites using the COCs given in the Appendix C tables. Cite here the section in this document that describes elimination of COCs." The response to this comment was: "Comment Accepted. The text will be revised to cite Section C3.2 as the text which describes the selection of chemicals of potential concern (COPC) process." The change was not made. Cite in this section the section in this document that describes elimination of COCs.
101.	Section 3.5.3, Page 3-13, Line 15	Revise text to read: "... cause groundwater concentrations to exceed..."
102.	Section 3.5.3.1, Page 3-13, Lines 21 through 23	Revise text to read: "The PRGs for nonradionuclides in the vadose zone that are protective of groundwater are developed from potential ARARs (e.g., MTCA risk-based standards, MCLs as defined in 40 CFR 141, "National Primary Drinking Water Regulations") and published risk-based standards, whichever is most stringent. Consistent with this...."
103.	Figure 3-1, Page 3-18	Enlarge Figure 3-1 so that it is legible, or modify the figure to show the core zone specifically.
104.	Table 3-1, Page 3-19	Is an RDL the same as the PQL? If so, use PQL instead; if not, add a footnote explaining why the RDL is being used to set the PRG.
105.	Table 3-1, Page 3-19	Nitrate and nitrite should not be listed as COPCs. They are COCs. Remove them from the list of COPCs.
106.	Table 3-1, Page 3-19	Add tributyl phosphate to the COPC list.
107.	Table 3-1, Page 3-19	Check the acenaphthene concentration for protection of groundwater. The previous value was 97.9 mg/kg; the new value is 121 mg/kg. Revise to the old value or explain the change.
108.	Table 3-1, Page 3-19	Several contaminants are indicated to have "unlimited" direct contact values. This occurs when the direct contact value exceeds 1E06 mg/kg. However, the state does list direct contact values for these contaminants, and they should be listed in the table. They can be footnoted to indicate that the state's direct contact values exceed concentrations for pure product. Change the values as indicated (all in mg/kg): Chromium (list this as Chromium (III)): 5.2E06 Strontium: 2.1E06 Titanium: leave as unlimited – the state does not have a limit for Ti Zinc: 1.05E06 Acetone: 3.5E05 (explain use of any higher values) Benzoic acid: 1.4E07 2-Butanone: 2.1E06

Index	Reference	Comment
109.	Table 3-1, Page 3-19	Change the overall PRG for chloromethane from 0.165 mg/kg to 0.0165 mg/kg to be consistent with the groundwater protection value. There appears to be a typo in the table.
110.	Section 5.2, Page 5-6, Lines 2 through 24	The text addresses the regulatory requirements in WAC 173-303-610(2)(a), but does not address the performance standards contained within WAC 173-303-610(2)(b). Add text/information addressing compliance with these regulatory requirements.
111.	Section 5.2, Page 5-6, Line 24 through Page 5-7, Line 3	The text addresses the regulatory requirements in WAC 173-303-646(2)(a) and (b), but does not address the regulatory requirements contained within WAC 173-303-646(2)(c) and (d). Add text/information addressing compliance with these regulatory requirements.
112.	Section 5.2.1, Page 5-7, Lines 6 through 36	Add text explaining how the 216-U-12 TSD complies with each of these Hanford Facility RCRA Permit conditions.
113.	Section 5.2.2, Page 5-8, Lines 7 through 11	Modify text to read: “.....with the landfill closure requirements of WAC 173-303-665(6)(a)(ii), “Dangerous Waste Regulations,” “Closure and Post-Closure,” “Landfills,” “Closure and Post-Closure Care.” The proposed strategy is to close the 216-U-12 Crib as a landfill and to construct a final cover as discussed in Sections 4.2.54 and 5.3.4. The proposed final cover is an engineered barrier. The engineered barrier will be designed <u>in compliance with WAC 173-303-665(6)(a)</u> to control the amount of water infiltrating into contaminated....”
114.	Section 5.2.3, Page 5-8, Line 26	Revise the regulatory citation to: WAC 173-303-665(6)(a).
115.	Section 5.2.5, Page 5-9, Line 19	Revise the regulatory citation to: WAC 173-303-665(6)(a)
116.	Section 5.2.5, Page 5-9, Line 20	Revise the regulatory citation to: WAC 173-303-610(2)(a)
117.	Section 5.2.5, Page 5-9, Line 35	Revise the regulatory citation to: WAC 173-303-610(2)(a)
118.	Section 5.2.6, Page 5-10	Add a table listing the basic sections of a post closure plan, and a short description of what the content of each section should be.
119.	Section 5.2.7, Page 5-10	Add a new Section 5.2.7 addressing submittal of a verification SAP.
120.	Section 7.1, Page 7-1, Line 17	Revise text to read: “...CERCLA <u>nine</u> criteria; then ....”
121.	Section 7.1.5, Page 7-3, Lines 27 and 28	Solid Waste Sites 200-W-56 and 200-W-57 have been reclassified and removed from the CERCLA process. Add text explaining this change.

