



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10  
HANFORD/INL PROJECT OFFICE  
309 Bradley Boulevard, Suite 115  
Richland, Washington 99352

March 4, 2013

Jonathan A. Dowell  
Assistant Manager for the  
River and Plateau  
U.S. Department of Energy  
Richland Operations Office  
P.O. Box 550  
Richland, WA 99352

Re: EPA Comments on the Remedial Investigation/Feasibility Study for the 100-FR-1, 100-FR-2, 100-FR-3, 100-IU-2 and 100-IU-6 Operable Units, DOE/RL-2010-98, Draft A and Proposed Plan for Remediation of the 100-FR-1, 100-FR-2, 100-FR-3, 100-IU-2 and 100-IU-6 Operable Units, DOE/RL-2012-41, Draft A

Dear Mr. Dowell,

This letter transmits EPA comments on the above-referenced documents. If you have any questions, feel free to contact me at [guzzetti.christopher@epa.gov](mailto:guzzetti.christopher@epa.gov) or (509)376-9529.

Sincerely,

A handwritten signature in blue ink, appearing to read "Chris Guzzetti", with a long horizontal flourish extending to the right.

Christopher Guzzetti  
Project Manager

Enclosures

Cc (electronically):

Gabe Bohnee, Nez Perce Tribe  
Sandra Lilligren, Nez Perce Tribe  
Stuart Harris, CTUIR  
Russell Jim, Yakama Nation  
Jane Hedges, Ecology  
Brenda Jentzen, Ecology  
Ken Niles, ODOE

**EPA Comments on the 100-F and IU-2/6 Remedial Investigation/Feasibility Study**

<b>#</b>	<b>Page</b>	<b>Line/Figure</b>	<b>Comment</b>
1	General	General	Throughout the entire document, when reasonably anticipated future land use is discussed as preservation/conservation, it needs to be made clear that this what DOE believes the future use will be. The way it is currently described can lead the reader to think that EPA concurs.
2	vi	19-20	This language suggests that there is a data need or a data gap?
3	1-40 to 1-42	Section 1.2.3.3	The tables in this section are really confusing. They do not seem to match with the number of sites in the PP and in other places in the RI/FS.
4	1-42	Section 1.2.3.4	This section will need to be updated based on PP General Comment #1
5	2-10	Figure 2-1	Well F5-53 is labeled but you can't tell where it is on the map
6	2-12	15	the is missing the "e"?
7	2-24	10-18	This info should be summarized in a statement for the Proposed Plan as well. The public should know that ALL sites will eventually be compared to clean up levels in this ROD
8	3-78	Figure 3-42	Is the Uranium and Tritium in this figure from the 200 Area OUs?
9	4-6	23-26	Again, the number of waste sites for each category seems inconsistent and confusing.
10	4-7	39	Says four 600 sites are discussed but text following describes 5 sites??
11	4-33	Table 4-6	In the footnote section, what does "no data" actually mean? Also need a descriptor for the "U" that is in the table.
12	4-77	Table 4-19	In the footnote section, the text associated with the asterisk contradicts the statement at the beginning of this section on page 4-76 line 37
13	4-88	3	It would help if the location of the temporary well described here was depicted on the map in Figure 4-29.
14	4-88	Figure 4-28	The groundwater section of the PP states that natural processes are causing contaminate concentrations to decline in groundwater (Page 17), however, well 199-F5-47 as depicted in this Figure demonstrates and increasing trend since 2007. Furthermore, the MNA evaluation that was performed in Appendix M to support Alternative 2 in the PP did not use this well in the analysis. Why?
15	4-103	3	"remediation is addressed" or will be addressed?
16	4-113	1	Dissolved Chromium? If you mean Cr(VI) then it should say that for consistency. Or at least explain what dissolved chromium actually means.
17	4-121	Figure 4-46	Again, titled Dissolved Chromium? Cr(VI)?
18	5-1	Highlights Box	Last bullet, does this correspond to #4 on line 34 of the same page? Are these timeframes if no further action was taken? If so, the highlights box should state that
19	5-3	30-31	See General Comment #1 above
20	5-13	11	Replace "the" with "DOE's" reasonably anticipated.....see General

