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April 2, 2019 19-NWP-060

William F. Hamel, Assistant Manager for the River and Plateau
Richland Operations Office
United States Department of Energy
PO Box 550, MSIN: H5-20
Richland, Washington 99352

Re: Department of Ecology's Comments on 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units Documents

Dear William F. Hamel:

The Department of Ecology (Ecology) is submitting a separate review comment record form for each of the following documents:

- *Remedial Design/Remedial Action Work Plan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units* (100-D/H Area RD/RAWP), DOE/RL-2017-13, Draft A,
- *Remedial Action Waste Management Plan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units* (100-D/H Area WM Plan), DOE/RL-2017-39, Draft A,

Ecology strongly recommends reformatting the 100-D/H Area RD/RAWP in a manner that keeps soil remedial requirements and sections separate from groundwater remedial requirements and sections.

The 100-D/H Area WM Plan contains little information that has not been copied from the 100-D/H Area RD/RAWP. Maintaining such a small, specific document is costly and provides no benefit. The 100-D/H Area WM Plan should be incorporated as part of the 100-D/H Area RD/RAWP for consistency, similar to how both the 100-F and 300 Area RD/RAWPs included a Waste Management Plan.

If there are any questions, please contact me at nina.menard@ecy.wa.gov or (509) 372-7941, or Brian Johnson, Environmental Specialist, at brian.johnson@ecy.wa.gov or (509) 371-7908.

Sincerely,

Nina M. Menard

Nina M. Menard
Environmental Restoration Project Manager
Nuclear Waste Program

bj/aa
Enclosures (2)

cc: See page 2

cc electronic w/enc:

Dave Einan, EPA
Steve Balone, USDOE
Mark French, USDOE
John Sands, USDOE
Marty Doornbos, CHPRC
Robert Evans, CHPRC
Jon Perry, MSA
ERWM Staff, YN
Ken Niles, ODOE
Alicia Boyd, Ecology
Brian Johnson, Ecology
Stuart Lutrell, Ecology
Nina Menard, Ecology
Cheryl Whalen, Ecology
Environmental Portal
Hanford Facility Operating Record
CHPRC Correspondence Control
MSA Correspondence Control
USDOE-RL Correspondence Control

cc w/enc:

Susan Leckband, HAB
Hanford Administrative Record
NWP Central File

cc: Matt Johnson, CTUIR
Jack Bell, NPT
Alyssa Buck, Wanapum
Laurene Contreras, YN

Ecology Comments on the Remedial Design/Remedial Action Workplan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units (DOE/RL-2017-13, Draft A)

Review Comment Record (RCR)

Tracking_ID	Chapter	Section	Page_Num	Line_Num	Table_Figure	Comment_Basis	Modification_Needed
1	Global comment					The format of the RD/RAWP makes it very difficult to find information because sections and subsections contain both remedial action information for soils and groundwater. There are instances where information is duplicated in several subsections. There are also instances of information being omitted. When someone references the RD/RAWP for “Basis for Remedial Action”, “Remedial Action Design” and “Remedial Action Management” they will nearly always be focused on either soil or groundwater. The USDOE designated leads are separate for soil or groundwater.	Ecology strongly recommends reformatting the RD/RAWP in a manner that keeps soil remedial requirements and sections separate from groundwater remedial requirements and sections. This format could mirror the 100-F RD/RAWP with separate appendixes for soil and groundwater. The format could also split Chapters 2-4 into strictly soils or groundwater and add another 3 chapters to focus on the other media.
2	Global comment					Throughout the document text switches between using the term “Lead Regulatory Agency” and “Ecology”. This is confusing.	Pick one phrase for consistency and use throughout the document. Ensure that authorities that are retained by EPA (such as granting offsite determinations) are specifically called to be approved by EPA, not Ecology or the LRA.
3	Global comment					There are many cases of an unfocused "cut and paste" throughout the document, where present tense is used when addressing required future activities. Some examples of this approach are included in detailed comments below.	Change present tense to future tense when addressing required future activities.
4	1	1.2	1-6	26-27		The work plan makes reference to DOE/RL-2013-31, 100-HR-3 Groundwater Operable Unit Remedial Design/Remedial Action Work Plan, but it is not clear whether this plan will still be in effect.	Recommend text change to Clarify that this document will supersede DOE/RL-2013-31 upon approval.
5	1	1.4.1	1-8	31-40		The RUM aquifer thickness is provided, but the thickness of the unconfined aquifer is not provided.	Provide the thickness of the aquifer contained in the sands and gravels beneath 100-D and 100-H. Suggest this from DOE/RL-2013-31: "Thickness of the unconfined aquifer ranges from near 0 to 12 m (39 ft) across the area."

6	1	1.4.1	1-8	37		This sentence on line 37, pg. 1-8, states that RUM is an aquitard. This contradicts statements in other places throughout the document that identify uppermost RUM as an aquifer (for example, see lines 38-39 on page 1-18, also lines 32-33 on page 1-21).	Clarify and check the document for consistency.
7	1	1.4.1 and 1.4.3.1	1-9, and 1-20	n/a	1-3 and 1-11	Figure 1-3 identifies an aquitard directly under the unconfined aquifer, and seems to imply that the aquitard consists of less transmissive sediments. Figure 1-11 defines that area as "Ringold confined aquifer & aquitard undifferentiated"	Reconcile and clarify the apparent inconsistencies.
8	1	1.4.1	1-9	1		The value in inches is provided here to three significant figures (0.059 in/yr), but the value on the previous page is provided to two significant figures (0.06 in/yr).	Correct one or the other values given so they are consistent in the number of significant figures used.
9	1	1.4.1	1-9	6-8	Figure 1-3	The wording in this sentence does not state this is an area of riverbank storage, and the figure does not indicate clearly the bank storage zone or the zone where riverbank seepage would occur. Figure 3-28 of the RI/FS Report (DOE/RL-2010-95) indicates these zones .	Clarify in the sentence that this is the area of bank storage caused by the seasonally large range of the Columbia River stage. Clarify on the figure where the bank storage and riverbank seepage zones are generally located.
10	1	1.4.2.1	1-10	33-34		Text states, "Most of the 100-D/H contaminated vadose zone materials have been removed." No specific information is provided on the depth of the contaminated vadose zone materials that have been removed.	Provide some clarification on the depth of contaminated vadose zone materials that have been removed (less than 15 ft?).
11	1	1.4.2.2	1-10	38-39		It is apparent, after reviewing later sections of the report, that these figures show the hexavalent chromium plumes in the uppermost aquifer, but that is not stated anywhere.	Provide clarification what aquifer these plumes are in.
12	1	1.4.2.2	1-18	5-6		I cannot understand what year the average concentrations represent.	Provide what year the "annual maximum" concentrations represent.

13	1	1.4.3.1	1-20		Figure 1-11	The relationship between the Ringold Upper mud in this hydrostratigraphic section and Unit 6 (Middle Fines) in the generalized Hanford hydrostratigraphy (figure in many reports) is unclear. If the RUM is coincident with Unit 6, then Ringold Unit C on Figure 1-11 may be misplaced.	Review and verify.
14	1	1.4.3.2	1-21	28-31		The bullets do not include one very significant result: the hydraulic connectivity between the uppermost RUM and the Columbia River. This relationship seems to be downplayed in this section, as well as the previous and following sections. These very important hydrologic relationships will require further investigation, and it is not clear this will be addressed under this Plan.	Provide an additional bullet that identifies the hydraulic connectivity between the uppermost RUM aquifer and the Columbia River. Provide the plan to further investigate this relationship and its impacts to the Columbia River and receptors.
15	1	1.4.3.3	1-22	9-19		The paragraph does not accurately describe all the effects that are a result of the river stage changes. In some situations the contaminant concentrations increased with an increase in the river stage, due to secondary sources. This should discuss all the effects that occur as the river stage changes. The last sentence is an overly simplistic summary of the effects of river stage changes.	Provide all the mechanisms of contaminant concentration changes that occur as the river stage changes.
16	1	1.4.3.4	1-23	1-6		This paragraph does not indicate the specific mechanism by which contamination may have migrated into the RUM aquifer. Vertical downward hydraulic gradients must have been present to cause this.	Clarify that a vertical, downward hydraulic gradient resulted from the elevated hydraulic head caused by mounding.
17	2	2.1.1.2	2-1	36		Text presumes that chromium will meet final cleanup levels. Text should be more open ended.	Modify text to be more open. Possible text: "Activities at these two waste sites will include collection and evaluation of Cr(VI) data to determine if the site meets final cleanup levels. Any further action will be based on that data collected."