Index	Reference	Comment
122.	Section 7.1.3, Page 7-4, Lines 21 and 22	Delete the sentence on lines 21 and 22: "Because it will be under the 221-U Facility engineered barrier, confirmatory sampling is not necessary."
123.	Section 7.2, Page 7-4, Lines 31 through 33	Modify text to: "...closure process with the CERCLA process. In accordance with the Implementation Plan, the <del>elements of RCRA requirements for the TSD unit closure</del> are to be addressed in the CERCLA operable unit <del>remedial investigation/feasibility study</del> documentation. These elements are summarized in Section 1.4 <u>and Table 1-2 of ...</u> "
124.	Section 7.2, Page 7-5, Line 2	Revise text to: "These monitoring <del>activities</del> <u>requirements</u> will be..."
125.	Section 7.3.1, Page 7-5, Lines 12 through 14	Revise text to: "...prepared to incorporate the <del>proposed actions</del> <u>closure plan</u> into WA 7890007967, <i>Hanford Facility RCRA Permit</i> , (i.e., the addition of a chapter in Part V and an attachment) for the TSD unit. <del>and to document that All</del> the waste sites <u>in the 200-UW-1 OU</u> will be remediated in accordance with the record of decision...."
126.	Section 7.3.2, Page 7-5, Line 19	Revise text to: "...Implementation Plan (DOE/RL-98-28) <del>defines</del> <u>describes</u> this strategy <u>which serves</u> as a means to streamline remedial ...."
127.	Section 7.3.2, Page 7-5, Lines 27 through 29	Delete the sentence starting on line 27 and ending on line 29: "This table builds off the decision logic presented in Chapter 2 and provides a basis for initiating the data quality objectives evaluation."
128.	Section 7.3.2, Page 7-5, Lines 30 through 37	Rewrite this paragraph to reflect the pre-ROD DQO and SAP, which will be completed by the time the ROD is out for public comment, and the post-ROD DQO and SAP, which will be conducted after the ROD. Add foot notes to Table 7-7 indicating pre-ROD and post-ROD sampling.
129.	Section 7.3.2, Page 7-6, Line 1	This text presents "operation and maintenance sampling"; however, Table 7-7 does not have a column reflecting this type of sampling. Add a column and the appropriate "X's."
130.	Section 7.4, Page 7-6 though 7-8	Remove all of Section 7.4 from the FFS and replace with the comparable text from the PP (as revised per discussions with Ecology).
131.	Table 7-1,	Add footnote (f) indicating that 241-U-361 Settling Tank remedy is based on the assumption that sludge and liquids have been removed (same change already made to PP).
132.	Table 7-5	The first shaded row has a footnote (d) after UPR-200-W-118; the footnote should be "e"
133.	Table 7-5,	Solid Waste Sites 200-W-56 and 200-W-57 have been reclassified and removed from the CERCLA process. Modify the table to reflect this change.
134.	Table 7-6	Solid Waste Site 200-W-56 has been reclassified and removed from the CERCLA process. Modify the table to reflect this change
135.	Table 7-7	Replace Table 7-7 with the revised (attached) Table 7-7.

