



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
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December 1, 2022

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 *Field Sampling Plan for Baseline Groundwater and Surface Water Characterization at the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee* (DOE/OR/01-2812&D1) dated March 2019. The review of this document is now provided following the tri-party signed Environmental Management Disposal Facility (EMDF) Record of Decision (September 30, 2022).

This Field Sampling Plan (FSP) provides for baseline groundwater and surface water characterization across the EMDF site. It describes the objectives, requirements, and approach for collecting baseline data that will enhance the ability to evaluate groundwater and surface water compliance monitoring during operations and continue as the facility enters post-closure care.

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 R. Froede Jr.
Senior Remedial Project Manager
Restoration & DOE Coordination Section
Restoration & Site Evaluation Branch
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EPA Comments on the Field Sampling Plan for Baseline Groundwater and Surface Water Characterization at the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee (DOE/OR/01-2812&D1)

GENERAL COMMENTS

1. The eleven radionuclides proposed for baseline monitoring in surface water and groundwater (C-14, Cs-137, H-3, I-129, Sr-90, Tc-99, Th-228, Th-230, U-233/234, U-235, and U-238) are all either naturally occurring and/or fission products and known to be widely distributed in the environment, (but which could also be site related contaminants based on their concentration). EPA requests the following radionuclides be added because they are also naturally occurring but could also be site related: Cl-36, Ra-226, Ra-228, and Th-232. Additionally, EPA wants the DOE to sample at least once for all EMDF radionuclides that are not naturally occurring but which are known to have been used or generated during operations at the ORR, and which will be included in EMDF wastewater monitoring plan: Am-241, Co-60, Eu-154, Np-237, Pu-238, Pu-239/240.

2. The FSP does not discuss the rationale for the proposed locations of the monitoring wells and surface water locations for the baseline characterization. As noted in Section 2.2 (DQO Step 2: Identify the Goal of the Study), one of the study questions is to define an appropriate monitoring network for establishing baseline conditions. However, it is unclear how the proposed network was determined to be appropriate for the baseline characterization. The following issues should be addressed:
 - a. Section 2.1 (DQO Step 1: State the Problem) states that groundwater and surface water data of sufficient quality and quantity are needed to evaluate if upgradient contaminant sources are present; however, according to Figure 3 (Baseline monitoring locations) only one upgradient shallow groundwater monitoring well location (i.e., GY-021) is proposed. It is unclear why one location was deemed a sufficient quantity to characterize the upgradient groundwater quality and why a deeper (bedrock) groundwater monitoring well is not proposed. It is also unclear why upgradient surface water samples are not proposed to ensure a sufficient quantity of surface water data is collected. Please revise the FSP to include the rationale for the proposed upgradient sample locations, and ensure the FSP discusses how the proposed number of samples will be of sufficient quantity for the evaluation of whether potential upgradient contaminant sources are present.

 - b. The surface water samples shown on Figure 3 are located within two of the northern tributaries (NTs) (i.e., NT11 and NT10) on the west and east sides, respectively of the site. However, it is unclear why surface water samples are not proposed for Bear Creek (i.e., the downgradient boundary noted in Section 2.4 [DQO Step 4: Define the Boundaries of the Study]) or the tributary located along the eastern side of the site (i.e., D-10W). In addition, as noted in Section 1 (Introduction, page 3), the groundwater discharges along the NT valley floors where the water table is at or near the ground surface. Therefore, it appears this tributary could be impacted and baseline conditions should be assessed. Please revise the FSP to include the rationale for the number and locations of the surface water samples.

3. The FSP does not provide sufficient information how the baseline data will be used to determine upper threshold limits (UTLs). Section 2.5 (DQO Step 5: Develop the Analytic Approach) states that the baseline characterization data will provide the basis for establishing threshold/evaluation values; however, the text does not describe how these values will be calculated.

For example, it is unclear how UTLs will incorporate seasonal variability and how non-detections will be treated. Section 6 (Data Management and Assessment) states that low detection frequencies may lead to the use of project quantitation limits (PQLs) for the proxy UTL values, but it is unclear how many detections are needed for the UTL calculation. To ensure the proposed sampling will provide sufficient data for the calculation of UTLs, please revise this section to discuss how the threshold values will be determined.