18	2	2.1.1.4	2-5	20		Typically this lifting of restrictions would be by the lead regulatory agency, rather than either Ecology or EPA.	Change "EPA or Ecology authorizes the removal of restrictions" to "the lead regulatory agency authorizes the removal of restrictions" or to "Ecology authorizes the removal of restrictions" in accordance with comment #2.
19	2	2.1.1.4	2-5			More details of the Institutional Controls should be included. See Sections 2.1.2.1 and 2.1.2.2 in the Integrated Remedial Design Report/Remedial Action Work Plan for 100-F/IU, DOE/RL-2014-44 Rev. 0 for an example.	Include specific requirements from "Institutional Controls" in Section 9.2 of the ROD for waste sites. If additional information is included in section 4.3.1.5, it may not need to be duplicated here.
20	2	2.1.1.4	2-5			Include figures of where ICs are applied.	Include figures (Figures A1-1 and A1-2 from Rev. 9 of DOE/RL-2001-41, sitewide IC Plan would be appropriate).
21	2	2.1.2.1	2-5	38-41		This paragraph contains information pertinent to the nitrate and strontium-90 plumes. It should be moved to section 2.1.2.2 MNA for 100-HR-3 OU Groundwater. Also, the text should emphasize that this action is not part of the chosen remedy of MNA for nitrate and Sr-90.	Move text to section 2.1.2.2 and include as a second paragraph. Modify text similar to "The P&T system for Cr(VI) remediation also co-extracts nitrate and strontium-90. While the treatment process does not remove nitrate or strontium-90, water from many wells is blended together during the treatment process. The result is that water coming out of the treatment process is below the drinking water standards for all contaminants, including nitrate and strontium-90." Also consider including the final paragraph from Section 4.2 of DOE/RL-2013-49 that refers to the SAP including sampling for these co-contaminants. Alternatively, summarize or refer directly to Table 3.4 in the SAP, which describes the treatment process water monitoring, including for nitrate and strontium-90.
22	2	2.1.2.1	2-6	1-20	n/a	This long discussion omitted the pertinent information that the interim remedy of the in-situ chemical treatment barrier proved ineffective and has been discontinued.	Revise this paragraph to clarify that the interim action of in-situ treatment by the redox manipulation barrier proved ineffective and has been discontinued.

23	2	2.1.2.1	2-6	22-24		These 2 sentences are awkward. If optimization is to thank for the increase from 600 to 775 gal/min, then what happened to increase all the way up to 900 gal/min?	Reword to better explain all the increases. Specifically discussing the switch to single treatment train would probably be good here.
24	2	2.1.2.1	2-6	37-39		The plan states "This section describes planned remedial process optimization (RPO) activities and P&T system expansion for the RA as required in the selected remedy of the 100-D/H ROD (DOE et al., 2018)." The section does not describe any RPO activities.	Provide the specific process optimization activities. The next short section, Remedial Process Optimization, only discusses some past actions identified as planned activities. See comment on Section 6.3.2.1, Page 6-4, Lines 15-17.
25	2	2.1.2.1	2-6 through 2-7	42-46 on page 2-6 and lines 1-3 on page 2-7	n/a	The Remedial Process Optimization paragraph refers to activities that had been planned for 2017-2018.	Revise this paragraph to clarify if these activities have been completed as scheduled.
26	2	2.1.2.2	2-7	12-17		This paragraph does not read smoothly, "MNA will be used…"	Substitute text from section 2.1.3 of DOE/RL-2014-44 Rev. 0 (pp 2-1 to 2-6) after having adjusted for COCs.
27	2	2.1.2.3	2-7			Include figures of where ICs are applied.	Include figures (Figure A1-3 from Rev. 9 of DOE/RL-2001-41, sitewide IC Plan would be appropriate).
28	2	2.3	2-11	Notes	2-3	Update the risk numbers 10-4 and 10-5 to superscript $1X10^{-4}$ and $1X10^{-5}$.	
29	2	2.3	2-13	arsenic footnote	2-4	Include language describing the error in the ROD concerning the Arsenic cleanup values for soil to protect groundwater/surface water for 100-D. The number included in the ROD should have been a value that is scaled by waste site width in the direction of groundwater flow, down to a lower limit of 20 mg/kg.	Update table 2-4 footnotes and elsewhere in the document the soil to protect groundwater and surface water values for arsenic in 100-D. Section A4.8.4 seems like a reasonable place to include discussion as well.
30	2	2.4				Between section 2.4 and Appendix C, this is not enough discussion or description of ARARs. ARARs are listed in the ROD and intended to be described in greater detail in the RDR/RAWP. Section 2.4 contains no useful information and Appendix C is simply the tables from the ROD reprinted.	Include details on ARARs similar to those in Section 2.4 of DOE/RL-2014-44 ADD1, Rev. 0.

31	3	3.1.1	3-1	11-13		More explanation is needed here to distinguish between the many waste sites that had RTD selected and the 4 that we expect still need RTD to be performed. Several sections in this document are restating the exact same concept. Section 2.1.1.2 (Remedy Components) contains all the preliminary information needed, Section 3.1.1 (Design Basis) doesn't contain anything of value, and Section 3.2.1 (Conceptual Design Summary) again contains good information, which is then detailed in 3.3.1 (Design Approach), 4.3.1 (Remedial Action Work Tasks).	Pick one section to contain detailed information. Delete or minimize other locations. This level of section and subsection is not needed and adds confusion to the document. See Chapter 3 in DOE/RL-2014-44 for an example of a document containing the same sections and subsections that has minimized repeated information.
32	3	3.1.2	3-2	3-11 and 20-25		The text states, Remedial activity recommendations that are incorporated into RPO include the following:" but does not include the uppermost RUM aquifer Cr(IV) investigation. The RUM investigation is included later, under the "Tasks for groundwater remedial design." It is not clear if the RPO activities include the items identified in lines 21-25.	Clarify if the "Tasks for groundwater remedial design" are an element of the RPO.
33	3	3.1.2	3-2	17-18		This states, "Section 2.4.2 in DOE/RL-2013-31 provides additional details for RPO." Section 2.4.2 in DOE/RL-2013-31 is titled "Remedy Performance Monitoring." It is not clear if that plan will still apply.	If this document will supersede DOE/RL-2013-31, then all applicable information should be included in this document.
34	3	3.1.2.1	3-2 to 3-11		Figure 3-1	It is not clear how the subheadings and their content relate to the list of items in Figure 3-1.	Suggest revising the section so the discussion in the text may be directly associated with the items in Figure 3-1.
35	3	3.1.2.1	3-4	22-23	Figure 3-4	The plan states, "Figure 3-4 shows initial modifications to this well network underway as part of RPO efforts under the interim remedy." Figure 3-4 identifies uppermost RUM aquifer wells, but the tie between the RPO and RUM investigation is not clear.	Clarify whether the RUM investigation is a part of the RPO.

