



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
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June 6, 2023

VIA ELECTRONIC MAIL

Mr. Roger B. Petrie
 Federal Facility Agreement Manager
 Oak Ridge Office for Environmental Management
 Department of Energy
 Post Office Box 2001
 Oak Ridge, Tennessee 37831

Dear Mr. Petrie:

The U.S. Environmental Protection Agency has completed review of the *Fiscal Year 2023 Phased Construction Completion Report for the Oak Ridge Reservation Environmental Management Waste Management Facility* (DOE/OR/01-2941&D1) received by EPA on March 27, 2023.

This document is intended to convey the fiscal year 2022 status of operations, land use controls, environmental monitoring, and capacity assurance for the Environmental Management Waste Management Facility (EMWMF) and to evaluate the performance of EMWMF consistent with applicable or relevant and appropriate legal requirements.

Comments are attached and must be resolved before a revised document is submitted.

If you have any questions or concerns regarding this matter or require additional information, then please contact me at (404) 562-8550, or electronically at froede.carl@epa.gov.

Sincerely,

**CARL
 FROEDE**

Digitally signed by CARL
 FROEDE
 Date: 2023.06.06
 12:31:15 -04'00'

Carl R. Froede Jr.
 Senior Remedial Project Manager
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Received 06/06/2023

EPA comments on the *Fiscal Year 2023 Phased Construction Completion Report for the Oak Ridge Reservation Environmental Management Waste Management Facility (DOE/OR/01-2941&D1)*

General Comments

1. The DOE is currently out of compliance with Resource Conservation and Recovery Act (RCRA) Part 264.97 and the associated RCRA Detection Monitoring requirements defined by EPA regulations under 40 CFR Part 264.98. Both RCRA requirements are identified in the EMWMF ROD as applicable or relevant and appropriate requirements (ARARs) for groundwater monitoring at the EMWMF:

The RCRA regulations at Part 264.97(a) state “The ground-water monitoring system must”:

- (2) – Represent the quality of ground water passing the point of compliance.
- (3) - Allow for the detection of contamination when hazardous waste or hazardous constituents have migrated from the waste management area to the uppermost aquifer.

The existing groundwater detection monitoring network around two sides of the EMWMF does not adequately address the two RCRA regulations cited above. The DOE should submit Federal Facility Agreement (FFA) milestones for the installation of two additional groundwater monitoring wells along the southwestern side of the landfill in FY2023. The northeastern side of the EMWMF currently has one monitoring well which is insufficient to meet the RCRA groundwater monitoring requirements. The DOE should propose specific locations and set FFA milestones for additional northeastern monitoring wells to complete the RCRA-required perpetual groundwater monitoring requirements for the EMWMF.

2. The PCCR indicates additional monitoring wells will be installed to the west of the Environmental Management Waste Management Facility (EMWMF). According to Figure 16 (Generalized directions of groundwater flow in the uppermost aquifer during wet-weather/high-flow conditions [February 2022]) and Figure 17 (Generalized directions of groundwater flow in the uppermost aquifer during dry-weather/low-flow conditions [August 2022]), groundwater beneath Cell 6 flows offsite to the north of the only monitoring well (GW-961) located along the western edge of the EMWMF area. Cell 6 has been active since 2018, so additional wells to the west should be installed to monitor if any hazardous constituents enter the upper aquifer in this area.

3. The PCCR does not include all of the data collected during fiscal year (FY) 2022, and it is unclear where this information is documented. Section 3.7.1 (Landfill Wastewater) states that contact water was collected, analyzed, and released to the Sediment Basin as the samples met discharge limits, but information regarding the number of samples collected during FY2022 is not specified, and it is unclear where the full set of data are documented as only maximum concentrations are listed in Table 6 (FY2022 contact water characterization results for key COCs) and Table 7 (FY2022 annual COC extended list contact water characterization results). Please revise the PCCR to provide (e.g., as appendices) the FY2022 data discussed or include references to where the results are documented.

4. Supporting information for the inspections performed during FY2022 is not included or referenced in the PCCR. For example, Section 3.8.7 (Erosion and Sediment Control) notes that inspection and maintenance of the erosion and sediment controls are used to minimize sediment and color in Bear Creek, but results of the inspections and any necessary maintenance activities for the erosion controls are not discussed. In addition, Section 3.8.4 (Contact Water Management: Control of Contact Water Tank Discharge Valves) notes that there are daily and weekly inspection checklists for the contact water tanks, but a summary of these inspections is not provided. Please revise the PCCR to include

information for the inspections performed at the EMWMF.