Index	Reference	Comment
136.	Appendix B, Section B10, Page B-1, Lines 9 through 12	The sentence that begins on line 9 and ends on line 12 is not clear. "The <i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i> (CERCLA) provides for the identification of to-be-considered (TBC) nonpromulgated advisories, criteria, guidance, or proposed standards that may be consulted to interpret ARAR to-be-determined remediation goals when ARARs do not exist or are insufficient." Revise text to clarify intent.
137.	Appendix B, Section B1.0, Page B-2, Line 15	Change the word "units" to "unit."
138.	Appendix B, Section B1.1, Page B-3	At the end of this section add a statement that no waivers are being requested for the 200-UW-1 OU.
139.	Appendix B, Section B1.2, Page B-3, Line 17	Revise text to: "...standards for nonradioactive <del>and radioactive</del> contaminants at waste sites. The several Federal..."
140.	Appendix B, Section B1.2, Page B-3	Add text addressing the ARARs for radioactive contaminants.
141.	Appendix B, Section B1.2, Page B-3, Lines 22 and 23	Revise text to use the acronym FFS.
142.	Appendix B, Section B1.2, Page B-3, Line 26 and 27	Revise text to: "...standards for waste left in place), <u>and</u> <i>Atomic Energy Act of 1954</i> regulations (for performance standards for radioactive waste sites), <del>and Federal and state regulations related to air emissions.</del> " Air emissions are already addressed on lines 17 through 21.
143.	Appendix C, General	The RLS data were not included in the risk assessment. In most cases this is probably appropriate. However, at the 216-U-12 Crib (p. 2-29), the RLS data provide the only data to evaluate contamination directly through the crib, as there are no soil samples at this borehole. The RLS data indicate very high concentrations of Cs-137, which were not evaluated in the risk assessment because there were no soil samples. The risk assessment should address cases where there are no soil samples but the RLS data indicate high contaminant concentrations. In addition, the intruder scenario results for 216-U-12 are probably grossly underestimated because the contaminant data comes from a borehole adjacent to the site. The RLS data from the borehole going through the waste site would provide a more realistic estimate of intruder doses. Text needs to be modified to clarify this and discuss how DOE has addressed it.

Index	Reference	Comment
144.	Appendix C, General	Human Health Risk Assessment results for radionuclides are compared to both a 15 mrem/yr radiation dose limit and a 1E-5 risk limit. The 15 mrem/yr limit is specified as an RAO and PRG (p. 3-7 and 3-11), while the 1E-5 limit is not. Clarify the purpose of comparing HHRA results to a standard that is not an RAO or PRG. In addition, 15 mrem/yr and 1E-5 risk are not equivalent. Using the LNT dose response model, 1E-5 risk is approximately equal to 0.7 mrem/yr. Thus, the HHRA is in essence comparing the radionuclide results to two different dose standards. Clarify which of these standards is being used for decision making.
145.	Appendix C, General	<p>To evaluate protection of groundwater, RESRAD was used to obtain drinking water dose estimates, and the results are compared to a 4 mrem/yr drinking water dose limit for screening purposes. This method for evaluating the protection of groundwater is not appropriate. We have addressed this issue before, and are not satisfied with the response.</p> <p>The RAO and PRG for protection of groundwater (p. 3-8 and 3-14) are based on achieving the EPA drinking water MCLs. Yet the risk assessment in the FFS for protection of groundwater is based on comparing the drinking water dose calculated with RESRAD (reported as Effective Dose) with a target Effective Dose level of 4 mrem/yr. This is not appropriate because the Effective Dose results from RESRAD are not comparable to EPA drinking water MCLs or to the EPA criterion of 4 mrem/yr Equivalent Dose (organ dose). It is more appropriate to compare the maximum groundwater concentrations calculated by RESRAD with the EPA MCLs. Change the risk assessment for protection of groundwater to compare the maximum groundwater concentrations calculated by RESRAD to EPA drinking water MCLs. This is easy to accomplish, as RESRAD automatically calculates groundwater concentrations.</p> <p>Furthermore, comparing the drinking water dose calculated by RESRAD to 4 mrem/yr is not an adequate screening method to test for exceedance of the EPA MCLs. As an example, for Sr-90, a drinking water dose of 4 mrem/yr corresponds to a groundwater concentration of 36 pCi/L, which is several times greater than the 8 pCi/L MCL. Therefore, Sr-90 might pass the "screening", and not be further evaluated, but not meet the RAO.</p>
146.	Appendix C, General	Appendix C evaluates both human health and ecological risk. Include a discussion that integrates the results of these two assessments. Specifically, indicate whether the ecological risk assessment resulted in any potential remedial action plans that were not already determined from the human health risk assessment.
147.	Appendix C and Appendix D, General	Protection of groundwater analysis was carried out using both RESRAD and STOMP models. Include a discussion of why two different models were used, and which model's results will be used for decision making. In some cases, the two models' results are significantly different, for example in estimating the time contaminants reach groundwater. Include a discussion on the differences in the models that lead to different results.