#	Page	Line/Figure	Comment
			Comment #1 above
21	5-13	12-14	An upgradient waste site with deep Cr(VI) is not considered a source? Confusing? Clarify.
22	5-31	13	Since “model input values” is mentioned here, it would be helpful to reference Table 5.4
23	5-32	Section 5.6.3	This waste site needs to be carried forward to the FS for a ROM cost to RTD, similar to those sites with deep rad.
24	5-63	2	This paragraph which starts on the previous page is discussing heptachlor, not endrin.
25	6-1	Chapter 6 General	This language in several sections of this Chapter is really confusing (e.g., 6.1.2 and 6.1.3). It is EPA’s understanding that the information from the RCBRA was supposed to feed the site specific (or OU specific) risk assessments for 100-F and IU-2/6. In the 100K RI/FS there was a summary of what the RCBRA did, then a site specific assessment.
26	6-28	21-22	Assume that Table G-1 and G-2 are in Appendix G? If so, it should state that
27	6-34	1-11	Again, discussing tables without a reference to where the tables are located. Assume Appendix G?
28	6-177	Table 6-42	The TCE value has changed. TCE is no longer based on cancer risk. The new number is based on toxicity. New MTCA calculation puts the number at 4.1 ppb.
29	8-8	1-3	Is there a more current reference to the amount of Nitrate entering the river from upstream irrigation return flows? More recent than 1980?
30	8-41	Table 8-3 Footnote j	Since there is no breakthrough within 1,000 years, then if the site is cleaned up to the HH PRG it will also be protective of GW and SW?
31	8-51	Table 8-5	See comment #27
32	8-58	14	Have these sites (27) been evaluated against PRGs since this chapter was written? See PP General Comment #1
33	8-61	1-4	See comment #23
34	8-61	23-24	Have these sites been evaluated since this chapter was written? Where do fall?
35	8-75	Table 8-9	In our meeting on February 7, 2013, I was told that In-situ bio (anaerobic) treatment is best when it’s a component of a P&T system. However, the description on this table does not indicate that a P&T is required as it does for the last technology on this page (Physical – Flushing – saturated zone)
36	9-2	35	Should also state that these sites were cleaned up under IARODs and have been reevaluated in the RI/FS (Chapter 8) and determined not to need additional action
37	9-8 – 9-9	Sections 9.2.2 and Section 9.2.3 and associated Tables	Revise based on PP General Comment #1

#	Page	Line/Figure	Comment
38	9-10	16	Switch the title to MNA and ICs, since MNA is the primary remedy and ICs are in place until the remedy is complete
39	9-10	17-18	Revise first sentence to read, "Alternative GW-2 uses MNA processes to reduce COC concentrations to PRGs and ICs to prevent exposure to contaminated groundwater until the remedy is complete." See comment #38
40	9-11	15	Change Alternative GW-3 to Pump-and-Treat with In-situ Treatment and MNA. Call it what it is.
41	10-13	13-14	Approximately how many additional wells?
42	10-15	Table 10-7	Reduction of TMV through Treatment should rank higher, IX is treatment right??
43	10-16	Table 10-7	Implementability should rank higher, same reasons as Alt 4 which has a higher ranking in this criterion.
44	10-21	Table 10-10	Reduction of TMV for Alt GW-3 has a different ranking than in Table 10-7, which is correct.
45	10-22	Table 10-9	This table at the top of the page is titled/labeled incorrectly. It is supposed to be a continuation of Table 10-10 on the previous page, not 10-9
46	10-24	Table 10-11	This table might be useful in the PP to summarize the GW remedies
47	Appendix F F-97	Second Paragraph	<p>Revise following text to: "The approach used here is to calculate SSLs in the same manner as PRGs but using a more conservative recharge rate based on an irrigated farming scenario (<del>recognizing this is not the planned land use for this source area</del>)."</p> <p>The purpose of this ECF is to calculate SSLs and PRGs, not a discussion on future land use.</p>
48	Appendix M	General	<p>Section M3.3, the document presents field specific data characterizing the oxidation-reduction potential, dissolved oxygen, nitrate, iron, sulfate, TCE, and carbon sources in the 100-F/IU groundwater area and clearly states that based on observed conditions, degradation processes are not expected. Then, in the 'Summary and Conclusions' (M4) goes on to describe the degradation processes likely responsible for the natural attenuation of the plumes. What IS true is the last sentence of each bullet that states "non-degrading processes are also reducing (X) concentrations in the groundwater".</p> <p>Given the data presented in M3.3, it sounds like non-degradation processes are going to dictate the timeframe in which PRGs are met. That said, the COC concentrations are not astronomically high and certainly abiotic, non-degradation processes like diffusion, dispersion, sorption, and radioactive decay will attenuate them over time.</p> <p>Below are more specific Appendix M comments.</p>

