STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Richland Field Office
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November 15, 2023 23-NWP-148

Naomi Jaschke, Director
Soil and Groundwater Division
Richland Operations Office
United States Department of Energy
PO Box 550, MSIN: H5-20
Richland, Washington 99352

Re: Transmittal of the Department of Ecology's Review Comment Record for *Groundwater Monitoring Plan for the Horn Subarea Rebound Study (100-HR-3 Operable Unit)*, DOE/RL-2021-23-ADD5 Draft A

Reference: See page 2

Dear Naomi Jaschke:

In accordance with the *Tri Party Agreement*, Section 9.2.1, the Department of Ecology (Ecology) completed our review of the *Groundwater Monitoring Plan for the Horn Subarea Rebound Study (100-HR-3 Operable Unit)*, DOE/RL-2021-23-ADD5, Draft A (Reference).

Ecology's comments are on the enclosed Review Comment Record, in accordance with the *Tri Party Agreement*, Section 9.4.

If you have any questions or concerns, please contact me at kim.welsch@ecy.wa.gov or (509) 318-3263, or Michael Ramirez, Environmental Specialist, at michael.ramirez@ecy.wa.gov or (509) 975-6384.

Sincerely,

Digitally signed by Welsch, Kim (ECY)
Date: 2023.11.15 11:54:21 -08'00'

Kim Welsch
Environmental Restoration Project Manager
Nuclear Waste Program

mr/mo
Enclosure

cc: See page 2

Reference: Letter 23-SGD-0022, dated October 12, 2023 , "Groundwater Monitoring Plan for the Horn Subarea Rebound Study (100-HR-3 Operable Unit), DOE/RL-2021-23-ADD5, Draft A"

cc electronic w/enc:

David Einan, EPA
Kate Amrhein, USDOE
Jason Capron, USDOE
James Hanson, USDOE
John Virgin, USDOE
William Faught, CPCCo
Jon Perry, HMIS
Mason Murphy, CTUIR
Jack Bell, NPT
Alyssa Buck, Wanapum
Laurene Contreras, YN
ERWM Staff, YN
Susan Coleman, HAB
David Reeploeg, Hanford Communities
Max Woods, ODOE
Michael Ramirez, Ecology
Beth Rochette, Ecology
Kim Welsch, Ecology
Environmental Portal
Hanford Administrative Record
Hanford Facility Operating Record
CPCCo Correspondence Control
HAB Correspondence Control
HMIS Correspondence Control
USDOE Correspondence Control

Review Comment Record	Washington State Department of Ecology Nuclear Waste Program Section: Cleanup Project Manager: Kim Welsch	Date: 11/6/2023
Document: DOE/RL-2021-23-ADD5_Draft A: Groundwater Monitoring Plan for the Horn Subarea Rebound Study (100-HR-3 Operable Unit); Document Lead: Michael Ramirez. 509-975-6384, mira461@ecy.wa.gov		