Index	Reference	Comment
148.	Section C2.4.5, Page C-15	<p>Ecology previously made the following comment about this section:            “It is not statistically valid to replace a 95 UCL with a maximum value detected for a COC. If the 95 UCL exceeds the maximum value detected then there are not enough data points to obtain an accurate UCL – either collect more data or use the 95 UCL that you have calculated. This is the disadvantage of having only a few sample results.”</p> <p>Ecology is requiring additional sampling at several of the sites and expects that maximum values will be replaced by 95% UCLs at all sites.</p>
149.	Section C3.2, General	<p>Note that early drafts of this document preceded Ecology’s requirement that COPCs be selected on the basis of analytical methods. As a result of this timing consequence, Ecology is not requiring this approach for this OU, but will expect it for other OUs within the 200 Areas. Several of the following comments pertain to selection of COCs from the COPC list used for this FFS. These changes are required for this FFS. Similar requirements will apply to FS documents prepared for other OUs in the 200 Areas.</p>
150.	Section C3.2.2, Page C-18	<p>Do not use frequency of detection as a basis for eliminating COCs unless the data set contains greater than 20 observations.</p>
151.	Section C3.2.2.2, Page C-20	<p>Ecology previously made the following comment about the use of 10x the soil CUL when eliminating COCs:            “The contaminants eliminated for 216-U-1 and U-2 cribs should be re-evaluated after referring to WAC 173-340-740 (7)(e). Instead of using a criterion of 10x the soil CUL, use 2x the soil CUL. This alone will not give grounds for elimination. You also need to consider the 95 UCL and whether or not 10% of samples exceed the soil CUL. After re-examining the COCs add those that couldn’t be eliminated to risk assessments and reconsider remedial action alternatives.”</p> <p>Ecology also requested that the data be analyzed using the criteria from the 3-part rule (WAC 173-340-740 (d) and (e)).</p> <p>In accordance with the above comments, change this section to the following:            “Constituents detected in shallow-zone or deep-zone soil samples at a frequency of 5 percent or more <u>for data sets with greater than 20 observations</u> were carried to the next step of the screening process. <u>Frequency of detection was not used as a criterion for data sets with less than 20 observations.</u> In addition, constituents detected at a frequency of less than 5 percent, but with maximum concentrations greater than <del>10</del><u>2</u> times the soil CUL were retained as <del>COPCs</del> COCs.”</p> <p>This is actually rather nonconservative as it allows for some detected contaminants to be eliminated from the COC list. EPA’s risk assessment guidance (EPA/540/1-89/002) indicates that such a process is optional and that it is generally not appropriate to exclude any contaminants for which ARARs have been established. This option may not be available for other OUs in the 200 areas.</p>
152.	Section C3.2.2.5, Page C-22, Lines 10-11	<p>Since Draft A of this document, Ecology has obtained tributyl phosphate toxicity information; soil CULs are now available for TBP. Eliminate TBP from the list in this section and include it on the COPC list.</p>