#	Page	Line/Figure	Comment
49	Appendix M Page M-55	18-24	"Cr(VI) transformation to trivalent chromium most likely occurs through an abiotic-iron reduction pathway where Cr(VI) is reduced to trivalent chromium in the presence of aqueous or solid phase Fe(II) minerals" However, on p.M-52, second paragraph clearly states "...iron reducing conditions are not prevalent. Therefore, Cr(VI), nitrate, and trichloroethene degradation is not expected under these conditions" The paragraph goes on to state that the current sampling locations may not represent what is going on in other parts of the subsurface, but that the possible presence of reducing conditions should be confirmed with field testing of Fe(II) measurements and vertical profiling (not provided).
50	Appendix M Page M-55	25-30	"Nitrate transformation to nitrogen gas most likely occurs through the denitrification pathway". Page M-13, Section M2.1.1.2 fourth paragraph states that "Anaerobic conditions (DO less than 0.5mg/L) are essential for denitrification", and p.M-48, Section M3.3.2 states that of the 226 DO measurements collected from 2006 to 2011, only was below the anaerobic threshold of 0.5mg/L (0.3mg/l). This section goes on to state that aerobic conditions prevail, but that vertical profiling <i>may</i> reveal fine-grain portions of the aquifer more likely to be anaerobic (data not presented).
51	Appendix M Page M-55	31-36	"Trichloroethene transformation to cis-DCE with direct oxidation to ethene/ethane and carbon dioxide is expected to occur via low-level biological and/or abiotic pathways" p.M-52, Section M3.3.6 states "The absence of these daughter products suggests that a reductive dechlorination pathway does not occur in 100-F/IU groundwater."
52	Appendix M Page M-52 Page M-52 Page M-48	36-41 11-12 31-32	Additionally, Section M3.3.7 states that "the absence of naturally occurring organic carbon in groundwater is expected to be a limiting factor affecting the degradation processes in 100-F/IU groundwater." Section M3.3.4 states that "Cr(VI), nitrate, and trichloroethene degradation is not expected under these conditions." Section M3.3.3 states that "based on the levels of nitrate present, and its widespread distribution, it is believed that nitrate is a significant inhibitor to degradation processes in the 100-F/IU groundwater"  See Appendix M General Comment above (#48).