36	3	3.1.2.1	3-4	35-40		The text makes reference to the exit strategy that "will identify plume conditions at the end of P&T operations that will meet the aquifer RAO and the river protection RAO. The exit strategy will also define how monitoring and rebound testing will be used for verification that the RAOs are met and maintained over time." It is not clear how this exit strategy is documented and implemented.	Clarify how the objectives of the exit strategy will be documented. Provide if this is a separate document and if so, when it would be written and implemented. If it is in this plan, more information should be provided that describes the objectives, approach, and schedule for specific activities.
37	3	3.1.2.1	3-9	1-6		This paragraph is largely a reiteration of the previous paragraph.	Combine the second sentence with the previous paragraph.
38	3	3.1.2.1	3-9	12-15		The plan states, "The secondary source investigation will be identified through development of a test plan for a rebound study or a well installation SAP (addendum to DOE/RL-2013-35, 100-HR-3 Groundwater Operable Unit Well Installation Sampling and Analysis Plan). This task will be implemented early in the remedial design to provide time necessary to address secondary sources during operations." It is not clear whether the "test plan..." is a separate document. It seems the RD/RAWP should contain such plans to investigate the secondary sources.	Clarify if the test plan referred to here is a separate document. The secondary source investigation should be identified in this RD/RAWP, and the test plan or well installation SAP are very specific to discrete activities to implement the source investigation plan.
39	3	3.1.2.1	3-9	18-19		This sentence reads that "existing and proposed" wells are listed in Table 3-1.	Change to reflect the actual table.
40	3	3.1.2.1	3-9	25-26		This reflects in part work that was completed in FY 2018. The completed wells should be included in these numbers to bring the plan current.	Provide the wells drilled in FY2018 as a separate bullet. Update the current bullet to reflect FY2019 to FY2020 planned wells.
41	3	3.1.2.1	3-9 to 3-10		Table 3-1	The table is not current and does not indicate the year the wells were or are planned to be installed.	Update the table to provide missing information for completed wells. It may be helpful to provide the year that the wells were installed and are planned to be installed.

42	3	3.1.2.1	3-11	24-25		The sentence, "Separating the plume from the river enables studies that can maintain river protection while evaluating rebound effects" is a direct repeat of the sentence at lines 17-18..	Remove the redundant sentence.
43	3	3.2	3-12	n/a	n/a	Section titled Conceptual Design is incomplete and confusing. It does not summarize the conceptual design approach to remediation of the solid waste sites.	Section titled Conceptual Design should identify the waste sites including their OU designation (i.e., for RTD: 100-DR-OU site 118-DR-2:2; 100-DR-1 OU site 100-D-52; 100-HR-1 OU site D-52; 100-HR-1 OU site 100-H-5; 100-HR-2 OU site 100-H-58; 100-DR-1 OU site 100-D-50:2; also include all waste sites identified in Table 2-1 that require ICs). Describe each of the waste sites. Identify sites' locations including maps, figures, and/or photographs to illustrate locations and physical configurations of the sites. Describe physical characteristics of each site including its size, and horizontal and vertical extent of contamination.
44	3	3.2.1	3-12	25-33	n/a	The bullets are confusing.	The bullets should list all the waste sites identified by bold in Table 2-1 along with their OUs, and include a short description of each site.
45	3	3.2.1	3-12	25-27	n/a	Description of site 118-DR-2:2 and the final remedial action required is incomplete and confusing.	The size and location of the "small decision unit" should be clearly identified on a map or figure. The nature and extent of the "final action remediation" should be specified. For example, will excavation of soils be required, over how large area and how deep?
46	3	3.2.1	3-12	34-36	n/a	Description of RTD activities is confusing and incomplete.	Description of RTD activities should be site specific. For example, structures that may require removal should be identified for each site. The size and depth of soils excavation should be identified for each waste site.

47	3	3.2.1	3-12	36-37	n/a	The description of the remedial activities for site 100-H-58 in the last sentence of this paragraph is incomplete and confusing.	Description of the remedial activities for site 100-H-58 should include information about the number of the contaminated power poles, the location of these poles on the site, and the type of remedial activities that will be required. For example, will the poles be cleaned and left in place or will they be removed? Will there be any excavation/backfilling of contaminated soils? What other activities may be required? Provide a summary of remedial activities required.
48	3	3.2.2	3-13	7		The word "strontium-90" is misspelled.	Correct the spelling from strontiun-90 to strontium-90.
49	3	3.2.2.1	3-13	38		The cited reference ECF-100HR3-17-0125 is not available.	Provide the document ECF-100HR3-17-0125 to Ecology.
50	3	3.2.2.1	3-13	35-38		Merely citing a reference without a summary discussion of the results of that work does not provide adequate information here. It is important to discuss how the trend test calculations were applied and how the results were used specifically for the secondary source investigation at 100-HR-3 OU. The ECF states, in section 7.2, that the trend tests assessment emphasized three main results: "the approximate extent of hydraulic containment provided by each of the 100-D, 100-H, and 100-K P&T systems; the approximate extent of contamination in each OU, as reflected on the interpolated Cr(VI) distribution under low river stage conditions; and the location of sampled wells in which concentrations exceed standards (Standard Test) and/or exhibit an upward trend (Trend Test)." It is not clear how this work supports the secondary source investigation.	Provide a summary discussion on the trend tests and how the results of the trend tests support the secondary source investigation.

51	3	3.2.2.2	3-16	8-10	Figure 3-7 and others	The text introduces "Layer 4" but there is no additional information what this layer represents in the model.	Provide a discussion on what "Layer 4" represents.
52	3	3.2.2.2	3-16	22-24		This states, "This variation between simulated and measured data can be attributed to an overestimated Cr(VI) distribution in the initial conditions used in the model, or presence of additional Cr(VI) mass in the aquifer in areas where some additional characterization may be required." This statements seems to be counter-intuitive. The simulated conditions identify areas of higher concentration, and the measured conditions indicate "additional Cr(VI) mass in the aquifer." This seems to imply the same thing.	Clarify what this statement is stating.
53	3	3.2.2.2	3-29	6-9	Figure 3-13	The text states, "In addition, the spatial extents and, especially, vertical layering of the hydrogeological units in the aquifer also impact Cr(VI) migration patterns with depth in some areas, with concentrations exhibiting different rates of change in zones with different hydraulic properties, as Figure 3-13 also illustrates." The relationship between zones with vertical layering and different hydraulic properties and Cr(VI) is unclear. It is also unclear how Figure 3-13 illustrates these relationships. This could benefit from a more complete discussion on these relationships and how the cited figure illustrates such.	Provide a more complete discussion on the relationship between zones with vertical layering and different hydraulic properties and Cr(VI).

54	3	3.2.2.2	3-29 and 3-30		Figures 3-13 and 3-14	Annual concentration fluctuations apparently due to the influence of the Columbia River essentially stop at about year 2020. The reason for this change in the concentrations is not discussed, or is not obvious to this reviewer. The reason for this change in the trend should be discussed.	Discuss the reason for the changes in the concentration trend variability of Cr(VI) prior to 2020.
55	3	3.2.2.2	3-30	7-10	3-12	Ecology is concerned about the modeling implication that, after the implementation of the final remedy, Cr (VI) will continue to be discharged to Columbia River before dropping below the remedial action objectives in 2040.	Please add a decision specifying when the actions described on lines 7-10 will be implemented, how the results will be communicated to Ecology, and what other actions may be required to prevent Cr(VI) discharges to the river over the next 20 years.
56	3	3.2.2.2	3-30	7-10		The last part of this sentence states, "...to determine ...or if the plume is smaller than assumed for the simulations and no action would be needed to prevent discharges to the river." It is premature to state that no action would be needed "...if the plume is smaller than assumed..." This needs to be reworded so this assumption is not implied.	Revise the sentence to remove the implication that just because the plume may be smaller that no action would be needed.
57	3	3.2.2.4	3-31	38		The text states, "...and EPA or Ecology approves termination of the monitoring." Ecology is the lead regulatory agency, so EPA should not approved termination of the monitoring.	Remove reference to EPA providing any approvals in the sentence.
58	3	3.2.2.5	3-32	40		The word "technetium" is misspelled.	Correct the spelling of technetium.
59		3.3.1	3-33	9-10	n/a	There are very few waste site remedial design packages expected under this ROD and Work Plan. Ecology expects to review all of the design packages.	Remove "if requested" from the end of the sentence.
60	3	3.3.1	3-33	15-16	n/a	There are very few waste site remedial design packages expected under this ROD and Work Plan. Ecology expects to review all of the design packages.	Remove the phrase "When requested, " from the 1st bullet in 3.3.1.

