STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Remediation - Oak Ridge
761 Emory Valley Road
Oak Ridge, Tennessee 37830

June 20, 2025

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

RE: TDEC Comments for the Remedial Design Report / Remedial Action Work Plan for K-31/33 Area Groundwater at the East Tennessee Technology Park, Oak Ridge, Tennessee, (DOE/OR/01-3001&D1)

Dear Mr. Petrie

The Tennessee Department of Environment and Conservation (TDEC), Division of Remediation, Oak Ridge (DoR-OR), received the above referenced submittal on March 27, 2025, as transmitted by the U.S. Department of Energy (DOE). TDEC reviewed the document in accordance with the Federal Facility Agreement (FFA) for the Oak Ridge Reservation (ORR).

TDEC provides the following comments and requests DOE schedule a meeting to discuss comment responses prior to submission of a D2. Questions or comments concerning the contents of this letter should be directed to Heather Lutz at 865-310-0474 or heather.lutz@tn.gov.

Sincerely

Randy C Young
FFA Project Manager
Division of Remediation – Oak Ridge Office

Enclosure

ec: Samantha Urquhart- Foster – EPA
Carl Froede – EPA
Erin Sutton – DOE
Mark McIntosh – DOE
Sam Scheffler – DOE
Tanya Salamacha- UCOR
Steve Conner- UCOR
Sid Garland- UCOR
Jared Brabazon- TDEC
Eileen Marcillo- TDEC
Heather Lutz- TDEC
Dana Casey - TDEC
ORSSAB
OREM Mailroom

xc: Wade Creswell - ORRCA
Amy Fitzgerald - ORRCA
Terry Frank - ORRCA
Warren Gooch - ORRCA

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General Comments:

1. **Determine whether a conceptual site model (CSM) revision is necessary to support the proposed Remedial Action Work Plan (RAWP) design based on property owner activities since the Record of Decision (ROD) publication.**
   Since the ROD signature, the property owner has been involved in large dewatering efforts for construction purposes. Please update the document text noting these activities and discuss how/if those activities may have altered (including temporarily) the original CSM for the area being addressed with this remedy. In the updated text, please specifically address:
   a. How those activities will be considered when planning the additional wells and assessing the efficacy of the current and proposed monitoring network intended to support this action.
   b. How flow direction may have changed during significant pumping events.
   c. Whether the infiltration of water during water management operations during construction modified previously expected flow directions. If so, elaborate on how.
   d. Whether additional significant pumping events are planned which could impact the remedy implementation. If so, elaborate on how.
   e. How can well placements manage this uncertainty, etc.

2. **Add clarifying text in the decision logic flow charts (Figures 5.3 and 5.4), and/or within the corresponding descriptive text (pages 5-14, 5-15, 5-16, 5-19) providing details on where and how the project team concurrence/agreements will be attained and memorialized in the administrative record**. These agreements should be defined in a primary document or similar record, that is able to be completed during the timeframe of the operation so that key decisions made by the tri-parties to support the remedy decisions are not lost over time.

   Specific areas of concern (AOCs) where agreements should be noted are shown in the flowchart at:
   a. The decision points labeled 'documentation points' in the SMP chart,
   b. The points defined as "modify monitoring program" or "implement contingency" in the monitored natural attenuation (MNA) decision logic, or
   c. In other key decision points where needed, including but not limited to 'Point 3' in the MNA decision logic figure, where a decision would be made to move from remediation to attainment portions of the remedy.

3. **Clarify guidance documentation references.**
   e.g., pages 5-9, 5-13, 5-14, figure 5.3, etc.
   This document repeatedly refers to "2014 Groundwater Restoration Completion Guidance." The reference section in the back of this document shows:

   > EPA 2014a. Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well, directive

9283.1-44, US Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington DC

EPA 2014b. Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions, Directive 9355.0-129, US Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington DC

The details in these reference documents are important to help provide clarity to questions about how evaluations will be completed. Please provide references that match the references in the back of the document or otherwise note/clarify that the statements in the text are intended to refer to one or both documents. These references are key to the data interpretation and should be easily identifiable to minimize potential uncertainty for the project team or other evaluators in the future.