5. Section 3.13 (Findings From 2021 Fifth Reservation-Wide CERCLA Five-Year Review) states that there were several operational issues listed in the Five-Year Review (FYR) and these are included in Section 3.14 (Conclusions and Issues) of the PCCR. Please revise the PCCR to clarify the operational issues identified in the FYR and include them as necessary in Section 3.14 of the PCCR.

Specific Comments

1. Section 2, PROJECT DESCRIPTION, p. 3. The text states:
“...and provides for the permanent disposal of radioactive, hazardous, and mixed waste from these cleanup projects.”

Comments:

- A. Please clarify the type/characteristics of the “radioactive” waste. Consider adding “Low-Level” before the word radioactive and briefly explain this specific type of waste. This will help the public better understand the nature of the radioactive waste being disposed in the EMWMF and minimize any possible misunderstanding.
- B. Following the words “mixed waste” add parenthesis and summarize what this waste constitutes. This is a primary Federal Facility Agreement document and should allow the public an opportunity to understand the waste types and forms being disposed in a perpetual care CERCLA landfill.

2. Section 2, PROJECT DESCRIPTION, p. 4. The text states:
“A revised SAP/QAPP will be prepared incorporating the resolved issues.”

Comment: This is too broad of a statement. The DOE should identify the issues that will need to be resolved (e.g., provide a table). The public must be made aware of the SAP/QAPP issues. Also, please add the timeframe when this will occur (e.g., “... the revised SAP/QAPP issues will be resolved before the FY2024 PCCR is issued”).

3. Section 2, PROJECT DESCRIPTION, p. 4. The text states:
“... the SAP/QAPP will be revised and approved as an appendix in FY2023.”

Comment: Several documents are listed so it is not clear to which the revised SAP/QAPP will be appended. Please clarify the text.

4. Figure 3, p. 8: A few features need to be resolved:
 - A. The “Sediment Basin” text is not located near the actual sediment basin. Please better collocate the text with the basin.
 - B. The “EMW-VWEIR” is a point in dry space. Add a dashed water line to show its ephemeral nature as it drains the sediment basin into Bear Creek.
 - C. The ephemeral creek rerouted around the top and right side of the EMWMF needs to be better defined as a blue line. The identification of the “EMWNT-03” surface water location is confusing in reference to surface water. Please add a water line – dashed as necessary.
 - D. Four rectangular water bodies are shown in the center of the figure without any label. What are they? If they are part of the EMWMF operations then they need to be identified.
 - E. This figure attempts to present too much information. The figure caption states “Layout of

the Environmental Management Waste Management Facility” yet instead of focusing on the EMWMF (and support facilities) it includes several former hazardous waste areas not related to the EMWMF and a Y-12 Material Storage Area. Please remove all of the information not directly related to the EMWMF and identify the features associated with the EMWMF.

5. Section 3.4, p. 11. The text states:

“An annual closure discussion is conducted with the Project Team.”

Comment: This statement is misleading and should be removed. The DOE can add the subject of a “Closure Plan Discussion” to a future EMWMF project team meeting agenda to validate this claim but EPA is unaware of this discussion in a formal manner from past project team meetings. Please document the agenda/meeting date in FY2022 when this discussion occurred in the DOE Response to Comments if DOE wishes to retain this statement.

6. Section 4, Page 35. The text states that the LUCs for EMWMF were in place and effective during FY2022; however, the text should note that some of the LUCs in Table 13 (Land use controls) will not be implemented until closure of the EMWMF (i.e., property record restriction, property record notice, and zoning notice). In addition, this section does not discuss how it was verified that the established LUCs were effective during FY2022 and if any corrective actions were needed for these LUCs (e.g., if signs were inspected and required maintenance). In addition, it is unclear if there were any permit requests that triggered the permits program LUC. Please revise Section 4 to discuss the LUCs that have been implemented and how it was determined that these controls were effective during FY2022, including any supporting documentation as necessary.