61	3	3.3.1	3-33	17-122	n/a	Ecology requires submittal of all remedial action designs for review and approval. Bullets 2 & 3 seem to conflict with one another. Why would 3-5 day approval period be considered a timely manner if the review period is generally 2 weeks? Also, bullet 2 seems to be covered by the final bullet. Bullet 2 originates in DOE/RL-96-17 Rev 6 Section 3.4.5, however "usually within 3 to 5 days" has been added with no justification.	Explain this discrepancy, remove the 2nd bullet, or remove the phrase "usually within 3 to 5 days".
62	3	3.3.2	3-34	25-31		The three bullets reflecting the three-level priority are not consistent with those listed in the referenced document, SGW-54542. The referenced document is out of date, and cannot be used to reflect the current strategy. The referenced document identifies an incorrect remedial action objective of 20 ug/L, rather than 10 ug/L. The referenced document does not identify "Separation of the Plume from the river" as a priority. Therefore, citing this document is inappropriate and provides for conflicting information.	Remove any reference to SGW-54542 and provide a reference that accurately identifies the priorities.
63	3	3.3.1	3-33	28-29	n/a	The last bullet is redundant.	Remove this bullet.
64	3	3.3.1.1	3-33	30-38	n/a	This paragraph is an example of unfocused "cut and paste".	This paragraph should be revised to be site specific and written in the future tense.
65	3	3.3.1.2	3-34	4-6	n/a	This sentence is an example of unfocused "cut and paste". The whole document should be examined and the present tense changed to future tense in analogous situations.	Change present tense to future tense.
66	3	3.3.2	3-34	36-37		The sentence "Figures 3-16 and 3-17 dimensions are approximate" is a repeat of information provided just above.	Remove the redundant sentence.

67	3	3.3.2	3-35		Figure 3-16	The general well construction shown here has at least two potential technical problems: 1) The filter pack will extend 7 feet into the Ringold upper mud and creates a possibility of providing a hydrologic conduit between the unconfined aquifer and confined aquifer. 2) Possible silting from materials of the Ringold upper mud entering the filter pack and well screen. The cost of installing all stainless steel well screens and casing must be extreme. Consideration should be given to other well materials such as PVC, since there would be no effect on the COCs with PVC. Also, a six-inch diameter well screen and casing may not be necessary in all cases, depending on the extraction or injection rate.	Review the well construction as discussed in the comment, and consider changes to the design.
68	3	3.3.2	3-36		Figure 3-17	The title of this figure indicates the design is for monitoring only. Verify this is not a design for injection or extraction also. The cost of installing all stainless steel well screens and casing must be extreme. Consideration should be given to other well materials such as PVC, since there would be no effect on the COCs with PVC. Also, a six-inch diameter well screen and casing may not be necessary in all cases, depending on the extraction or injection rate.	Review, and correct the title if necessary. Review the well construction comments and consider design changes.
69	3	3.3.2	3-37	4-7		The referenced report, SGW-42305, identifies a number of constraints, assumptions, and considerations that must be addressed when using the technique.	This RD/RAWP should discuss how these are met.

70	3	3.3.2	3-37	9-15		The text states, "Status of river protection is evaluated annually based on assessing the hydraulic effects of remedial action systems operations, changes in the discharge boundary head conditions associated with the Columbia River, and the inferred distribution of Cr(VI) in groundwater." The specific measures associated with "assessing the hydraulic effects of remedial action systems operations" and "changes in the discharge boundary head conditions associated with the Columbia River" are not described. The text also states, "Details on the technical approach used for evaluating progress toward river protection are provided in SGW-54209, Systematic Method for Evaluating the Length of the Hanford Reach of the Columbia River Shoreline that is Protected from Further Discharges of Chromium from the 100 Area Operable Units (OUs)."	State the specific objectives for "evaluating progress toward river protection" in this Plan.
71	4	4.2	4-3		4-1	"Realize cost increase or decrease (>+50% or <-30%) looks like the definition of a significant change.	Remove or reword the cost increase line in Table 4-1 to accurately reflect insignificant cost changes (that are within the original +50% or -30% estimate).
72	4	4.2	4-4		4-1		Add the appropriate line for a significant change due to cost increase or decrease.
73	4	4.3.1				All Section 4.3.1 information (with the exception of 4.3.1.3) has been duplicated from the 100-F RD/RAWP, and to a certain extent the 300 Area RD/RAWP, to provide consistency. It provides almost no D/H specificity.	Include language in the introduction of 4.3.1 acknowledging that this is generic language that has been applied to the 100 Areas. It provides almost no D/H waste site specificity.

74	4	4.3.1.1	4-4	9-27	n/a	The introductory paragraph above this sub-section states that the objective is to identify work tasks specific to remediation of the solid waste sites. Yet the text on lines 10-27 is an example of an unfocused "cut and paste", and of no value added to this RD/RAWP.	This section should be specific to each of the solid waste sites. *In particular, remove text of no value added to this RD/RAWP.* For example, which (if any) of the solid waste sites would require removing slabs and foundations of demolished buildings as stated on lines 26-27? Which sites exactly would require site utility services and what kind? Which would require constructing roads or any of the facilities identified on lines 13-16?
75	4	4.3.1.2	4-5	7-20	n/a	This text is another example of the unfocused "cut and paste" approach, and of no value added to this RD/RAWP.	Revise the text to be specific to each of the solid waste sites. For example, identify the expected depth of remediation, identify pipelines that may be left in place and methods used to demonstrate that the residual contamination is acceptable under RAOs. Identify the sites, if any (?) , that contain nonfriable asbestos.
76	4	4.3.1.2	4-5	21-43	n/a	This text is another example of the unfocused "cut and paste" approach, and of no value added to this RD/RAWP.	Revise the text to be specific to each of the solid waste sites. For example, which of the solid wastes sites addressed by this RD/RAWP do you classify as "dump sites" or burial grounds, where the methods described on lines 22-28 are applicable?
77	4	4.3.1.2	4-5	29		Include paragraph from DOE/RL-2014-44, ADD1 (Section 4.3.2.1, 1st paragraph on page 4-3) regarding sluicing. Sluicing would not be considered an acceptable excavation method.	Add "Sluicing (use of water) is not an acceptable excavation method."
78	4	4.3.1.2	4-7			Add in paragraphs concerning surveying/decon of ERDF shipping containers and releasing containers to a clean CTA from page 3-5 of DOE/RL-96-17 Rev 6.	Include relevant information or explain why it is not needed.
79	4	4.3.1.2	4-7	15-39	n/a	Change the present tense to the future tense.	Change present tense to future tense.
80	4	4.3.1.2	4-7	37-39		Include reference to DOE/RL-2001-36 *Hanford Sitewide Transportation Safety Document* or explain why the reference is not needed.	Include reference.