EPA Comments on the 100-F and IU-2/6 Proposed Plan

Comment Number	Page	Line/Figure	Comment
1	General	General	<p>The summary of waste sites is still confusing. The 114 sites/locations that were determined to not have contamination and therefore never needing CERCLA action should be left out of the PP. If DOE wants to ensure these sites are covered, it would be appropriate to leave the discussion about them in the RI/FS. EPA suggests the following Alternatives for the 286 sites/locations that did require CERCLA action:</p> <ul style="list-style-type: none"> <li>• Alternative 1 – No Action – 153 Sites have been completed with interim actions and were re-evaluated for this RI/FS and determined not to need additional action (Page 8-90, Lines 7-9 of the RI/FS states, “no action may be an appropriate alternative component where interim actions have been completed as dictated by the interim action RODs, and verification sampling data indicates that the waste site does not pose a risk to HHE.”).</li> <li>• Alternative 2 – No Further Action with ICs – 16 sites with deep rad or deep Cr(VI), however, the deep Cr(VI) site needs to be carried into the FS for a ROM cost for RTD (similar to what was done in for the deep rad sites)</li> <li>• Alternative 3 – RTD - ??? Sites, we know 36 for sure but of the 81 that might be done before this ROD is final we should just pick a point in time and either add sites to the No Action (153) or to the RTD (36). The RI/FS references June 2012 as a cut-off date several times, but later (Page 8-58, Lines 14-15) states that 27 sites have verification data against interim RAGs but have not been evaluated against PRGs. Has this been done to date? If so, then adjust the numbers accordingly and use those.</li> </ul>
2	General	General	<p>The PP should use PRGs or “Proposed Cleanup Level” (like Table on pg 56) at this stage in the process (we prefer proposed CUL). The tables on pages 50-54 of the PP should ONLY have Proposed CULs for soils protective of GW and SW based on the exposure scenario that included irrigation. The tables should remove the “no irrigation” columns. EPA is willing to consider the balancing factor concepts as outlined in the IARODS for soil sites (See page 29 of the 100 Area Burial Grounds ROD).</p>
3	General	General	<p>Eco and Sediment PRGs/CULs – The extensive cleanup in the 100 Areas seems to indicate that Cr(VI) has been the only contaminant of ecological concern that drives a need for action. In EPA’s opinion, with the exception of Cr(VI), DOE should be able to conclude through the ecological risk assessment that the other contaminants listed in the tables on pages 57-60 do NOT pose a risk to ecological receptors. If this presumption is incorrect, then the table should be based on contaminants of ecological concern that pose a risk, and the others be eliminated from the table.</p>
4	General	General	<p>At this point in the process, the PP should no longer use COPC, they are COCs.</p>
5	General	General	<p>Recently, the 300 Area PP has gone through and extensive review process; should look to that and make changes to this PP accordingly.</p>
6	General	General	<p>The TCE value has changed. TCE is no longer based on cancer risk. The new risk based value is based on toxicity. New MTCA calculation changes the number from 4.9 ppb to 4.1 ppb.</p>

Comment Number	Page	Line/Figure	Comment
7	3	1	The executive summary in the RI/FS does not mention the sites that never made it in to the CERCLA process, it starts with 286. The PP should do the same, see General Comment #1 above.
8	3	31	Revise as follows, "The sites will be backfilled with clean material and re-contoured to provide a natural grade, followed by revegetation with native plants."
9	5	25-32	This seems irrelevant, remove the paragraph.
10	7	6	If the EAF is not used frequently throughout the document, we suggest just spelling it out.
11	8	Figure 4	This figure is not labeled correctly. Revise to: "Hanford Townsite after Camp Construction in 1943"
12	9	12-13	Revise to: "The active facilities within the 100-IU-2/IU-6 include guard stations and emergency sirens."
13	9	14-15	Revise to: "Radioactive liquid effluent was sites were remediated first because they were the primary contributors to contamination at 100-F."
14	10	1-28	Revise entire section. Look at PW-1,3,6 PP/ROD.
15	10	38	Remove reference to LIGO, see comment #9 above.
16	11	6-8	Is this active in F Area? Or just IU? If so, it's not mentioned when discussing active facilities?
17	11	12-13	Revise to: "The City of Richland water supply has not had contaminants from Hanford Site operations above any regulatory standard."
18	12	38-39	Nitrate a primary contaminate in solid waste burial grounds? Please clarify.
19	17	3-4	Sentence that starts with, "Natural process....." should end with the fact that all the sources were removed from soil.
20	17	7	Spell out EAF.
21	17	10-12	Remove last sentence in this paragraph regarding MTCA Risk Threshold.
22	17	19	Recently, there has been discussion that EPA may be going to a risk level of 31 µg/l for Cr(VI). We need to discuss this with DOE.
23	17	22-27	TCE, see comment #6 above.
24	17	Entire Page	The constant switching from MCL to DWS is confusing. Use one or the other (We prefer MCL).
25	20	10-12	Perhaps it would be best to be silent on the reactor under this section and just say no PTW left. Reactors are not part of this decision.
26	20	37-38	100-F was an operational area; however, large portions of IU-2/6 are nonoperational areas.
27	21	3-30	This info is captured on Page 9. No need to be redundant, say it once.
28	21	31-36	Delete this section. This language is more appropriate for the ROD or RAR/RAWP.
29	23	7-13	Either remove this section since the reactors are not part of the decision OR if it is left here, make sure the formatting makes is a part of the "Previous Cleanup Decisions" section preceding it, and then add the discussion of ISS that was done under the Action Memo.

