



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
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June 29, 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 *RDWP/RAWP for the Groundwater Field Demonstration at the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (DOE/OR/01-2948&D1) received by EPA on May 9, 2023.

The Remedial Design Work Plan/Remedial Action Work Plan (RDWP/RAWP) addresses the specifics of the Groundwater Field Demonstration (GWFD) outlined in the Environmental Management Disposal Facility (EMDF) Record of Decision. The GWFD is designed to approximate the elimination of recharge to groundwater following construction of the EMDF specifically for the knoll area. While the GWFD is not part of the remedy it will inform the final EMDF design in the knoll area.

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.
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EPA comments on the *Remedial Design Work Plan/Remedial Action Work Plan for the Groundwater Field Demonstration at the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (DOE/OR/01-2948&D1)

General Comments

1. Per the *Record of Decision for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (DOE/OR/01-2794&D2/R2) dated September 2022, the overall goal of the Groundwater Field Demonstration (GWFD) is to determine the impact on long term groundwater levels given the reduction in recharge from the construction of the Environmental Management Disposal Facility (EMDF) Landfill. As such, the proposed temporary cap system, consisting of a 50-milimeter high density polyethylene (HDPE) geomembrane liner, is intended to mimic the impact to groundwater levels of completed landfill cells; however, it is unclear if this is appropriate considering a basis for this equivalency was not provided. A Hydraulic Evaluation of Landfill Performance (HELP) Model should be conducted, in accordance with EPA guidance (see <https://www.epa.gov/land-research/hydrologic-evaluation-landfill-performance-help-model>), to verify the temporary cover system's overall impact to groundwater would be similar to that of a proposed landfill cell. The RDWP/RAWP should be revised to provide the design basis supporting that the proposed temporary cover system is sufficiently equivalent to a constructed landfill cell for the purpose of this GWFD.
2. The GWFD is proposed to evaluate seasonal high groundwater levels at the projected depth of the base of the geologic buffer, but the RDWP/RAWP does not include information for the depth of the geologic buffer or the recent groundwater elevation data collected for all shallow piezometers within the proposed landfill area. Section 8.3 (Interpretation of Monitoring Results) notes that the existing potentiometric data monitoring during wetter periods demonstrated that the knoll area has groundwater above the preliminary design elevation of the geologic buffer; however, comparison of the existing potentiometric data and the design elevation of the geologic buffer is not provided to support this statement. Further, since the objective of the GWFD is to demonstrate that the seasonal high post-construction groundwater surface will be below the base of the geologic buffer, the RDWP/RAWP should provide the design elevations at all shallow piezometers within the proposed landfill as a reference to the groundwater elevations that the demonstration aims to achieve. Please revise the RDWP/RAWP to include the projected depths of the base of the geologic buffer at each shallow piezometer located within the landfill area and include recent potentiometric data for the same shallow piezometers.
3. The document references "sediment ponds" for the management of surface water/storm water from across the Environmental Management Disposal Facility (EMDF) groundwater field demonstration (GWFD) study site. These surface water retention ponds (Fig. 7, Fig. 13, Fig. 14, Fig. A.4., Fig. A.6., Appendix C) will continue to be used throughout the operational life of the EMDF. However, insufficient engineering/construction/operational information is presented. The volume of stormwater/surface water retention in each pond is not known. The design to route surface water to the sediment basins and the point of discharge for each pond is not clearly identified (e.g., ditch, pipe or culvert?). At what volume will the retained water be discharged? How will these water retention basins feed into Bear Creek? Will these "ponds" serve the same function as the sediment pond at the Environmental Management Waste Management Facility (EMWMF)? Will they be used to manage "contact water?" Will they be used to collect surface water/storm water runoff from around the Groundwater Field Demonstration (GWFD)/EMDF site? A new section specific to the two large

sediment/stormwater ponds must be added to the work plan to answer these questions and explain the expected function of these surface water retention basins not only for the GWFD but for the future operational life of the EMDF.