7. Section 5.2.1, p. 39. The text states:

“... three additional groundwater monitoring wells will be added on the west side of EMWMF (Sect. 5.2.5).”

Comment: Please update the text to indicate that two additional groundwater monitoring wells will be added and modify the text in Section 5.2.5 as appropriate.

8. Section 5.2.1, p. 41. The text states:

“NT-5 collects shallow groundwater along the western boundary of EMWMF, and EMWNT-05 is an appropriate detection monitoring location.”

Comment: The location of the EMWNT-05 surface water monitoring point along NT-5 is **over** 600 feet distant from the southwest side of the landfill. It does not meet the RCRA-specified groundwater monitoring requirements presented in General Comment 1. Therefore, remove the text stating that EMWNT-05 is “an appropriate detection monitoring location” and state that EMWNT-05 is a surface water sampling point.

9. Table 15, FY2022 groundwater detection monitoring dates, Page 42. This table lists multiple dates for sampling of EMWMF underdrain in the first, second, and fourth quarters of FY2022; however, it is unclear why multiple samples were collected at this location in the second and fourth quarters. As discussed in Section 5.2.2 (Groundwater Detection Monitoring Data Evaluation), resampling of the groundwater location EMW-VWUNDRDRAIN was performed in December 2021 to confirm or negate the elevated concentration of uranium-233/234 measured in November 2021 (i.e., the first quarter). It is unclear if a similar sampling was required in March 2022 (second quarter) and September 2022 (fourth

quarter). Please revise the PCCR to explain why additional sampling was performed at EMWMF underdrain in March and September 2022.

10. Section 5.2.2, Groundwater Detection Monitoring Data Evaluation, Page 44. The text states that the source of contamination at surface water location EMWNT-03A was determined to be an area near the Boneyard/Burnyard, but further information for this source area is not provided. It is unclear how the source area was determined to be present and where this information is documented. Please revise the text to provide a brief description of how the source of the surface water concentrations at EMWNT-03A was determined and/or include a reference to where this information can be found.

11. Section 5.2.2, p. 44. The text states:

“Station EMWNT-03A is not considered a suitable location to monitor for a potential release from EMWMF and will be replaced by a surface water station located closer to the landfill.

In conjunction with the quarterly surface water monitoring, surface water samples were collected from station EMWNT-03B (Fig. 11), the proposed replacement surface water station for EMWNT-03A. All results for the key COCs in surface water samples from EMWNT-03B are below TVs.”

Comment: Station EMWNT-03A (Fig. 3) is a surface water sampling point acknowledged by DOE as unsuitable for monitoring possible EMWMF contaminant releases to groundwater. Figure 11 does not show the location of EMWNT-03B nor does Figure 3. The location of EMWNT-03 in Figure 3 is approximately 300 feet northeast of the EMWMF and it does not meet the RCRA groundwater monitoring requirements conveyed in General Comment 1. A single groundwater monitoring well located at GW-916 does not meet the RCRA perpetual groundwater monitoring requirement along the NE side of the EMWMF. One or more additional groundwater monitoring wells will need to be proposed, approved and installed on the northeastern side of the EMWMF to meet the RCRA requirements specified in General Comment 1. The text should be revised to explain the current situation and outline the steps intended to install additional monitoring wells.

12. Figure 13, U-233/234 activity in samples from EMW-VWUNDRDRAIN and EMWNT-05, Page 45. The data presented in the two graphs cease at the end of 2021 and the graphs do not include the data collected in 2022. According to Table 15 (FY2022 groundwater detection monitoring dates), these locations were sampled three additional times in 2022 (i.e., February, May, and August). Please revise these graphs to include all of the results from the sampling performed in FY2022.

13. Section 5.3.2, Potentiometric Monitoring, Page 51, and Figure 15, Potentiometric surface and geologic buffer elevation comparison (FY2022 wet season), Page 53. Section 5.3.2 indicates the potentiometric surface of groundwater was compared to the geologic buffer surface; however, the depth of the geologic buffer within each cell is not provided. It is unclear how the potentiometric contours for the depth of the groundwater below the geologic buffer as depicted on Figure 15 were determined. It is also noted that the contours beneath Cells 4 and 3 are inconsistent at the border between the cells. For example, depths beneath the southeast corner of Cell 4 are -6 feet (beneath the bottom of the geologic buffer), while the depths along the corresponding southwest edge of Cell 3 are -12 feet. Please revise the text to discuss how the depth of the groundwater potentiometric surface beneath the geologic buffer was determined, including the depth of the geologic barrier (e.g., in feet above mean sea level) and any areas of inconsistency across the cells.