81	4	4.3.1.3	4-9	14-29			Include an explanation that the purpose of end-capping is to prevent human and ecological exposure to the contaminants within the pipes.
82	4	4.3.1.5	4-10	3-14		More details of the Institutional Controls should be included. See Sections 2.1.2.1 and 2.1.2.2 in the Integrated Remedial Design Report/Remedial Action Work Plan for 100-F/IU, DOE/RL-2014-44 for an example.	Include specific requirements from "Institutional Controls" in Section 9.2 of the ROD for waste sites. If additional information is included here, Section 2.1.1.4 may not need as much detail.
83	4	4.3.2.2	4-11	20-21		The sentence is written, "Water level data are used to monitor the extraction and injection rates, assess plume capture, and assess the need to rebalance flow rates to optimize capture zone boundaries." Water level data don't monitor the extraction and injection rates, rather they monitor the "effects of extraction and injection."	Revise the sentence to accurately reflect the purpose of the water level data.
84	4	4.3.2.2	4-11	22-23		The reference list in section 8 identifies SGW-38815, Rev 0; however Rev 1 has been released.	Correct the document reference for SGW-38815 to Rev 1 in the Reference section.
85	4	4.3.2.2	4-11	27-28	Table 4-2	The text states that "Table 4-2 summarizes ongoing work tasks by activity for the P&T systems, the minimum frequency, and where the information is documented." The purpose and content of the table is not clear. This needs further discussion to make it clear how each of the work tasks fits with "specific to procurement and construction, operational approach, and data use and interpretation for the groundwater P&T and MNA remedies included in this section."	Provide the discussion and description requested in the comment.

86	4	4.3.2.2	4-11	40-41		The text states, "Effluent sampling results will be used to track plume boundaries and monitor radiological conditions." It is unclear how effluent contaminant chemistry data can be used to track plume boundaries and monitor radiological conditions. The 183-HR-3 SAP includes effluent sampling to answer the study question "Is the remedy effectively reducing the groundwater Cr(VI) plume?" The O&M Plan states that "Effluent tank samples provide characterization of Cr(VI) concentrations at the completion of treatment prior to reinjection at the injection wells." Tracking plume boundaries does not appear to be a use for these results. Please clarify this or remove the statement.	Provide clarification how effluent sampling results can be used to track plume boundaries and monitor radiological conditions. Or remove this sentence.
87	4	4.3.2.3	4-12	25-26	Table 4-2	The text states, "Table 4-2 lists the groundwater RA reporting tasks." It seems Table 4-2 not only lists the RA reporting tasks but other documentation associated with the work tasks.	Clarify the documentation that Table 4-2 identifies.
88	4		4-13 to 4-16		Table 4-2	The heading "Requirement (Location)" does not provide the source of the requirements. In many cases the "Requirements" box describes activities, rather than requirements, for the work task. Some of these are called out specifically below.	Provide the source of the "Requirement (Location)" column. Review and revise the "Requirements" for work tasks where they identify activities rather than requirements.
89	4		4-13 to 4-16		Table 4-2	The elements under "Remedial Design/Remedial Action Work Plan (this RD/RAWP)" do not include RUM characterization. It is not clear if this is intentional or was inadvertently left off. In addition, evaluating secondary sources is not included in this list.	Review and add RUM characterization, if appropriate. Review secondary sources evaluation and include if appropriate.

90	4		4-13 to 4-16		Table 4-2	The references under "Activity" to the sections in this plan are in some cases incorrect. For example, Section 6.3.3.3 is identified, but that section does not exist in the plan because the headings are identified only to 6.3.3. This occurs in a few other cases also where a sub-heading is identified but it does not exist.	Review the Section references cited where an activity is discussed, and correct them as necessary.
91	4		4-13		Table 4-2	The second row of the table, "Evaluate Completion of Active P&T Remediation" includes the requirement to "Develop and implement the necessary analysis to initiate the rebound study" and to "Prepare rebound study plan." Developing the analysis and preparing the rebound study plan would seem to be a discrete and separate effort than to "determine with active remediation can be suspended."	Suggest that the analysis and study plan for the rebound study be identified as a separate work task. Note that the "Rebound Study Plan and SAP" is in the row for the "Perform Rebound Study" row.
92	4		4-15		Table 4-2	The first row on the table in this page is to "Evaluate Uncertainty Sampling" in order to "Calculate “uncertainty” analyte concentrations and compare with action levels." I did not see this activity even touched upon in this plan. Perhaps this row does not belong in the table.	Review the Work Activity row to "Evaluate Uncertainty Sampling" and remove it if appropriate. Otherwise, include this activity in the plan.
93	4		4-15		Table 4-2	The second row on this page "Evaluate Potential Source Areas" is identical to the second row on page 4-14. Review and verify if this is correct.	Review and verify.

94	4		4-16		Table 4-2	The first row on this page is to "Evaluate Effects of Source Removal/Remediation Schedule" The relation of the "remediation schedule" with "determining potential monitoring and treatment system effects" is not at all clear. Evaluation of the source remediation schedule would not seem to be a driver on potential system effects. But rather evaluation of source remediation activities would be such a driver.	Review this and correct or clarify it if appropriate.
95	4		4-16		Table 4-2	The "Requirements" for the second row, "Maintain Remedial Systems" are currently written as an activity. This should be revised to reflect the actual requirement associated with the work task. The "Requirements" for the fourth row, "System Calibration" are currently written as an activity. This should be revised to reflect the actual requirement associated with system calibration.	Review these and revise to reflect the actual Requirement for each work task.
96	4		4-16		Table 4-2	The "Requirements" for the fifth row, "Well Maintenance" are currently written as an activity. This should be revised to reflect the actual requirement associated with the well maintenance work task.	Review these and revise to reflect the actual Requirement for each work task.
97	4		4-17		Table 4-2	The table states that "Assess System Performance" will be done "As needed." No criteria are provided that would provide the basis for determining when this would be needed.	Provide criteria to determine when this work task activity will be performed.

98	5	5.1.1	5-1	8-12		This document contains no information on radiological air emissions monitoring. This (or another) section should include air monitoring requirements. See Sections 2.4.2 "WAC 173-480 and WAC 246-247" on page 2-7 of DOE/RL-2014-44 ADD1 Rev. 0 and Section 3.3.5 on page 3-4 of DOE/RL-2014-44 ADD1 Rev. 0. This work plan include waste sites with radiological contaminants.	Include sections on Radiological Air Monitoring.
99	5	5.2	5-2	9-11		The text states "The Hanford Site has comprehensive policies and procedures in place to report nonroutine releases to the environment." The specific program under which the policies and procedures fall should be identified.	Provide the specific program under which the "comprehensive policies and procedures" fall.
100	5	5.4	5-2	19-27		This section needs more information on minimizing disturbance during construction and performing cultural reviews.. See Section 5.4 of DOE/RL-2013-31 and Section 2.4.3 Location-Specific ARARs of DOE/RL-2014-44 ADD1 Rev. 0.	Include additional information on both minimizing disturbance during construction and performing cultural reviews.
101	5	5.4	5-2	25-26		The text states that "Surveys are conducted, as appropriate…" It may be important to identify the general qualifications of those who would conduct the surveys, and under what conditions.	Provide who would conduct the surveys, and under what conditions.
102	5	5.7.3	5-5	5.7.3		The text states, "The responsible design agency will maintain control of the design documents through acceptance of the documents." The specific "design agency" for this Plan should be identified specifically. I believe this should be DOE.	Provide the specific responsible design agency.
103	6					All Ch. 6 information pertinent to soils has been duplicated from the 100-F RD/RAWP, and to a certain extent the 300 Area RD/RAWP, to provide consistency.	Include language in the introduction of Ch. 6 acknowledging that this is generic language that has been applied to the 100 Areas.