Specific Comments

1. **Section 2.2, Topography, Geology, Soils, and Surface Water, page 2-5, 3rd paragraph**
   This section implies that epikarst is a predominant geologic feature in the K-31/33 area. Epikarst is defined in the referenced paragraph as a zone that "frequently supports a perched aquifer, serves to retard and store infiltrating rainwater, and is a key link to precipitation and transport of water to the deep aquifer." Information regarding perched zones, storage of infiltrating rainwater, and deep aquifer transportation mechanisms are not included in section 2.3 *Groundwater* and are not incorporated into the CSM in section 4.2. If epikarst as described in section 2.2 is indeed present in the K-31/33 area, please include all pertinent information regarding groundwater behavior relevant for remedy design in section 2.3 and update the CSM in section 4.2 as needed. If epikarst is not present in the K-31/33 area, then please revise section 2.2.

2. **Figure 2.7, page 2-13**
   Please confirm how the vertical gradients were calculated. The embedded figure title suggests it simply is the difference in head values between the well pairs. While this will indicate upward or downward flow, it will not provide the magnitude of the gradient. The vertical gradients could not be replicated because the data appear to be incomplete in OREIS.

3. **Section 5.1, Monitoring Well Network, page 5-1, last paragraph**
   The last sentence in this paragraph, "*With respect to the other 11 wells where MCLs were not exceeded*" appears to be incorrect. Text within this same paragraph identifies that the '11 wells' did have MCL exceedances. Please double check this text and revise or remove as necessary.

4. **Table 5.1, page 5-3, Well screen length for proposed bedrock well BRW-01.**
   This table shows a 20 feet (ft) well screen interval for BRW-01 and a 10 ft well screen interval for BRW-02. Confirm 20 ft screen length in BRW-01 and 10 ft screen interval in

BRW-02 and provide an explanation how the screen lengths/intervals are determined to support monitoring objectives.

5. **Section 5.2.1, Monitored Natural Attenuation Performance Monitoring and Decision Making, page 5-7, 4th paragraph. (*Same text is a*lso called out in last paragraph of page 5-13 referring to "delineation wells.")**
The text states that *"If an MCL exceedance is not reported in the first 4 samples from any new well, then it will no longer be included in future sampling at the site."* While the concept of four (4) non-detects in a well would trigger conclusion of remediation monitoring (and transition to assessment monitoring) within the established TMZ, TDEC disagrees with the approach to remove new wells from sampling after 4 events, even when below action levels.

   Page 5-5, 1st sentence of this document reads *"As a result of the August 28, 2024, DQO meeting and comments received from EPA and TDEC, DOE identified the need for more monitoring wells downgradient of wells with historical exceedances of MCLs. These new wells will help assess potential migration of contaminants..."* Since the intent of these additional wells is at least in part to confirm there is no migration of the constituents of concern from the impacted monitoring wells during the remedy implementation; then the decision to remove those newly installed downgradient wells from the sampling network prior to the removal of their upgradient 'source' wells, would be premature. Removal of the downgradient wells should be tied to the timing when the associated upgradient contaminated wells are also removed, not before. TDEC strongly recommends DOE not remove those wells from the sampling network after four (4) non-detects. The absence of contamination in downgradient wells provides beneficial information that can help DOE identify if MNA is occurring or whether contamination is simply migrating beyond the monitoring network.

6. **Table 5.4, page 5-8**
Please reconfigure this table to clearly identify which analytes will be sampled at each well. Even with the footnote, the table as currently drawn is hard to follow. Text on page 5-7 identifies that "TMZ and new wells will be analyzed for the metal, MNA, and gross alpha activity parameters listed in Table 5.4." Please reconfigure the table to ensure this table clearly captures the intended sampling expectations.