Item	Page, Line, Section, Paragraph	Comment and Basis/Justification	Modification Needed	DOE Response	Ecology Response	Open/ Close, Date
1.	Page: 1 Section: 1.1 Line: 30	The text states, "Performance monitoring samples will be co-sampled with the rebound study samples and will not be duplicative." Additional elaboration is requested to explain the intent of this statement. This reviewer interprets the statement to mean that an individual sample may be used to provide data for both performance monitoring as well as data for the rebound study. Please confirm if this is the proposal, and if so, if the number of performance monitoring samples and rebound study samples are the same. Furthermore, clarify that the rebound study samples will only be analyzed for Cr(VI), whereas the performance monitoring samples will be analyzed for additional constituents in accordance with the Parent SAP.	See comment.			
2.	Page: 1 Section: 1.1 Line: 37	The text states, "The treatment of Cr(VI) groundwater contamination will result in the attainment of cleanup levels for total chromium, which are greater than the Cr(VI) cleanup levels." For improved clarity and a better understanding, include the cleanup levels for Cr(VI) and total chromium within the text to support the statement.	Include the cleanup levels for Cr(VI) and total chromium within the text.			
3.	Page: 2 Section: 1 Lines: 4-5 Figure 1	To better understand the location of the wells selected for rebound monitoring, show all the extraction, injection, and monitoring well locations, and the aquifer tubes (AQT) within the figure (both inside and outside of the rebound subarea boundary), including those not selected for monitoring. [The non-selected wells could be added to the figure using the same symbols but in another color; labeling them would be optional.]	Show all existing wells/aquifer tubes not selected as part of the rebound study but within the figure boundary.			
4.	Page: 2 Section: 1 Lines: 4-5 Figure 1	Reviewing Figure 1 to the Hanford Site GWMR for 2021 (DOE/RL-2021-51) and the Annual Summary Report for the 100-HR-3 and 100-KR-4 Pump and Treat Operations, and 100-NR-2 Groundwater Remediation (DOE/RL-2021-52), there are additional monitoring locations that should be included to minimize perceived data monitoring gaps: • Injection well H1-6 (inland well north of the plume area; northwest of well 99-44) and injection well 97-47C (northwest of plume area). These wells would serve as additional monitoring points or as an alternative to well 101-45 that is further to the northeast. • Adding additional east-southeast aquifer tube (AQT) locations as control points (specifically, AQTs 45-M and C5682), if the AQTs are still operational.	In the response discuss the reasons why these suggested locations were not selected and if value would be gain with adding them to the monitoring program.			
5.	Page: 3 Section: 2 Line: 13	The text states, "Contamination from the releases migrated through the soil column to the groundwater that underlies the region between the 100-D and 100-H Areas known as the Horn (DOE/RL-2017-13)." The term contamination typically represents more than one constituent. In light of this interpretation, explain why Cr(VI) is the only contaminant that is being addressed for the Horn in this Rebound Study if the releases were from facilities and waste sites in the 100-DR-1, 100-DR-2, 100-HR-1 and 100-HR-2 OUs during the past operations at the D, DR, and H Reactors.	See comment.			
6.	Page: 3 Section: 2.1 Line: 30-31 2nd Bullet	The bullet in question states Cr(VI) concentrations near the shoreline are currently less than the 10 µg/L cleanup level for groundwater discharging to surface water. This is not correct based on the plumes concentrations shown in Figure 1 and the information in DOE/RL-2021-51, which suggests AQTs C5633, C5638, and C5641 have or had Cr(VI) concentrations above 10 µg/L.	Please review the statement for correctness to Figure 1 and provide an additional discuss if needed.			

Document: DOE/RL-2021-23-ADD5_Draft A: Groundwater Monitoring Plan for the Horn Subarea Rebound Study (100-HR-3 Operable Unit); Document Lead: Michael Ramirez. 509-975-6384, mira461@ecy.wa.gov

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7.	Page: 3 Section: 2.1 Lines: 28-35 Bullets	It would be beneficial to add an additional bullet mentioning if there are underlying RUM plumes within the subarea, and if there are RUM monitoring wells and/or extraction wells within the figure boundaries (to be based on most recent information).	For general information, simply state if there are underlying RUM groundwater plumes and wells within the rebound subarea.			
8.	Page: 5 Section: 2.2 Figure 3	Figure 3 shows the reference wells to illustrate the downward trend of Cr(VI) in the central Horn subarea. Well 699-97-45 is the only well presented to have experienced an upward rebound (still above surface water standard of 10µg/L) between 2022 and 2023. Is this the only well w/ any form of rebound in recent monitoring or are there others? Are any rebound trends localized to a particular location or spread across the Horn subarea?	Include an acknowledgement on the situation/plan for Well 699-97-45 and other wells experiencing a rebound in Cr(VI).			
9.	Page: 6 Section: 2.3 Line: 22 2nd to Last Paragraph	The first sentence in the paragraph states there are two sand, silt, and gravel units underlie the RUM, which are confined water-bearing units. If this statement includes the RUM-2, then the sentence should be changed to *state semi-confined to confined water bearing units*, based on information in this section and reference CP-65222's title.	If the statement includes the RUM-2, then it should be changed to state semi-confined to confined water-bearing units.			
10.	Page: 8 Section: 2.3.1 Line: 17-18 3rd Paragraph	In this paragraph, mention that do to cessation of the P&T operations within the subarea boundary, groundwater gradients (direction and magnitude) may change than that depicted in Figure 4.	Add a statement that during the rebound study, groundwater flow gradients and directions are not expected to change drastically but could be different then that shown on the figures.			
11.	Page: 9 Section: 2.3.3 Lines: 5-6 1st Paragraph	The first sentence of the section states the wells within the study area have between 0.5 and 6.5 m (1.5 and 21 ft) of screened water columns (Table 1). The least amount of screen water column length in this range is correct when compared to Table 1 (extraction well 199-H1-51) but three of the injection wells listed in Table 1 have greater than 20 ft of saturated screen intervals: 199-H1-32 (21.4 ft), 199-H1-5 (24.1 ft), and 199-H4-80 (28.9 ft).	Revise the sentence to be consistent with the information presented in Table 1 (screened water column length).			
12.	Page: 12 Section: 3 Lines: 2-4 Paragraph after bullets	The second sentence of the paragraph mentions all PSQs, except for PSQ 3, are applicable to the subarea. Please mention what PSQ 3 represents so that the reader does not have to look back at the parent SAP.	After where PSQ 3 is mentioned, add what it represents (vertical well water depth sampling).			
13.	Page: 12 Section: 3 Lines: 4-6 Paragraph after bullets	The sentence in question mentions Table 1 and points out Well 199-H1-32 has a water screen length of over 20 ft. Based on Table 1, three of the injection wells have saturated screen intervals greater than 20 ft [199-H1-32 (21.4 ft), 199-H1-5 (24.1 ft), and 199-H4-80 (28.9 ft)]. Therefore, revise this sentence to mention that the wells to be monitored have, in general, saturated screened water column of less than 20 ft with the exceptions of three injections wells (saturated screen columns between 21.4 and 28.9 ft). Would then summarize in the paragraph what is stated in Table 1, Footnote "b".	Revise the sentence to be consistent with the information presented in Table 1.			