104	6	6.2	6-1	25		The section heading "Site Verification and Closeout" should be a subheading under 6.1 Verification of Waste Site Cleanup. The heading should be 6.1.1, and the following subsections should be below that. This clarifies that "Site Verification and Closeout" is a component of "Verification of Waste Site Cleanup."	Review and correct the heading numbers if necessary.
105	6	6.2.3	6-2			Include more information about the operable unit in this section, including references. 100-OL-1 is currently in the process of Remedial Investigation.	Include more information about the operable unit in this section, including references.
106	6	6.3	6-3	8		Groundwater Cleanup is one of the major actions under "Remedial Action Completion" and should be renumbered to 6.2 - if the section number changes suggested above are made.	Renumber Section 6.3 to Section 6.2 if other numbering changes are made as suggested above.
107	6	6.3	6-3	15-17		This sentence indicates that "Total chromium in groundwater is primarily present as Cr(VI), so the treatment of Cr(VI) groundwater contamination will result in attaining cleanup levels for total chromium, since the total chromium cleanup levels are greater than the Cr(VI) cleanup levels." This is an unsupported conclusion. This statement will need to be supported with the basis. The total chromium RAO will always need to be achieved.	Provide the information that will support this conclusion or remove the sentence.
108	6	6.3.1	6-3	29	n/a	" Implemented" is confusing as it implies that some action has been completed.	Replace "implemented" with "initiated".

109	6	6.3.1	6-4	5-7		The text states, "Because of this disruption, attainment monitoring cannot be completed until Step 3 (End Remediation with Rebound Study) of the P&T RA." The word "attainment" is used here as a monitoring approach, but is not used in this context elsewhere in this section. Elsewhere it is used to describe when cleanup levels are achieved (e.g., "to demonstrate attainment of cleanup levels in groundwater"). Maintain consistency in the terminology, e.g., compliance monitoring (as used in text and the figure). Further, in this context it is more accurate to state that compliance monitoring cannot be started until Step 3 is completed.	Revise the sentence to replace "attainment" with "compliance" to the sentence reads, "Because of this disruption, compliance monitoring cannot be completed until Step 3 (End Remediation with Rebound Study) of the P&T RA." Or revise to state that "attainment of the RAOs cannot be demonstrated until Step 5.
110	6	6.3.2	6-4 to 6-9	Entire section		This section introduces the steps and general activities to conduct and evaluate the remediation progress. Specific plans for each step are not provided. Provide the specific plans or discuss that these specific plans will be prepared and how they will be provided to Ecology. Discuss whether specific plans will require Ecology review.	See comment. Provide the specific plans or that specific plans will be prepared and provided to Ecology prior to conducting the work for each step.
111	6	6.3.2.1	6-4	15-17		Expand text on RPO to describe the process used here at Hanford. It is relatively unusual in CERCLA to go through an RPO process annually.	Describe Hanford RPO process.
112	6	6.3.2.2	6-5	3	Figure 6-2	The information in Figure 6-2 applies to all the steps in the Pump and Treat Remediation. The figure should be presented under the major heading 6.3.2 Pump and Treat Remediation Steps.	Provide the first reference to Figure 6-2 under major heading 6.3.2 Pump and Treat Remediation Steps.

113	6	6.3.2.2	6-5	10-12		The text states, "Another element will be to verify that the concentrations or plume/source conditions for other COCs are still within the expectations set for use of MNA as the remedy." This sentence, which is specific to MNA appears to be out of place for the active remediation performance monitoring subsection. As such, it does not belong here.	Move this sentence to the MNA section.
114	6	6.3.2.2	6-5	14-15		Text states, "The performance assessment may be performed on groups of wells that identify sub-areas within the OU where concentrations indicate that cleanup has been achieved." The sentence does not clearly communicate the intent, that sub-areas within the OU can achieve cleanup based on performance assessment of groups of wells within those sub-areas.	Suggest revising the sentence to be more clear.
115	6	6.3.2.2	6-5	15-18		These two sentences are repeated in lines 28-30. The sentences in lines 28-30 introduce some of the tools discussed. Remove these sentences from lines 15-18.	Remove the redundant sentences from lines 15-18.
116	6	6.3.2.2	6-5	19-20	Figure 6-2	The sentence here is not clear that the diamonds in Figure 6-2 indicate decision points.	Make it clear that the diamonds in Figure 6-2 indicate decisions associated with the criteria listed.
117	6	6.3.2.2	6-5	28-31		The analytical tools introduced here are discussed in detail in Section 6.3.4.3. Reference to that section should be provided here.	Provide a reference to Section 6.3.4.3, where these tools are discussed in detail.

118	6	6.3.2.2	6-5	33-36		The bullets indicate sources of information with which to make decisions to stop treatment. EPA 240-R-92-014 does not make this statement, rather it states, "The statistical techniques presented in this chapter can be used to (1) determine whether contaminant concentrations are decreasing over time, and/or (2) predict future concentrations if present trends continue. Other factors must be used in combination with these statistical results to decide whether the remedial effort has been successful, and when treatment should be terminated." Revise the sentence to reflect the EPA statement.	Revise the sentence to accurately reflect the EPA statement how regression analyses may be used, and that other factors must be used in combination with the statistical results.
119	6	6.3.2	6-6		Figure 6-2	The figure does not provide a decision diamond after the "Compliance Monitoring" box to reflect the end of compliance monitoring. Another decision diamond with a box below it titled "End Compliance Monitoring" will make the figure complete in relation to all the steps.	Provide another decision diamond on Figure 6-2 titled "Compliance Monitoring Indicates Attainment of Remediation Goals" with a box below it titled "End Compliance Monitoring."
120	6	6.3.2.2	6-7	5		Text states that "The set of wells may be divided by proximity to the river." This statement reads like an exclusive statement that the subarea would be defined only by proximity to the river. Wells within subareas may also be divided by other criteria.	Clarify the statement.
121	6	6.3.2.2	6-7	2-3		The text states, "Each P&T system will have a sample set composed of wells used to monitor performance." It is not clear where this information is documented. The wells associated with each pump and treat system to monitor performance should be provided in a work plan.	Provide the where this information is documented. Assumedly this is the SAP.

122	6	6.3.2.2	6-7	10-12		The location of work plan(s) that provide or will provide the data collection is not provided. It will be necessary to provide documented plans for this work.	Provide where the data collection frequency and timeframe are or will be documented.
123	6	6.3.2.2	6-7	14		Remediation monitoring may be appropriate to reevaluate as cleanup levels are approached on an individual COC basis. Consider that Cr(VI) is expected to be remediated decades before strontium-90 is expected to reach cleanup through MNA.	Remove the phrase "for all COCs".
124	6	6.3.2.2	6-8	1		Text states, "OSWER 9283.1-44 identifies nonstatistical or visual review that may be appropriate when groundwater data are all nondetect (ND) or data are a combination of ND and detected COC concentrations less than the cleanup level." This statement is not clear when these nonstatistical methods may be used. The approach provided in OSWER 9283.1-44 for a non-statistical review is "If the groundwater COC concentrations are all "non-detect" (the PQL or RL is below the cleanup level) or a combination of "non-detect" sampling results and all detected COC concentrations is below the cleanup level, a statistical analysis may not be needed to accurately conclude that the COC cleanup levels have been reached." Clarify that these methods may be used when the PQL or RL is below the cleanup level.	Revise the sentence to clarify that nonstatistical review may be used if the PQL or RL is below the cleanup level. See Page 6-16, lines 25-28 for the appropriate language.
125	6	6.3.2.2	6-8	1-11		This section is to discuss "advanced performance analysis" but does not provide adequate information on these tools.	

