STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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July 3, 2019

19-NWP-105

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 (Ecology) Comments on the *Well Installation Sampling and Analysis Plan for 100-HR-3 Groundwater Operable Unit, DOE/RL-2019-15, Draft A,* received June 18, 2019, for the Initial 45-day Comment Review Period

Reference: See below

Dear William F. Hamel:

In accordance with the *Tri-Party Agreement*, Section 9.2.1, Ecology has completed our review of the referenced document. Enclosed are our comments.

We are submitting a copy of the Review Comment Record to the Administrative Record, in accordance with the *Tri-Party Agreement,* Section 9.4.

If you have any questions, please contact me at kim.welsch@ecy.wa.gov or (509) 372-7882, or Brian Johnson, Environmental Specialist, at brian.johnson@ecy.wa.gov or (509) 372-7908.

Sincerely,

Kim Welsch
Acting Environmental Restoration Project Manager
Nuclear Waste Program

bj/aa
Enclosure

Reference: Letter 19-SGD-0030, dated June 11, 2019, "Well Installation Sampling and Analysis Plan for 100-HR-3 Groundwater Operable Unit, DOE/RL-2019-15, Draft A"

cc: See page 2

cc electronic w/enc:
Dave Einan, EPA
Steve Balone, USDOE
Mike Cline, 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 Luttrell, Ecology
Nina Menard, Ecology
Kim Welsch, Ecology
Environmental Portal
Hanford Facilities 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 w/o enc:
Matt Johnson, CTUIR
Jack Bell, NPT
Alyssa Buck, Wanapum
Laurene Contreras, YN

Review Comment Record (RCR)

# 100-HR-3 Drilling SAP DOE-RL-2019-15, Draft A, Document Working Comments

| Tracking_ID | Chapter | Section | Page_Num | Line_Num | Table_Figure | Comment_Basis | Modification_Needed |
|---|---|---|---|---|---|---|---|
| | General | Table of Contents | vii | | | A Table 1-2 is listed in the table of contents, but Table 1-1 is not listed. | Correct this. |
| | 1 | 1 | 1-1 | 13-14 | | This states the SAP requires DOE and EPA approvals, and it will be provided to Ecology for review, comment and approval. A signature from Ecology is included on the Signature Page (iii), so should the sentence indicate Ecology approval is also required? | Add Ecology as an approver. |
| | 1 | 1.2 | 1-3 | | Figure 1-2 | The figure provided here is not consistent with the most recent figure provided in the most recent review draft of the RD/RAWP. | Replace this figure with the revised figure (1-11) in the RD/RAWP. |
| | 1 | 1.2 | 1-3 | 8-12 | | Hydrologic test results have provided additional information that is not indicated here. The draft A RD/RAWP includes additional information that may be important if further hydrologic characterization will be performed under any of the SAP addenda. The draft A RD/RAWP states the following (page 1-21):<br><br>Results from these investigations (pumping tests) include the following:<br>• Hydrologic continuity within the uppermost RUM aquifer is likely to extend on distance scales of ≥300 m (984 ft), and perhaps considerably more (SGW-60571).<br>• There is hydraulic communication between the unconfined and uppermost RUM aquifer through the intervening RUM confining layer (SGW-47776 and SGW-60571). | Consider including the information cited from the draft A RD/RAWP. |