4. The FSP does not specify the laboratory that will be used for the groundwater and surface water analyses. The laboratory should be identified prior to sampling to ensure the PQLs in Table 3 (Baseline characterization analytical requirements) and the quality control (QC) criteria in the Quality Assurance Project Plan (QAPP) can be achieved. Please revise the FSP to specify the laboratory and to provide the laboratory-specific information to ensure that the necessary PQLs and QC criteria can be met.

5. The FSP indicates that semiannual baseline characterization sampling will continue after the first year of quarterly sampling; however, it is unclear which quarters will be selected for the continued semiannual monitoring. For example, the quarter exhibiting the highest water table or highest concentrations could be selected for semiannual monitoring. Please revise the FSP to clarify how it will be determined which quarters will be used for the continued semiannual groundwater sampling.

6. The FSP does not include sampling for PFAS compounds. PFAS has been identified in contaminated media across the DOE Oak Ridge Reservation and should be included here to establish a baseline for both groundwater and surface water conditions before waste disposal occurs.

SPECIFIC COMMENTS

1. Section 1, Introduction, Page 3: The last paragraph on this page discusses the depth to groundwater and vadose zone thickness in relative terms, but the depth to groundwater at Site 7c is not specified. In addition, Section 2.4 (DQO Step 4: Define the Boundaries of the Study) refers to a shallow zone of saprolite and a deeper bedrock zone, but the hydrogeology at the site is not discussed. Since the proposed monitoring wells target shallow and deep groundwater zones, the hydrogeology should be described to support the proposed monitoring of both zones. Please revise the FSP to provide additional information for the depth to groundwater and hydrogeology at the site.

2. In Section 2.6, the last paragraph begins with the sentence “Where possible, threshold values will be calculated using UTLs for each COC in the proposed baseline monitoring wells.” If this proposed approach is determined to not be possible, then an alternative approach for determining threshold values will be needed. An alternative to this approach should be proposed in the FSP.

3. In Section 2.7, some rationale needs to be included for why proposed shallow wells GY-021 and GY-030 are not paired with a deeper monitoring well, unlike the remaining six well pairs. Absence of a paired deep well with GY-030 is especially concerning as this shallow well appears to be proposed for location in the Maynardville Limestone strike belt. This placement could be where significant bedrock groundwater contamination from any EMDF leakage would most likely be observed.

4. Figure 3, Baseline monitoring locations, Page 8: The figure Legend does not define the four outlined areas that are shown. Additionally, the blue colored outlined areas near NT-11, D-10W and NT-10 are not shown or defined in the Legend.

Furthermore, the figure does not include a north arrow for reference. Please revise Figure 3 to include this information and any other information necessary to understand the figure.

5. Section 3.1, Monitoring Network, Page 11: The text states that the downgradient wells installed in the Maynardville Limestone will obtain baseline data from an area noted to have “periodic plume extension” from the upgradient groundwater plumes migrating along Bear Creek; however, it is unclear what contaminants these upgradient plumes contain. Also, it is unclear how the future sampling results will be assessed if the plume extensions impact baseline values. For example, it is unclear if an additional downgradient well located closer to the EMDF or an additional upgradient well along Bear Creek would be useful. Please revise this section to discuss the contaminants in the upgradient plumes and how future sample results will be evaluated if the plume expansions impact the baseline characterization results.

6. The vertical separation between the base of the shallow well screen and the top of the paired deep well screen varies between different well pairs (refer to Table 1). There needs to be some discussion of the thinking that was used to propose the well screening depths of the well pairs.

7. Section 6, Data Management and Assessment, Page 23: The text under the subheading Data Validation states, “at least 10 percent (%) of the laboratory analytical results will undergo data validation in accordance with SMO Analytical Support Level 3 guidelines and procedures;” however, it is unclear what is included in this level of validation and how the 10% to be validated will be selected (e.g., randomly). Please revise this section to clarify what is included in a Level 3 data validation and how 10% of the data will be selected for validation.

8. Section 6, Data Management and Assessment, Page 23: The text discusses manual data entry into a pre-populated database and entry of data validation qualifiers into the database after data assessment, but it is unclear if the data entry will be verified for accuracy. Please revise Section 6 to indicate that all data entry into the database will be verified for accuracy.

(End of Comments)