4. It is not clear how the GWFD topographic hill (capped by the GWFD impermeable cover system) with an approximate 70-ft elevational difference across the EMDF footprint can be used to define a groundwater elevation 15-ft beneath flat-lying waste cells and underlying geologic buffer (see EMDF Conceptualization in Appendix A, Figure A.6., p. A-14). Explain how the groundwater elevation under the GWFD surface can define the required 15-ft separation from the base of the hazardous waste to the base of the geologic buffer. Cross-sectional figures should be added to show how the waste cells/geologic buffer are projected relative to the GWFD surface (both north-south and east-west across the GWFD site).

5. The DOE plans to conduct various field activities in association with the GWFD and then share the results with EPA/TDEC in “Technical Memorandums.” While this is acceptable, the DOE is expected to share GWFD activity results with the EPA/TDEC project team members as soon as the data is available. This needs to be clearly stated in this document.

6. A potentially serious problem occurs in the current DOE EMDF conceptual design (Appendix A, Figure A.6., p. A-14) in addressing the required Resource Conservation and Recovery Act (RCRA) Part 264.97 and associated RCRA Detection Monitoring requirements defined by EPA regulations under 40 CFR Part 264.98. The EMDF ROD identifies these groundwater monitoring regulations as “action-specific” applicable or relevant and appropriate requirements (ARARs). DOE should integrate the RCRA requirements during the GWFD to plan for the future installation of the perimeter groundwater monitoring well network.

7. It is generally not necessary to repeat the ARARs in a post-ROD document. Review of this document has highlighted that some ARARs/TBCs may have been erroneously omitted from the EMDF ROD. Given the nature of the omissions from the ROD, it may be sufficient to note the omission in this workplan rather than require the submission of an ESD.

8. The RDWP/RAWP should add a section discussing precipitation monitoring. Precipitation monitoring may be very important in understanding the response of groundwater levels to precipitation events after the GWFD cover is installed. Based on text following Figure 3, some precipitation monitoring has already occurred. The RDWP/RAWP needs to describe such past monitoring, including identifying the location where it has occurred. The revised RDWP/RAWP will need to discuss the adequacy of monitoring to provide GWFD cover baseline precipitation monitoring information needed to fully assess the potential for unacceptable groundwater levels once the EMDF is installed. If there is any question about continued precipitation monitoring at an existing precipitation monitoring station, then a more suitable monitoring location(s) will need to be identified. Baseline precipitation monitoring should be ongoing. A lower annual or seasonal precipitation average during the planned groundwater level monitoring over two wet seasons may invalidate or otherwise be problematic for the planned GWFD cover evaluation. The possibility of having such atypically low precipitation during the groundwater level monitoring needs to be anticipated and a contingency monitoring plan or an adjustment to water level measurements to account for low precipitation years needs to be considered and proposed in the RDWP/RAWP as necessary.

9. Because the Environmental Disposal Management Facility Groundwater Field Demonstration scope

of work was not discussed/presented to the three FFA parties before the DOE submitted the RDWP/RAWP it does not include project specific data quality objectives (DQOs) for the data to be collected during the GWFD (e.g., groundwater elevation data, pumping test data, and rainfall data). It is unclear what level of data is necessary to achieve the goals of the demonstration and pumping test, and what decisions will be made based on the data. For example, Section 8.6 (Pumping Test) notes that manual groundwater level measurements will be collected as data validation for comparison to the transducer measurements, but acceptance criteria for this comparison are not specified. Also, it is unclear if manual groundwater elevations will be collected for all of the seasons (with the focus limited to the wet season). It is recommended that the RDWP/RAWP include the seven-step process in EPA's Guidance on Systematic Planning Using the Data Quality Objectives Process (QA/G-4) to describe how the GWFD data will be properly identified and used, if any decisions will be made based on the data (i.e., project "if..., then..." statements), and to establish the quality of data needed to achieve the study goals. Please revise the RDWP/RAWP to include project specific DQOs for the data to be collected under the GWFD.