| | 1 | 1.2 | 1-4 | 1 | Figure 1-3 | The fuel storage basins are not apparent on the map. | Show the fuel storage basins on the map. |
| | 1 | 1.2 | 1-4 | 4-6 | | The text makes reference to DOE/RL-2017-66, *Hanford Site Groundwater Monitoring Report for 2017* as the source of identifying contaminants of concern in groundwater. This is not an appropriate document to cite for the COCs; the ROD (EPA et al., 2018, *Record of Decision Hanford 100 Area 14 Superfund Site 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units) is the appropriate citation.* | Cite the ROD as the source that identifies the contaminants of concern for the 100-HR-3 OU. |
| | 1 | 1.2 | 1-3, 1-4 | 16, 1-3 | | The text identifies "Areas suspected as having source material remaining in the lower vadose zone." No further information is provided regarding these sites. It is unclear whether additional drilling and sampling is planned for these areas, or if this is provided just as background information on source locations. These are not identified for further investigation in the RD/RAWP. | Provide clarification whether additional characterization is planned at these sites. |
| | 1 | 1.2 | 1-4 | 3 | | The text identifies the 100-D-100 and 100-D-30/104 wastes sites. If 100-D-30 and 100-D-104 are separate sites (as it shows on the map), please identify them separately. | Identify these waste sites separately as follows: 100-D-30 and 100-D-104. |
| | 1 | 1.2 | 1-4 | 20-22 | | Text states, "The RD/RAWP also describes the data quality objective (DQO) process for investigation of the extent of contamination in the first water-bearing unit of the RUM aquifer, in support of remedy design and implementation for the deeper water-bearing units." It is unclear how the scope of that DQO process applies to work beyond the 12 wells identified therein (which have been installed or are in process). If that DQO does identify objectives/activities to be conducted under this SAP, that needs to be made clear. Also, this SAP is insufficient in that it does not include several elements of hydrogeologic characterization that are identified in the DQO. This all needs to be clarified. | Clarify how the DQO process for the RUM and MNA provided in Appendix B of the draft RD/RAWP relates to or defines objectives for this SAP. Include in this SAP all the elements defined in the DQO if it does apply. |
| | 1 | 1.2.1 | 1-5 | 8-9 | | This states, "In addition, elevated Cr(VI) has been identified in the RUM aquifer." This does not provide the relation of these elevated levels to cleanup levels. | Please clarify that the Cr(VI) levels in the RUM are also above the cleanup levels as defined in the ROD.1.2.4 |