126	6	6.3.2.3	6-8	29		This states that the rebound study approach will be documented, but no information is provided on the content, review, or reporting requirements of the study approach.	Provide what information will be included in the rebound study approach, and provide how the documentation will be reported. Include if the intent is to update the work plan prior to a rebound study or if a separate plan will be agreed to at that time.
127	6	6.3.2.3	6-8	31-33		This states, "When the rebound study shows that the aquifer is not under the influence of active remediation (e.g., extraction and injection wells have ceased operating, and groundwater head levels and gradients return to ambient conditions), the compliance monitoring period (step 4) will commence." One element of the decision to move to step 4 seems to be missing - that contaminant levels remain below the RAOs.	Revise the sentence to add "and contamination levels remain below the RAO" before "the compliance monitoring period (step 4) will commence.
128	6	6.3.2.4	6-9	1		The statement "The attainment monitoring evaluation should be conducted separately for each COC at each well" is not definitive. This statement should state that attainment monitoring evaluation will be conducted separately for each COC at each well, in accordance with OSWER 9283.1-44.	Revise the sentence to "The attainment monitoring evaluation will be conducted separately for each COC at each well."
129	6	6.3.2.4	6-9	6-9		This paragraph provides recommendations, which are not definitive. This should provide definitive statements regarding the planned work. Also provide how the plans will be documented. The wording in the sentence on lines 6-7 is not clear, and could benefit by breaking the sentence up, since two different thoughts seem to be stated here.	Provide definitive statements regarding the planned work. Also provide how the plans will be documented. Suggest rewording the sentence on lines 6-7 as follows: "The same data set will be used to make both attainment monitoring conclusions provided in the bullets above. A minimum of eight data points will be used in these analyses."

130	6	6.3.2.4	6-9	12-13		This states "Completed remediation can be attained after 95% UCL for each COC at each well remains below the established cleanup levels for a period of 3 years." It is unclear in this sentence what "completed remediation" means. It reads as if this is completion of attainment monitoring because this is when each COC remains below the cleanup level for a period of 3 years , but this could also be interpreted that this is the end of compliance phase. It is not clear whether the minimum of eight data points indicated on line 7 are collected during this period of 3 years.	Please clarify the relationship between the 8 data points on line 7 and the period of 3 years.
131	6	6.3.2.4	6-9	27-29		This states, "The 95% UCL calculation will be completed by selecting the most suitable methodology based on the characteristics of the concentration datasets and considering WAC 173-340-720(9)(d)(i), “Groundwater Cleanup Standards.” The remedial action goals for 100-HR-3 have been set forth in the ROD, so reference to WAC 173-340-720(9)(d)(i), “Groundwater Cleanup Standards” is unnecessary. This should state considering the remedial action objectives stated in the ROD.	Revise the sentence to state, "The 95% UCL calculation will be completed by selecting the most suitable methodology based on the characteristics of the concentration datasets and the remedial action objectives."
132	6	6.3.4	6-12	1-8	Table 6-2	The organization of the report is unclear in this heading. The section "6.3.4 Remediation Monitoring and Evaluation" appears to be a general discussion of both P&T and MNA, and would seem to be more appropriate as a section under 6.3 Groundwater Cleanup. The content on pages 6-13 through 6-21 apparently is directed specifically to MNA.	Review the information and move if appropriate.

Ecology Comments on the Remedial Design/Remedial Action Workplan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units (DOE/RL-2017-13, Draft A)

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133	6	6.3.4	6-12	7-8	Table 6-2	Line 7 states that Table 6-2 provides a general timeline; however this is not obvious from the information in the table. Some actions are identified in Stage I only and others are identified in both Stage I and Stage II. Installation of new wells is shown for a duration of 2 years, implying it will not be performed beyond 2 years. The action "Evaluation of P&T system performance" is both 2 years and ongoing. The activity "Performance monitoring sampling" is shown only in the 2 year duration, implying that it is not an ongoing action. The action "Evaluation of MNA processes and associated indicators" is a 2 year duration, implying this will be completed within two years and will not be an ongoing activity. The action, "Reporting of performance monitoring sampling results and performance evaluation in the annual groundwater report" is a 2 year duration and also an ongoing activity but with the "performance evaluation" not part of the ongoing activity.	Review Table 6-2 and clarify which actions are limited to 2 year duration and which are ongoing. It would seem that only the actions that occur within 2 years should be listed here, and all actions that occur within 2 years and beyond 2 years should be ongoing duration.
134	6	6.3.4	6-12	7-8	Table 6-2	Line 8 states that discussions of these activities are provided in the following sections, but some of these are not. The relation between Table 6-2 and the activities discussed is not clear. The discussion provides actions that meet the steps of EPA's framework for MNA implementation.	Consider revising the Table 6-2 to provide direct relationships to the activities discussed, to the steps of EPA's framework, steps in groundwater remediation; or revise the table to provide a true timeline of remediation activities, or remove the table.
135	6	6.3.4.1	6-14	12-13		The text states "Evaluation of monitoring data for plume maps would also reveal unexpected increases in COC contamination…" Evaluation of trends as well as plume maps should indicate if unexpected increases in contamination may occur.	Provide contaminant trend evaluations as part of this review.

136	6	6.3.4.1	6-14	32-33		The text states "The new well installation data will include the elevation of geologic contacts, transmissivity of *unconfined aquifer* , and water table elevation." Wells that may be installed in the RUM will include transmissivity. This should not identify just transmissivity of the unconfined aquifer.	Revise the sentence to "The new well installation data will include the elevation of geologic contacts, transmissivity of aquifers, and water table or hydraulic head elevation."
137	6	6.3.4.1	6-14	41-42		The text refers to concentration data for each of these 'sources' will be used… Suggest replacing the word "sources" with "monitoring locations" so as not to confuse with secondary sources.	Replace "sources" with "monitoring locations."
138	6	6.3.4.1	6-15	1		The use of the word "may" in this sentence is not definitive.	Replace "may" with "will."
139	6	6.3.4.2	6-15	8		It is unclear whether this section applies only to MNA or to remediation in general. Clarify the scope of the section.	Clarify the scope of the section 6.3.4.2.
140	6	6.3.4.2	6-15	34-44		This entire paragraph is not needed. Cleanup projections in the RI/FS were based on years worth of data already collected from a robust monitoring network. This paragraph was more applicable to an operable unit such as 100-FR-3 where a new monitoring network to was required for MNA.	Remove the paragraph.
141	6	6.3.4.3	6-16	Entire section		This entire section discusses more specifically the statistical tests that are generally summarized in Section 6.3.2. It would be helpful to state in Section 6.3.2 that the analytical tools are discussed in more detail in Section 6.3.4.3.	Provide earlier in the Plan that details are provided in Section 6.3.4.3.

142	6	6.3.4.3	6-17	2-3		This states in part, "statistical analysis of the groundwater sample data set will be performed to evaluate if MNA progress is consistent with expectations and assess the attainment…" The specific mention of MNA causes some confusion. It is not clear if this entire section applies only to MNA.	Clarify whether the section applies only to MNA.
143	6	6.3.4.3	6-17 to 6-20	13-15, 29-45		This text seems to imply the section applies to MNA only.	Clarify whether the section applies only to MNA.
144	6	6.3.4.3	6-17	39-40		It is not clear why this section would require attainment monitoring for 5 years for each COC and well combination. Is this requiring that each well will be in attainment monitoring for 5 years? It is probable that monitoring of each individual well in 100-HR-3 may not be needed for attainment monitoring.	Remove or reword the statement to change the implication. Alternatively, provide justification for 5 years of attainment monitoring at each well. Since this language is specifically found in the MNA section, ensure it is duplicated in the sections on pump and treat.
145	6	6.3.4.3	6-17	39-41		This states, "Attainment monitoring will be performed for 5 years for each COC and well combination." A period of 3 years was identified in section 6.3.2.4, page 6-9. Section 6.3.2.4 also stated 8 samples are needed to demonstrate attainment. Please clarify this apparent discrepancy. Provide the basis for performing monitoring for 5 years.	See comment.
146	6	6.3.4.4	6-21	13		Large concentration increases in any wells are of concern. This could indicate a new or renewed release or a previously unknown source.	Remove "Near-source".
147	6	6.3.4.4	6-21	17		This bullet implies the section applies to MNA only.	Clarify whether the section applies only to MNA.