10. The existing shallow groundwater piezometers with a seasonal high potentiometric surface higher than the projected bottom of the geologic buffer are inconsistently identified. Section 8.2 (Piezometers) identifies three shallow piezometers (i.e., GW-983, GW-989, and GY-020) with a groundwater elevation higher than the bottom of the geologic buffer, while Table 5 (EMDF average seasonal high and low groundwater elevations—shallow piezometers/GWFD area) lists a fourth piezometer (i.e., GW-990). Section 8.3 (Interpretation of Monitoring Results) states that the three piezometers with current (pre-construction) wet season groundwater elevations/potentiometric surfaces higher than the base of the geologic buffer will be used to determine appropriateness of the geologic buffer's preliminary design elevation, but GW-990 is not included in the discussion. Please revise the RDWP/RAWP to resolve this discrepancy in the number of piezometers that currently have seasonal high groundwater levels that exceed the projected bottom of the geologic buffer. Additionally, revise the RDWP/RAWP to include all applicable shallow piezometers in the determination of the seasonal high groundwater level relative to the base of the geologic buffer.

11. The surface water drainages NT-10, NT-11, Drainage (D)-10 West (W), and D-11 East are not shown on Figure 2 (EMDF area existing piezometers and other features) as referenced in Section 3.3 (Surface Water) and Section 4.1 (Overview and Design Approach). In addition, Section 3.3 discusses several seeps where groundwater discharge occurs; however, these seeps are not depicted on Figure 2. Please revise Figure 2 to show the drainages and seeps discussed in the text of the RDWP/RAWP.

12. Detail Drawings for key erosion and sediment control features are not included in Appendix C of the RDWP/RAWP. For example, Drawing C2E-OSWDF-I273 includes detail references for sediment fence, check dams, energy dissipation basins, inlet protections, etc. but, the detail drawings are not provided. In addition, Drawing C2E-OSWDF-I280 includes detail references for the storm flow interceptor, runoff control ditch, water-filled barrier, perimeter berm, and a cross section for spur road, but again no detail drawings are provided. Further, Section 6.5 indicates that straw wattles and construction exits will be installed prior to clearing and grubbing, but no detail drawings are provided for these features, and it is unclear where these design elements will be installed. Please revise the RDWP/RAWP to provide detail drawings for all key erosion and sediment control features associated with the GWFD and clarify exactly where each will be installed.

13. The RDWP/RAWP does not appear to include any specification requirements (i.e., weight, tensile strength, elongation at break, puncture resistance, tear resistance, woven versus nonwoven, etc.) for the

geotextile fabric to be used in the drainage controls. As such, it is unclear what kind of geotextile fabric will be used, and if it is appropriate. Please revise the RDWP/RAWP to provide specification requirements for the geotextile fabric to be used in the drainage controls.

14. The RDWP/RAWP does not provide a gradation requirement, or specify the Tennessee Department of Transportation (TDOT) class, for the riprap material to be used in drainage controls. Please revise the RDWP/RAWP to provide a gradation requirement, or specify the TDOT class for the riprap material to be used in drainage controls.

15. The RDWP/RAWP states, “Because this action consists of new construction in a clean area, verification, monitoring and operations, and maintenance plans are not required;” however, maintenance activities will be necessary during the GWFD period and should be detailed in the RDWP/RAWP. For example, inspections should occur following major precipitation events (with defined criteria), as well as semiannual site surveys to verify if the temporary cover has settled resulting in low spots that may collect water. Please revise the RDWP/RAWP to incorporate temporary cover maintenance activities including precipitation event inspections as well as semiannual site surveys.

16. It is understood that the GWFD will occur in an area that is not known to be impacted by site contaminants from past historical use; however, it is unclear if there are any radiological impacts to the soil present onsite, in the vicinity, or from the fill at the 7B borrow source, that must be considered during field compaction testing of backfill (which is assumed to be conducted with a nuclear density testing gauge). Please revise the RDWP/RAWP accordingly to indicate if any considerations need to be made during field compaction testing of backfill, or calibration of equipment, to account for potential radiological influences due to past historical aerial site releases.

Specific Comments

1. Acronyms, p. vii.:

A. For consistency add the effective date to the “Comprehensive Environmental Response, Compensation, and Liability Act” (of 1980) because the RCRA Act effective date is provided.