# 100-HR-3 Drilling SAP DOE-RL-2019-15, Draft A, Document Working Comments

| Tracking_ID | Chapter | Section | Page_Num | Line_Num | Table_Figure | Comment_Basis | Modification_Needed |
|---|---|---|---|---|---|---|---|
| | 1 | 1.2.4 | 1-5 | 37-38 | | This states that technetium-99 is being monitored in the area. It would be helpful to state this has been added to the groundwater sampling plan and cite that reference. | State that technetium-99 has been added to the Sampling and Analysis Plan, and cite the reference and TPA CN. |
| | 1 | 1.3 | 1-6 and 1-7 | | | It is not clear in this section if there are data needs associated with hydrogeologic characterization, and what they may include. Discuss hydrogeologic data needs associated with achieving the goals of the RD/RAWP. | Provide a discussion of hydrogeologic data needs associated with achieving the goals and objectives in the RD/RAWP. |
| | 1 | 1.4 | 1-7 | | Table 1-2 | The "Inorganics" section of the table lists ammonia, anions and cyanide in the header, but then only includes specific analyte information for the anions (chloride, fluoride, nitrate, phosphate and sulfate). Please include the missing information for ammonia and cyanide. | Include the information for ammonia and cyanide within the table. |
| | 1 | 1.4 | 1-7 | | Table 1-2 | For technical accuracy, add "(total)" to "Uranium". This revision will make the information consistent with Table 2-3. | Revise "Uranium" to "Uranium (total)". |
| | 2 | 2.1.1.1 | 2-1 | 28-31 | | The text fails to state that Ecology also has approval authority of this SAP. | Include text to state that Ecology also has approval authority of this SAP. |
| | 2 | 2.1.1.14 | 2-4 | 28 | | The text is referencing an incorrect document number for HASQARD. It should be DOE/RL-96-68. | Revise the document number for HASQARD to DOE/RL-96-68. |
| | 2 | 2.1.2 | 2-5 | | | A reference to a DQO process and documentation for the work included in this SAP is not provided (with the exception of the RUM investigation). Data objectives, quality, and criteria are discussed in the SAP, but the basis for these as determined through a DQO process and documented in a report is not provided. | Provide the reference to the DQO process and documentation for the activities performed under this SAP. |
| | 2 | 2.1.6 | 2-9 | | Table 2-2 | Please edit footnote "a" as shown:<br><br>a. Consistent with DOE/RL-96-68 and Sections 9.3 of the Tri-Party Agreement Action Plan and 12.4 of Ecology et. Al., 1989b. | Edit footnote "a". |
| | 2 | 2.1.6 | 2-10 | 11-12 | | The text states, "The laboratory is responsible for maintaining, and having available upon request for a period of 2 years, the following:" Please provide a reference which dictates a limitation of 2 years for the listed documentation. | Provide a reference which states that laboratories only must have the requested records for a period of 2 years. |
| | 2 | 2.2.3.1 | 2-12 | | Table 2-3 | The first "Inorganics" section of the table lists ammonia, anions and cyanide in the header, but then only includes specific analyte information for the anions (chloride, fluoride, nitrate, phosphate and sulfate). Please include the information for ammonia and cyanide. | Include the information for ammonia and cyanide within the table. |
| | 2 | 2.4.3 | 2-24 | 40-42 | | This states, "Results of the DQA or DQI processes will be used by the contractor OU Technical Lead to interpret the data and determine if the DQOs for this activity have been met." It is not clear what "this activity" refers to in this sentence and context. | Clarify what "this activity" means and provide the reference to the DQOs mentioned here. |
| | 3 | 3.2 | 3-1 | | | See previous comment for Page 1-4, lines 20-22. The DQO, Appendix B of the RD/RAWP, included more specific sampling and analysis requirements than does this SAP (if applicable). This SAP should address the data needs identified in the RD/RAWP. | Include the planned work from the RD/RAWP in this SAP. Review and make sure the data needs identified in the RD/RAWP associated with drilling and well installation are included in this SAP. |
| | 3 | 3.2.1 | 3-1 | 27-31 | | The text states, "Geologic soil "grab" samples will be collected during borehole installation to total borehole depth but will not be analyzed under this SAP. These samples will be archived for future analysis if data needs are identified." If these specified soil samples are not the ones that are intended to be analyzed, please explain which soil samples will be characterized in support of this SAP, as it is not clear. Furthermore, explain the data needs that may arise in order to require the analysis of these specified geologic soil "grab" samples. | See comment. |