14. Section 5.3.2.2, Elevated pore water pressure in the vicinity of PP-01, Page 59. All pneumatic piezometers (PPs) are stated to be above the saturated zone except PP-08, but additional information for PP-08 is not discussed. It is unclear how it was determined that groundwater intrusion into the buffer zone did not occur at PP-08 if it is located within the saturated zone. Please revise this section to discuss the location and depth of PP-08 and how it was determined that groundwater remained below the geologic buffer at this location.
15. Section 5.3.2.3, Continuing evaluation of groundwater elevations, Pages 60 to 61. The locations of the 27 piezometers that measure continuous water levels are not provided (e.g., on a figure). For example, it is unclear where GY-012 and GY-018, which exhibited different responses to precipitation, are located. Please revise the PCCR to include the locations of the 27 piezometers that measure continuous water levels.
16. Section 5.3.3, Surface Water, Page 64. The third bullet point states that previous low levels of dissolved oxygen (DO) were measured during warm weather, but the five monthly samples that had low DO levels in FY2022 are not specified. Please revise this bullet point to specify when the low DO levels were measured in FY2022.
17. Section 5.3.3, Surface Water, Page 64. The fourth bullet point states that the pH of water closer to the convergence with NT-5 decreases, but it is unclear what data were used to determine the pH at this location. The text discusses monthly surface water sampling at EMW-VWEIR and EMWWMF underdrain only. Please revise the text to include the date and location of the pH data to support this statement of the decreasing pH values.
18. Figure 22, p. 67. A few features need to be resolved or deleted:
 - A. Either remove the polygon and “6 West” label in Cell 6 or explain its meaning and significance.
 - B. The V-Weir is identified in the “EXPLANATION” but not clearly identified in its location near the Sediment Basin. Please label the location of the V-Weir.
 - C. Recommend deleting the surface water ponds and stream on the NE side of the figure since they have no bearing on “Contact water and leachate sampling locations” at the EMWWMF.
 - D. Similarly, the NT-5 stream and unlabeled stream on the NW side of the EMWWMF should be removed.
 - E. The management and need “to transfer and discharge contact water” across the EMWWMF site is not presented [The text in quotes is found in Section 6 Conclusions]. Please show how contact surface water flow moves, is managed and is discharged across this area.
 - F. Clarify in this figure where leachate is managed and stored for tanker transport to clarify the conclusions text in Section 6.
19. Table 28, Summary of radiological results for surface water samples collected at EMW-VWEIR during FY2022, Page 68. It is unclear why alpha and beta activity were only analyzed twice, while the other isotopes had 65 analyses during FY2022. Please revise this table to explain the difference in the number of results for the isotopes.
20. Section 5.5, p. 72. The text states:

“Three new detection monitoring wells are planned for installation on the west side of the EMWWMF disposal cells and will be reported in a follow-on PCCR...”

Comment: The text should be changed to two new groundwater detection monitoring wells. The underlined text should be changed to “southwest side” based on the actual orientation of the EMWMF relative to “true north.” The public does not use “Plant North” in understanding the orientation of the EMWMF.

21. Section 6, p. 75. The text states:

“Three new detection monitoring wells are planned for installation on the west side of the EMWMF disposal cells and will be reported in a follow-on PCCR...”

Comment: The text should be changed to two new groundwater detection monitoring wells. The underlined text should be changed to “southwest side” based on the actual orientation of the EMWMF relative to “true north.” The public does not use “Plant North” in understanding the orientation of the EMWMF.

22. Appendix C, p. C-3. Clarification is needed regarding “closure activities” stated in the second paragraph. A list of specific closure activities should be included in this appendix. For example, the final cap installation, installation of the additional groundwater monitoring/detection wells, final long-term surface water monitoring locations, management of storm water/precipitation runoff, identification of the current contact/stormwater management facilities as compared to final EMWMF post-closure activities/facilities, etc. This additional information will identify the steps/issues that will need to be addressed moving the EMWMF from operations to post-closure perpetual care in the next few years.

(End of Comments)