Index	Reference	Comment
153.	Section C3.2.2.5, Page C-22, Lines 12 through 19	Eliminate the new text at the end of the paragraph, "Toxicity values were generally...into the RA;" Note that some PAHs have toxicity values and benzo-a-pyrene is used as a basis for assessing PAHs. Also, TICs may have toxicity values; TICs are defined on the basis of analytical constraints, not toxicity constraints.
154.	Page C-24	Reference is made to Table C-26. However, Table C-26 and C-67 appear to be the same table, yet have different information. Clarify which of these tables is correct.
155.	Page C-24	Include a discussion of the groundwater protection scenario; specifically, define the spatial extent of the contaminated zone that is assumed for the RESRAD calculations. In other words, define the range of depths that the deep zone exposure point concentrations are assumed to reside.
156.	Section C3.2.2.2, Page C-24, Line 35, and Table C-25, Page C-T53	Ecology previously made the following comment about this section: "The text states that the Industrial Land-Use Scenario assumes an individual will be exposed to contaminants over a period of 30 years. However, Table C-26 (page C-T51) indicates a value of 20 years was used in the RESRAD analysis for the exposure duration." Determine which value (20 or 30 years) is correct for the exposure duration, and ensure that the RESRAD calculations are run with the correct value. This RESRAD input parameter is important, as it is used in the calculation of lifetime cancer risk. Also, ensure that the text on page C-26 correctly states the value used in the RESRAD calculation." The end of the response to this comment was "Table C-26 will be revised to indicate that a 30 year exposure duration was used; all RESRAD runs were performed correctly with an ED of 30 years." Table C-26 is specific to RESRAD input parameters, and still lists the exposure duration as 20 years. Change the exposure duration in this table to 30 years.
157.	Section C3.3.3, Page C-25, and Sections C3.3.4, C3.3.5, C3.3.6	Ecology previously made the following comment about Section C3.3.3: "Since these equations are for non-radionuclides only, please clarify the headings by changing to 'Equations for Non-Radionuclide ...'" The response to this comment was "Comment Accepted. Text will be revised to indicate equations apply only to nonradiological constituents." The revision was not made. Revise the title of this section to Equations for <u>Non-Radionuclide</u> Soil Cleanup Levels. Also, revise the titles of Sections C3.3.4, C3.3.5, and C3.3.6 in a similar way.
158.	Section C3.3.7, Page C-28, Lines 23 through 27	There are several sources for toxicity data in addition to those listed. See OSWER Directive 9285.7-53. Toxicity values should be obtained from IRIS, HEAST-rad (FRG13), HEAST-nonrad, EPA Region 9 PRGs, ORNL-RAIS, ATSDR/MRLs, EPA/PPRTV, and scientific literature. Priority is given to IRIS; however, when values are not available in IRIS the other databases and scientific literature should be used. Add ORNL, ATSDR/MRL, EPA/PPRTV, and scientific literature to the list of sources for toxicity information.

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159.	Section C3.4.1.4, Page C-32, Lines 10 through 13	Depth is not a suitable criterion to use for elimination of COCs, unless backed by suitable modeling results. Eliminate the statement: "This makes it unlikely that the concentration of 1,4-dichlorobenzene detected would affect the groundwater because the groundwater table is at approximately 250 ft bgs." This statement is not needed and is not supported with calculations or modeling. The best case for elimination of 1,4-dichlorobenzene is made by considering the detection limit for 1,4-dichlorobenzene, which is above the soil CUL. Inform the laboratory that they need to pursue analytical methods for 1,4-dichlorobenzene with lower detection limits.
160.	Section C3.4.1.4, Page C-34, Lines 1 through 3	Similar to 1,4-dichlorobenzene in UPR-200-W-19, depth is not a suitable criterion to use for elimination of COCs, unless backed by suitable modeling results. Eliminate the statement: "Pentachlorophenol in the concentrations detected is unlikely to affect the groundwater because the groundwater table is at approximately 250 ft bgs." This statement is not needed and is not supported with calculations or modeling. The best case for elimination of pentachlorophenol is made by considering the detection limit for pentachlorophenol, which is above the soil CUL. Inform the laboratory that they need to pursue analytical methods for pentachlorophenol with lower detection limits.
161.	Section C3.5, Page C-34, General	For most of the sites there have been increases in risk levels, and in some cases dose levels, since Draft A of the document. This is especially true for the Native American scenario, though it does also apply in some cases to the groundwater protection scenario. Explain the cause of these changes. Several related specific comments follow.
162.	Sections C3.5.1.3, C3.5.1.4, and C3.5.1.5, Page C-37 through C-40, Native American scenario	The dose levels for the Native American scenario at 216-U-4/U-4A, UPR-200-W-19 and 216-U-1/U-2 have not changed since Draft A. However, the excess lifetime cancer risk (ELCR) values have increased. Explain.
163.	Section C3.5.1.5, Page C-40, Lines 21 through 26	The ELCR values for 216-U-1/U-2 groundwater protection scenario have changed somewhat. They are generally higher, though the times modeled have also been changed so it is difficult to make a direct comparison. Draft A included ELCR values for 4800 and 10,000 years for U-238 that were 8E-03 and 5.4E-06, respectively. No values have been provided in this section in Draft C for time periods after 1000 yr, though page D-2 lines 35-37 state that fate and transport models were run to examine low mobility contaminants that peak at times beyond 1000 yr. Explain the changes.
164.	Section C3.5.1.6, Page C-41, Groundwater Protection	The dose levels for this scenario have increased somewhat since Draft A. They have gone from 1.8 mrem/y to 9.1 mrem/y (both at 126 y). Explain the increase.