Comment Number	Page	Line/Figure	Comment
30	23	18-40	This language under “Summary of Site Risk” is really confusing. It is EPA’s understanding that the information from the RCBRA was supposed to feed the site specific (or OU specific) risk assessments for 100-F and IU-2/6.
31	23	30	Revise to: “The intent of the CRC HHRA was to....” – Past tense since the CRC is completed.
32	23	37	Revise to: “which is consistent with DOE’s reasonably anticipated future land use....”
33	25	3-6	Remove the last sentence of this paragraph.
34	26	35-36	Remove the last sentence of this paragraph.
35	26	37-38	“...comparison to federal and state DWSs, as well as AWQC....” – Also compare to MTCH risk levels?? Again, use either DWS or MCL (see comment #24).
36	26	37-43	The groundwater section is missing the State ARAR requiring that total risk for all contaminants does not exceed $1 \times 10^{-5}$ or HI=1. The evaluation of risk are based on the total risk and hazardous and not a single contaminant number. This section’s text is misleading and not accurate. Add the State requirements.
37	28	13	Revise to: “ <del>For informational purposes</del> The groundwater exposure risks were also....”
38	28	18-19	See General Comment #4 above. If these are COCs they should be added to the table on page 56.
39	30	27-30	Delete this (last) sentence. See General Comment #2 above.
40	31	5-6	Delete “selected from a detailed technology screening process” since it is already stated on line 3.
41	31	30	Delete “fencing.” Fencing is not an IC, ICs are administrative controls.
42	31	38-39	This section references the Site-wide IC Plan for CERCLA when discussing the required ICs. The ICs are enforced through the ROD not the Site-wide IC plan. The Site-wide IC plan only documents the decisions that have been made in the RODs. The reference to the required ICs should state the ICs will be in the ROD.
43	31	39-40	Revise: “Interim actions have been completed at 16 waste sites,” – this is really confusing, way more than 16 have been completed correct?
44	32	7	Delete: “or Ecology” – this is an EPA lead OU.
45	32	Table 2	Site 116-F-14 (first row of this table) - Need to clarify that this is the result of an RI borehole through the remediated waste site. Was the data from the borehole compared to the CVP data? Also, needs to have ROM cost for RTD similar to the deep rad sites. See RI/FS comment on this issue.
46	32	Table 2	Site 118-F-6 (last row of this table) – At a minimum, the language on page 8-61, lines 5-9 in the RI/FS regarding this site needs to be in the PP. EPA would like to discuss.
47	33	12-14	Delete. See General Comment #1 above.
48	33	15-30	Revise as per General Comment #1 above.
49	33	35	Revise to: “Alternative GW-2, MNA and ICs (Preferred Alternative) – MNA is the primary remedy, with ICs in place until remedy is complete.

<b>Comment Number</b>	<b>Page</b>	<b>Line/Figure</b>	<b>Comment</b>
50	34	3	Revise opening sentence to discuss MNA first, see RI/FS comment #39.
51	34	8	Revise to: "Alternative GW-3, Pump-and-Treat with In-Situ Treatment and MNA" – call it what it is.
52	42	Table 5	Revise table according to comment #1 above.
53	44	5-7	As stated earlier, Cr(VI) is entering into the surface water above the AWQC. Please explain how you are measuring compliance with this ARAR.
54	50-55	GW and SW Tables	Revise per General Comment #2 above.
55	55	Footnote c	Since there is no breakthrough within 1,000 years, then if the site is cleaned up to the HH PRG it will also be protective of GW and SW? If so, it should state that.
56	56	Proposed GW cleanup levels table	Column 5 – "Change WAC 173-340-72 Cleanup Levels" to Model Toxics Control Act Method B Cleanup Level.
57	56	Proposed GW cleanup levels table	TCE – See comment #6 above.