7. **Section 5.2.2, Surface Water Protection Performance Monitoring and Decision-Making, page 5-15.**
Please double check the table references within this section. Perhaps there are a few instances where Table 3.1 and Table 3.2 are mixed up. For example, the second sentence states that antimony and arsenic have surface water criteria greater than or equal to values shown in Table 3.2 the surface water criteria table. It appears that it should read the surface water criteria in Table 3.2 are higher than the groundwater criteria shown in Table 3.1.

8. **Section 5.2.2, Surface Water Protection Performance Monitoring and Decision-Making, page 5-15, 2nd paragraph:**
   This paragraph states that "A mean of the last 4 samples will be used to compare constituent concentrations..." Please clarify whether this implies a direct mean of the 4 raw concentration values or if it is instead referencing a mean test similar to the *2014 Groundwater Restoration Completion Guidance* (which includes the UCL 95 concentration statistics as addressed in the prior section).

9. **Section B.4.1.2, Bedrock Boring and Sampling, page B-21, 1st sentence**
   "...once the soil column has been collected from each borehole, where conducted, a temporary surface casing will be installed....."
   Confirm whether "where conducted" is the correct wording. Should this be "where required" or "if required based on surface conditions, to access bedrock"? Please clarify "conducted" or revise as appropriate.

10. **Section B.4.1.2, Bedrock Boring and Sampling, page B-21**
    Please include information outlining the procedure to differentiate between soil and weathered bedrock using the intended rotosonic drilling technique. Please identify how the top of rock will be assessed / documented in this formation?

11. **Section B.4.1.3, Borehole Geological Logging & Section B.4.2.5, Field Logs and Records, page B-21**
    Please include text to state that drilling logs/records shall include water used/injected and water recovered estimates during drilling as well as during well installation and well development activities. It will be imperative to demonstrate that the waters being sampled are not simply residual process water from drilling or installation, but rather truly reflect the aquifer conditions. Providing this information in drilling logs/records is an easy way to help make this determination.

12. **Section B.4.2.4, Well Development, page B-24**
    Similar to the request above, please include text in this section to state that the quantity of water injected during drilling and well installation shall be removed during well development, at minimum.

13. **Table B.9, Waste Forecast summary for K-31/K-33 Area sampling Activities, page B-34**
    The table identifies that the disposition of soil and rock cuttings from boreholes and rock cores are potentially planned for the "area of concern." Please provide more context and clarify the plan of disposition. Is it expected that cuttings will be spread on site (i.e., land apply at K-31/33) even though the property has been transferred to other owners?

14. **B-34 Waste characterization: Need specific wording to verify resolution of path for CERCLA contaminants and wastewater disposal for this project.**
Table B.9 and Section B.6.5 TREATMENT of the Field Sampling Plan for the K-31/33 MNA remedy implementation (the RDR/RAWP), identifies an estimated 20,000 gallons of drilling fluids, well development/purge water, and decontamination water going to the Chromium Water Treatment System (CWTS) or the Liquid and Gaseous Waste Operations (LGWO).

Section A4.1 of the ROD stated:

> Due to the relatively low contaminant concentrations in the groundwater, any wastewater (e.g., investigation-derived waste, decon water, well development, etc.) would not be Resource Conservation and Recovery Act of 1976 characteristic waste and would be sent to the existing treatment systems at ETTP (e.g., the Chromium Wastewater Treatment System) or an ORR-permitted wastewater treatment facility. Any wastewater will be characterized prior to treatment, and any treated wastewater would be characterized at existing treatment facilities to ensure all substantive discharge requirements would be met.

At the time the K-31/33 ROD and the Main Plant IROD were signed, the tri-parties agreed a wastewater disposal evaluation would be conducted in a post-ROD document for these projects. (This document is where a description of that disposal evaluation for K-31/33's COCs should clearly be described). This evaluation will determine whether the receiving facility can treat all the contaminants of concern in the wastewater and whether discharge limits are needed to be protective of the receiving streams.