148	6	6.3.4.6	6-22	17-18, 22-24, 32		The text mentions the 5-year performance monitoring report. It is unclear whether this refers to the CERCLA 5-year review or some other report. The Plan previously stated that attainment monitoring will be conducted for 5 years after the RA is completed. It appears that this has been considered in the timing of the 5-year reports mentioned in lines 22-24.	Clarify what this 5-year performance monitoring report is.
149	6	6.4	6-22	35	n/a	This title is misleading as it implies progress reporting for the interim remedy.	Suggest changing the title to "Periodic Remedy Progress Documentation and Reporting".
150	6	6.5	6-23	5		This identifies the outline for the final closeout report. Consider a separate section that provides the outline for the 5-year performance monitoring report.	See comment.
151	6	6.6	6-24	3-5	n/a	This section should address all the remediated sites, not just the P&T of groundwater.	Suggest changing the paragraph to clarify that this section applies to the solid waste sites and the P&T operations (rather than the P&T only as currently stated on line 4)
152	6	6.6	6-25	7-11		The text cites dangerous waste regulation requirements. Verify this is appropriate for the site. Perhaps the reference should be to the Waste Management Plan.	See comment.
153	6	6.6.1	6-25	13-36	n/a	This section should address all the remediated sites, not just the P&T of groundwater.	Revise this section to address solid waste sites in addition to the P&T systems.
154	6	6.6.1	6-25	33-36		The discussion on inspecting and replacing aquifer tubes is out of place here. Only removal and disposal of aquifer tubes is relevant to the scope of this section.	Remove discussions on aquifer tube inspection, repair, or replacement.

Ecology Comments on the Remedial Design/Remedial Action Workplan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units (DOE/RL-2017-13, Draft A)

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155	6	6.6.2	6-25 through 6-26			The history of the DX & HX P&T systems is included in other portions of the document. A brief reminder that the same systems were built under the interim actions but are authorized under the final action ROD will clarify that we are discussing the systems currently in use. The subsections of Chapter 6 are not included in chronological order, which makes it somewhat unclear if we are discussing D&D of old outdated Interim P&T system or the final P&T system.	Reiterate in the text that the DX and HX systems were built under the interim actions but that they will be the pump and treat system under the final action as well. This will clarify that the D&D of the P&T will occur after the P&T has concluded its purpose.
156	7	7.1	7-1	34		Please adjust text "waste site capping" to more accurately reflect that this is the remedial costs associated with 100-D-50:2.	Change text to "100-D-50:2 Remedial costs" or "Pipe capping at 100-D-50:2".
157	7	7.2	7-2		7-1	Work Plan schedules typically have dates associated with them. It is typical to develop TPA milestones associated with the schedule in the Work Plan.	Include dates within this table.
158	App A		A-2		Table A-1	The “Summary of Attainment of Remedial Action Objectives” table is missing a fifth column that is typically found on these tables. It is a Reference column, which documents the specific Calculation Brief that was prepared to demonstrate that the remedial action goal has been attained.	Include a reference column which documents the specific Calculation Brief that was prepared to demonstrate that the remedial action goal has been attained.
159	App A	A4.6.2	A-7			Recommend adding text from DOE/RL-2014-44 ADD1 Section B4.6.2 (1st paragraph) regarding statistical sampling designs.	Include discussion of statistical design.
160	App A	A4.7	18-19			For accuracy, the sentence should be edited as shown: “The verification samples collected are submitted to offsite laboratories certified and accredited to perform the requisite analyses using U.S. Environmental Protection Agency (EPA)-approved analytical methods.”	See comment

Ecology Comments on the Remedial Design/Remedial Action Workplan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units (DOE/RL-2017-13, Draft A)

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161	App A	A4.7	A-8	22-32		Include steps to take when the maximum analytical detection will be used for evaluation instead of a recommended UCL by ProUCL with a statistical data set. Steps should be outlined similar to those included in IAMIT Decision No. 2018-001. Recommend using the 2 bullets from page 2 of the agreement adjusted for closeout sampling (as opposed to baseline risk assessment).	Include steps for analyzing the data with the regulators when a recommended UCL from ProUCL will not be used given a statistical data set.
162	App A		A-9	17-20		The text provides the operational history of the Hanford Site that warrants the exclusion of thorium and radium isotopes from further evaluation if detected. However, a basis is not given for excluding potassium-40.	Please provide the requested justification.

Ecology Comments on the Remedial Action Waste Management Plan for the 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units (DOE-RL-2017-39, Draft A)

Review Comment Record (RCR)

Tracking_ID	Chapter	Section	Page_Num	Line_Num	Table_Figure	Comment_Basis	Modification_Needed
1	General					There are 10 or less pages of information that has not been copied from the RDR/RAWP. Maintaining such a small specific document is costly and provides no benefit. This document should be incorporated as part of the RAWP.	Incorporate the information contained in DOE/RL-2017-39 Draft A into the RD/RAWP (DOE/RL-2017-13).
2	General					A section needs to be included discussing potential treatment of solid waste from waste site remediation.	Include a treatment section with information on LDR treatments.
3	4	4.2.1	7	24-31		DOE/RL-97-01 Rev. 6 (approved in 2016) requires purgewater to be "contained at the wellhead, if necessary, until transport to the MSUs, or it may be dispositioned to the influent side of the DX, HX, KX, KW, or KR4 P&T facilities. Purge water withdrawn from wells will be handles by the particular pump and treat system that treats groundwater from the same operable unit." It is not clear why purgewater from 100-HR-3 should not be disposed of in 100-HR-3.	Please explain what the modular storage units are and how they are used. Remove language referring to another appropriate unit or include justification for why 100-HR-3 purge water should leave 100-HR-3.
4	4	4.4	10	31		This is the first time the centralized sample equipment cleaning facility in the 6268 Building has been mentioned in either this document or the RD/RAWP, which discussed decontamination at length. It is not clear if this location can be used without specific EPA onsite determination as it was not included with ERDF and 6265A as a "single site for response purposes" in the ROD. See ROD Section 5.0, page 7.	Describe the facility in the 6268 Building: it's purpose, and protocols. Describe what kind of equipment and tools can be taken there: hand tools? excavation equipment? Describe the capacities and limits of this facility? Determine if using this facility would require an onsite determination from EPA. The use of this facility may need to be removed from the document.
5	4	4.6	11			This section only discusses miscellaneous solid waste generated from groundwater activities. It should address all miscellaneous waste from groundwater and soil related activities.	Expand language in this section to include miscellaneous solid waste generated from waste site remediation.
6	4	4.7				It is unclear what kind of decommissioning is being discussed. Section 4.8 is specific to well decommissioning, is this section also supposed to be? There are well decommissioning tasks and Pump and Treat System Decommissioning tasks in the RD/RAWP that should both be included.	Include discussion of decommissioning debris to discuss all types of decommissioning: well, P&T system components (such as piping, etc.) and P&T system full decommissioning.
7	5					This section is specific to waste generated from groundwater activities. It should also reiterate sections from the RAWP about ERDF containers, packaging, and transportation requirements.	Include information pertinent to packaging and labeling for material likely to be encountered in waste site remediation.
8	6	6.1				This section is specific to waste generated from groundwater activities. It should also include information on stockpile areas, areas of contamination, and waste storage unique to waste site remediation.	Include information pertinent to storage for material likely to be encountered in waste site remediation or point to the pertinent descriptions within the RAWP. A section on the management of staging piles should be included or referenced from the RAWP.
9	6	6.1	19			Use the word "dispose" instead of manage when discussing an alternate disposal location to ERDF.	Replace "to manage" with "to dispose".
10	6	6.2				This section is inadequate. Substantive requirements of WAC 173-303-630 and WAC 173-303-160 should be outlined for what exactly needs to be followed.	List substantive portions of WAC requirements for container management here.