Index	Reference	Comment
165.	Section 3.6.3, Page C-43, 2 <sup>nd</sup> paragraph of section	Eliminate TBP from the list in this section since it will be added as a COPC.
166.	Section D3.2, Page D-3, last paragraph of page	Cite references in the text for the infiltration rates. Also, provide the November to February recharge rates. These are necessary for Ecology to approve the fate and transport results.
167.	Section D4.0, Page D-7, 1 <sup>st</sup> paragraph of page	Provide in the text the geologic unit that corresponds to the pressure values given in this paragraph.
168.	Section D5.0, Page D-7-D-9, General	The fate and transport modeling results are partial support for the remedies for the sites. For this reason, Ecology requires additional information; there are several comments below asking for modeling results between 1000 and 10,000 yr. The requests are made because the length of time required for a contaminant to reach groundwater is not a criterion used in setting cleanup levels according to WAC 173-340. However, if the contaminants do not exceed groundwater MCLs during the longer simulation periods then exceptions can be made for these sites.
169.	Section D5.1, Page D-8, Lines 12 through 15	Describe in the text the fate of uranium between 1000 and 10,000 yr.
170.	Section D5.2, Page D-8, Lines 28 through 32	Describe in the text the fate of uranium and mercury between 1000 and 10,000 yr.
171.	Section D5.3, Page D-9	Describe in the text the fate of Tc-99, Sb, and nitrate between 1000 and 10,000 yr.
172.	Section D5.4, Page D-9	Describe in the text the fate of uranium and arsenic between 1000 and 10,000 yr.
173.	Section D5.5, Page D-9	Describe in the text the fate of Tc-99, U, As, nitrate, and nitrite between 1000 and 10,000 yr.
174.	Figures D-2 through D-6, General	Plot on the y axis m bgs instead of elevation.
175.	Figures D-2 through D-6, General	The figures have changed significantly since Draft A. Explain the changes in the modeling since Draft A.
176.	Figure D-4, Page D-19 and D-20	Explain in the text why antimony concentrations in the soil are so high above and in the Cold Creek unit (they appear to be greater than 100 mg/kg).
177.	Appendix D, Figures D-4, D-5, and D-6	Labels on the cross sections conflict with the figure captions in many cases. Many are labeled "Backfill (216-U-1 and 216-U-2)" (see top centers). Correct the labels.

Index	Reference	Comment
178.	Appendix D, Page D-41, Dilution	The description of the STOMP model and its usage does not indicate what compensation has been made to account for the concentrations of contaminants in groundwater from upgradient sources. WAC 173-340-747(8)(b)(vi) requires that dilution factors be adjusted downward when there are upgradient sources of contamination. Upgradient contributions must be considered in modeling. Discuss this in Appendix D.
179.	Appendix D, Page D-41, Infiltration	Use of an evapotranspiration rate of 90% for the waste sites must be supported with data. Most of the precipitation arrives during the late fall and winter, during times of low temperatures and low biologic activity. The waste sites are currently disturbed, coarse, or graveled surfaces with enhanced infiltration rates. Provide the data used to arrive at an evapotranspiration rate of 90%.
180.	Appendix E Page E-2	Waste site 200-W-42 is included in the HHRA, but is omitted from the intruder scenario analysis, yet this site has some of the highest shallow zone contaminant concentrations. Furthermore, this site has no clean cover, so even if the site is capped, contamination will exist with 15 feet of the local surface. This site should be included in the intruder analysis unless an acceptable reason for its omission is given.
181.	Appendix E Page E-5	Section E3.3 needs clarification. First, page E-2 indicates that the waste sites were evaluated for an exposure time starting at 150 years in the future. Therefore, we assume that the exposure point concentrations used in the calculations were adjusted to account for radioactive decay over a period of 150 years. Inspection of Table E-1 and the EPC tables in Appendix C seem to verify this. However, this point should be made in the text of Section E3.3. Second, the statement that all radionuclides evaluated present acceptable cancer risks in year 150 is misleading. Change the statement to say that excess cancer risks achieve threshold levels 300 years from now (since time 0 of the calculations is 150 years from now).
182.	Appendix E Page E-6	For the rural residential intruder scenario conclusion, include a statement that the dose at 216-U-8 and 216-U-1 is 800 and 1000 mrem/yr at a time 150 years from now (time 0 of the calcs). It is important to note this since the dose results are so high.
183.	Appendix E Section E4.0, Page E-6, Lines 1 through 8	Intruder doses exceed guidelines for 216-U-1/U-2 and 218 U-8 for the well driller at 150 yr. For residential intruders the doses exceed guidelines for these two sites plus 216-U-4/U-4A at 150 yr. For these reasons the design of the barriers must include provisions for preventing human intrusion in the distant future.
184.	Appendix F General	With a cost estimate confidence range of +50 percent, -30 percent, 8 significant figures gives the illusion of precision. Recommend to either provide a statement as to the accuracy of the cost estimate, or assure that all cost values presented reflect the appropriate accuracy of the estimate.
185.	Appendix F, Page F-1, 1 <sup>st</sup> paragraph	Provide the basis for the +50 percent, -30 percent confidence range of the cost estimate.