# 100-HR-3 Drilling SAP DOE-RL-2019-15, Draft A, Document Working Comments

| Tracking_ID | Chapter | Section | Page_Num | Line_Num | Table_Figure | Comment_Basis | Modification_Needed |
|---|---|---|---|---|---|---|---|
| | 3 | 3.2.1 | 3-1 | 30-31 | | It is unclear what is meant by "contamination" in the sentence or how the contamination is determined. (Whether this is defined in procedures). It is not clear which samples will not be collected if contamination is observed (just the contaminated interval(s) or the entire borehole). | Clarify the basis for identifying the contamination and how contamination will be determined. Clarify what grab sample(s) will not be collected if contamination is identified. |
| | 3 | 3.2.1 | 3-1 | | | The text does not indicate that aquifer sediments will be collected for chemical analysis. The previous SAP included these as well as samples for permeability. | Confirm that sediments will or will not be collected for chemical analysis or permeability analysis, and if so state that they will be. |
| | 3 | 3.2.2 | 3-2 | 3-4 | | The text states samples will be collected "to confirm ambient chromium concentrations, develop a baseline chromium concentration..." It is unclear what is meant by "ambient chromium concentrations." The word "ambient" may be misleading. Baseline concentrations/conditions are generally developed with data obtained from properly constructed wells using routine sampling procedures. | Clarify what is meant by "ambient chromium concentrations" and remove the following: "...develop a baseline chromium concentration within the aquifer in the vicinity of the new well..." |
| | 3 | 3.2.2 | 3-2 | 5-6 | | The text states that "Samples will be collected if the need is determined during development of the addenda." It is unclear in what situation samples would not be collected since the objectives of the SAP include "Determine the vadose and groundwater contaminant levels." | Clarify why samples would not be collected, since the objectives of the SAP include "Determine the vadose and groundwater contaminant levels." |
| | 3 | 3.2.2 | 3-2 | 6-7 | | It is not clear what decision criteria will be used to determine whether the well will be appropriate for extraction or injection purposes. The text under "Borehole Drilling" (line 18 on this page) seems to suggest that the purpose of the wells will be determined before drilling the well. For example, drill depths and casing size needs to be considered. | Discuss the criteria that will be used to determine whether the well will be appropriate for extraction or injection purposes. Clarify whether the purpose of the well(s) will be determined prior to drilling, or criteria on which to base the decision. |
| | 3 | 3.2.2 | 3-2 | 10-12 | | The plan says samples will be collected and the data will be used to evaluate water quality concerns, the aquifer connection to the river, and potential connections between wells. It is unclear what the plan means by "water quality concerns." | Clarify what is meant by water quality concerns. Specifically, how this supports the objectives stated previously. Perhaps replace "water quality concerns" with "contaminant concentrations." |
| | 3 | 3.2.5 | 3-2 | 25-26 | | The text states, "Surging will continue until the well ceases to exceed this rate of settling and turbidity has decreased to ≤5 nephelometric turbidity units (NTUs)." Please explain if turbidity is the only field measurement which has a predetermined criteria that must be met prior to stopping surging. The other field measurements for this SAP are dissolved oxygen, oxidation-reduction potential, pH, specific conductance and temperature. | See comment. |
| | 3 | 3.2.3 | 3-2 | 29-30 | Table 3-1 | The data needs discussed in the text is not consistent with the information summarized in the Table 3-1. See specific comments on the table. | Clarify the text and table content to be consistent. |
| | 3 | 3.2.5 | 3-2 | 39-40 | | The previous SAP included that variances will be obtained from Ecology if the completion varies from WAC 173-160. Any well completion that varies from WAC 173-160 standards will require Ecology review and variance. | Include a statement that variances will be obtained from Ecology. |