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14.	Page: 13 Lines: 2-5 Section: 3	This text suggests a misunderstanding of PSQ 7 as discussed in Data Quality Objectives (DQO) meeting. A key point of PSQ 7 during the DQO was to ensure that data collected during the rebound study was of similar quality and frequency as compliance monitoring. Thus, if appropriate, some of the rebound study results could be substituted for compliance monitoring. Portions of a study area, or potentially the entire sub-area in the case of the horn, could smoothly transition to compliance monitoring at the end of the rebound study. PSQ 7 was included to save cost and time during the transition from rebound study to compliance monitoring, typically a 3 years/12 sample minimum effort for compliance. If results stabilize early in the rebound study year, then 2-3 quarters of rebound sampling could be used for compliance. To fully realize this cost saving, a compliance monitoring plan needs to be in place prior to the end of the rebound study. It would also require DOE to be prepared to shift to compliance monitoring for portions of HR-3, rather than the entire operable unit at once. These actions require some up-front cost in the near term but may be of significant cost savings in the future as we minimize duplication of sampling for compliance and discontinue routine sampling throughout portions of the operable unit as compliance is achieved. Whether we will use this PSQ 7 to its full intent should be discussed. See the following sections of DOE-RL-2021-23-R0: • (DR 7) on page A-30 • PSQ 6 on pages A-39 & A-40	Discussion needed.			
15.	Page: 14 Section: 4.1 Line: 14	Text states, “Sampling every other month (bi-monthly) elsewhere (with a few exceptions) ensures that plume dynamics under ambient groundwater flow conditions are captured.” “Few exceptions” may be a little vague or lends to the idea of other monitoring schemes or timelines may be (more) viable in select locations for the intended purpose of capturing desired characteristics of the plume. If this is the case, either a brief explanation or a footnote, briefly explaining these “exceptions” may help clarify what they are. Otherwise, consider omitting “(with a few exceptions)” from the text.	See comment.			
16.	Page: 15 Section: 4.3 Lines: 5-6 2nd Paragraph	Add a brief discussion as to how the non-operating injection wells will be sampled – using the existing P&T down-well configuration or will portable pumps be installed.	Explain how the injection wells are sampled.			
17.	Page: 16 Section: 4.3 Table :3	Edit the table to show that Dissolved Oxygen, pH, Specific Conductance, Temperature and Turbidity will be unfiltered measurements (UF).	See comment.			
18.	Page: 18 Section: 4.3 Table 3 Footnotes	Table 3, footnote “e” states sampling of aquifer tubes will be performed monthly as river levels permit. Are the selected AQTs all known to be functional? If not, incorporating the draft *ISRM Rebound Plan*, Table 3, Footnote “c” into the sentence.	Consider adding the contents of Footnote “c” Table 3 from the draft *ISRM Rebound Plan* into the footnote.			
19.	Page: 18 Section: 4.3 Table 3 Footnotes	Table 3, footnote “f” states those wells will be sampled at a frequency of every 3-month and if concentrations are below 10 µg/L for 2 sampling events then sampling for these wells will cease. Pondering this, seems that one would want to collect one final sample from these well prior to the end of the study regardless of the first two sampling results. With that in mind why not just switch these four wells to quarterly sampling to simplify the field sampling needs and to get an end of study sample.	See comment.			

O/C = open or closed

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20.	Page: 21 Line: 4 Section: 4.4	QAPjP doesn't have an initial spelled-out term/phrase. It's also not mentioned anywhere else in the document, so the acronym form wouldn't be necessary.	Spell out QAPjP and only use the acronym if the term will be brought up again later in the document.			

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