Index	Reference	Comment
186.	Appendix F, Page F-3, 1 <sup>st</sup> paragraph	Provide the cost estimate basis for the \$2,000 per sample; needs to be based on actual sampling and analytical costs.
187.	Appendix F, Page F-3, 3 <sup>rd</sup> paragraph	Clarify the sentence that "present net worth for surveillance and maintenance ... are added to the common costs discussed in Section F2.1 to reach the total present worth cost for this alternative." Section F2.1 is the No Action, assumes the costs to be zero.
188.	Appendix F, Page F-3, Section F2.3, 3 <sup>rd</sup> paragraph	Incorporate into the estimate the escalation rate to account for the costs associated with the RTD alternative. Even though the logics state that the alternative is to take place within one year, the site schedule is indicating something longer. The same statement "present net worth for surveillance and maintenance ... are added to the common costs discussed in Section F2.1 to reach the total present worth cost for this alternative." Section F2.1 is the No Action, assumes the costs to be zero.
189.	Appendix F, Page F-4, Section F2.4	Engineered barrier alternative requires upfront engineering design, construction QA/QC, and independent inspections, for example. Incorporate into the cost estimate these costs. As preciously stated, the same statement "present net worth for surveillance and maintenance ... are added to the common costs discussed in Section F2.1 to reach the total present worth cost for this alternative." Section F2.1 is the No Action, assumes the costs to be zero.
190.	Appendix F, Page F-45, Section F2.5	Provide a cost estimate comparison of the cost models used in the estimate to actual project costs. Such a sensitivity analysis would lend credence to the estimate uncertainty range provided earlier in Section F1.0.
191.	Appendix F, Page F-16, Footnote 2	Provide the basis for the cost estimate of \$1,500/site for less than an acre; \$6,000/site for site 1 to 4 acres; and \$1,500 x acreage for sites larger than 4 acres.
192.	Appendix F, Page F-24, Footnote 2	Provide the basis for the cost estimate of \$50,000/yr for Barrier Performance Monitoring, etc.
193.	Plate 1	Add well 299-W19-43 to the map, since data are presented in Figures 2-12 through 2-15 and Table 2-2 for this well.

**Attachment – Referenced in Index 135**

**Table 7-7. Post-Record of Decision Sampling.**

Alternative	Confirmatory Sampling						Design Sampling	Verification Sampling			O&M
	Confirm Appropriate Remedial Action	Nature of Contamination	Extent of Contamination	Groundwater Protection	Ecological Sampling	Observational Approach	Extent of Contamination	Verify No-Action Alternative	Ecological Sampling	Verify PRG Attainment	Verify PRG Attainment
<b>Alternative 1 - No Action</b>	X*							X	X	X	
<b>Alternative 2 - Maintain Existing Soil Cover, Institutional Controls, and Monitored Natural Attenuation</b>											
Representative Site			X		X				X	X	X
Analogous Site Equal to Representative Site	X	X	X							X	X
Analogous Site Less than Representative Site	X	X	X	If an issue at Rep Site						X	X
Analogous Site Greater than Representative Site	X	X	X	If not an issue at Rep Site	X				X	X	X
<b>Alternative 3 – Remove, Treat, Dispose</b>											
Representative Site						X			X	X	
Analogous Site Equal to Representative Site	X					X				X	
Analogous Site Less than Representative Site	X					X				X	
Analogous Site Greater than Representative Site	X					X			X	X	
<b>Alternative 4 – Engineered Barrier</b>											
Representative Site		X			X		X		X		X
Analogous Site Equal to Representative Site	X	X					X				X
Analogous Site Less than Representative Site	X	X					X				X
Analogous Site Greater than Representative Site	X	X			X		X		X		X

PRG = preliminary remediation goal.

\* Verify PRG attainment