# 100-HR-3 Drilling SAP DOE-RL-2019-15, Draft A, Document Working Comments

| Tracking_ID | Chapter | Section | Page_Num | Line_Num | Table_Figure | Comment_Basis | Modification_Needed |
|---|---|---|---|---|---|---|---|
| | 3 | 3.2.5 | 3-3 | | Table 3-1 | General: It would help to clarify the table if another column was inserted to identify the unconfined and one to identify the RUM. Additional comments for each column are provided below.<br><br>Well Type: the row for "Monitoring semiconfined to confined aquifer" (RUM) does not include extraction/injection. To be complete and to address all future wells, extraction/injection should be included.<br>Grain Size: The SAP does not indicate if any of the aquifer sediments will be collected with split spoon or other core method.<br><br>Vertical Permeability: Plan does not state the means of collecting the sample for "vertical permeability" from the RUM.<br><br>Vertical Hydraulic Conductivity: It is unclear what this means; e.g., what test method would be used. Clarify if this is an in situ test such as a slug test.<br><br>Soil Chemical Properties: This refers to samples collected through the waste site or expected zone of contamination. It is unclear where these boreholes would be drilled. It is also not clear how these samples will be collected, whether grab samples or split spoon or other. It is not clear if the soil chemical properties will be determined at locations other than waste sites.<br><br>Groundwater During Drilling: No information is provided on the method of sample collection. | See the specific comments.<br>General: Insert a column with row titles for unconfined and RUM aquifers.<br><br>Well Type: Include extraction/injection for the RUM wells if there is a possibility these type wells would be installed in the RUM.<br><br>Grain Size: Provide how the samples for these tests will be collected.<br><br>Vertical Permeability: Provide the means of collecting and analyzing these.<br><br>Vertical Hydraulic Conductivity: Discuss how this is determined; i.e., what test method would be used. Clarify if this is or is not a slug test.<br><br>Soil Chemical Properties: Discuss what type of sites these would be drilled in, and how the samples will be collected. Discuss soil chemistry samples collected other than at waste sites.<br><br>Groundwater During Drilling: Provide how the samples will be collected. |
| | 3 | 3.2.5 | 3-4 | 24-25 | | It may be unclear what is meant by "screen infill." Clarify this is sediment entering the well screen and settling in the tail pipe. If there is any maximum amount of infill that is allowed before a well would be considered unfit for use, provide that. | Provide what is meant by "infill." Provide if there is a maximum amount allowed before a well would be considered unfit for its intended use. |
| | 3 | 3.3 | 3-7 | 3-10 | | Specific sampling methods that would apply to all future addenda should be provided here. For example, how often and what type of field screening measurements are taken, how soil (grab) samples are collected, what specifically is meant by "borehole sampling," how core samples will be collected (e.g., split spoon, method of obtaining the sample, maintaining sample integrity, preserving), and specific information on groundwater sampling (open casing or temporary screen, bailing, etc), and frequency and use of water level measurements. | See comment for additional information to provide in this SAP that does not need to be repeated in the addenda. |
| | 3 | 3.3 | 3-7 | 11-32 | | It is unclear whether this is collection of samples from completed wells or samples collected from boreholes during drilling. | Clarify the condition of the well or borehole for the sample collection discussed here. |
| | 3 | 3.3 | 3-7 | 27-28 | | Be consistent in this SAP with the recent decisions regarding unfiltered samples. This should be clarified for the hex chrome samples. | Review, and clarify that samples collected for hexavalent chromium will be filtered. |
| | 3 | 3.3.3 | 3-8 | 31-35 | | The information provided in this section applies to drilling equipment, not pump decontamination. It seems a paragraph on pump decontamination is missing and the heading of this section is miss-titled. | Provide information on pump decontamination and remove the subsection 3.3.3 heading. Subsection 3.3.4 will become 3.3.3. |

# 100-HR-3 Drilling SAP DOE-RL-2019-15, Draft A, Document Working Comments

| Tracking_ID | Chapter | Section | Page_Num | Line_Num | Table_Figure | Comment_Basis | Modification_Needed |
|---|---|---|---|---|---|---|---|
| | 3 | 3.3.4 | 3-8 | 37-38 | | The text states that "Alpha and beta/gamma data collection in the field will be used as needed to support sampling and analysis efforts." It is unclear whether this means instrument measurements or how this data collection will support sampling and analysis efforts. State if this assists field personal to identify contaminated sediments for sample collection or if the purpose is for health and safety. | Clarify how the alpha and beta/gamma data collection will be used. State if the purpose is for health and safety monitoring. |
| | 3 | 3.3.4 | 3-9 | 1-18 | | This list seems to be information that would be provided in operating procedures and may not need to be repeated here. | Consider whether this list needs to be provided here. |
| | 3 | 3.6 | 3-11 | 14-16 | | This states, "If the sample data did not trend with the other data or data were not as expected, the data from the sample would be flagged accordingly." This statement seems to presume that these results would in all cases be invalid, but this cannot be presumed without appropriated review processes. | Remove the sentence. |
| | 3 | 3.6.3 | 3-12 | 24-25 | | This states "If anomalies are found, samplers should inform the SMR group so special direction for analysis can be provided to the laboratory if deemed necessary." Anomalies with samples should be documented in accordance with procedures. The term "should inform" is not consistent with a requirement to document the anomalies. | Correct this sentence to reflect procedural requirements to document sample anomalies. |
| | 5 | 5 | 5-1 | 12 | | This states "Site-specific health and safety plans will be used to supplement the general health and safety program." There should be site-specific health and safety plan(s) for this work. If so, reference them here. | Provide reference to site-specific health and safety plans associated with the work in this SAP. |