B. The acronym/term “ORRL – Oak Ridge Reservation Landfill” should be better defined by adding RCRA in parenthesis “Oak Ridge Reservation Landfill (RCRA).” This should prevent any confusion by the reader as to the onsite landfill (RCRA versus CERCLA) being referenced.

C. There is a typographic acronym error with the term “remedial action objective.” The correction should be “RAO.”

2. Executive Summary (ES), p. ix. The DOE has deviated somewhat from the groundwater field demonstration (GWFD) elements conveyed in the EMDF ROD (Section 2.14.4):

A. The “key elements” listed in this section are not consistent with those already agreed upon in the EMDF ROD (Section 2.14.4). The DOE should copy the original ROD text as much as possible to ensure the Remedial Design Work Plan/Remedial Action Work Plan (RDWP/RAWP) text is consistent with the ROD language.

B. The DOE identifies “sediment ponds” in reference to the “upgradient stormwater interceptor ditch.” These sediment ponds are not referenced in the EMDF ROD and should be identified in this summary section as new facilities necessary for the implementation of the groundwater field

demonstration (GWFD). Additional text should be added to explain the purpose of these features in relationship to the GWFD and future EMDF operations.

C. The paragraph beginning with “Existing shallow piezometers” eliminates important information conveyed in the ROD:

“Evaluation of the seasonal high water table of the uppermost aquifer, defined as the potentiometric surface based on the 80th percentile of water levels in the month with the maximum monthly median during the evaluation period (this may be thought of as the wettest month, where wettest refers to highest groundwater level and not necessarily the month with the most precipitation).” (p. 2-89; Underline added).

Comment: Change the text in the ES paragraph to be consistent with the text conveyed in the EMDF ROD (Section 2.14.4).

D. The text states:

“A Stormwater Management Requirements document will be implemented to protect surface water during implementation of this scope.”

Comment: The EPA has not been provided the *Stormwater Management Requirements for Groundwater Field Demonstration for the Onsite Waste Disposal Facility, Oak Ridge, Tennessee* [UCOR-5620] for review. Rather DOE has extracted portions of the UCOR document and included the information in Appendix C. The UCOR-5620 document must be reviewed by EPA before review of the RDWP/RAWP can be completed. Please provide it before the revised RDWP/RAWP is submitted.

3. Introduction and Purpose, p. 1, third paragraph. The first sentence references the term remedial action objective as “RAO.” Please change the acronym error in the list of Acronyms.

4. Introduction and Purpose, p. 2, second bullet. Reference is made to a stormwater flow diversion ditch. Is this a temporary or permanent feature? Please clarify the text.

5. Introduction and Purpose, p. 2, third bullet. Reference is made to stormwater controls:

“Installation of stormwater controls will be designed and incorporated into the GWFD to minimize impacts to the North Tributaries (NTs) and Bear Creek.”

Comment: Sediment ponds are mentioned but they are not technically defined with regard to stormwater controls/management. Additionally, nothing specific is mentioned in the document about storm controls for the North Tributaries (NTs) and Bear Creek. A new section should be added to the document that addresses stormwater management specifically for the NTs, Bear Creek, and possibly the sediment ponds. Provide any necessary text/figure(s) showing the management of surface water flow in relation to these features and describe the overall management of storm/surface water management.

6. Introduction and Purpose, Page 2. The second to last bullet point states that the amount of rainfall during the demonstration period will be compared to historical rainfall to determine if an adjustment is necessary, but historical rainfall data is not discussed (e.g., how and where this is measured, previous trends in rainfall amount, etc.). In addition, the text states that the representative criteria and adjustments will be determined by the Federal Facility Agreement (FFA) triparty technical team, but it is unclear when the criteria will be established and when this evaluation will be performed. Please revise the RDWP/RAWP to include information for the historical rainfall amount and include where the rainfall measurements are collected. Please also specify the criteria for determining that the demonstration period is not representative of historical rainfall or discuss when it will be established and evaluated.

7. Introduction and Purpose, p. 2, last sentence:

“Because fill material will be necessary to complete the GWFD, this RDWP/RAWP also includes development of the Site 7B Borrow Area, located adjacent to the GWFD site, as a potential fill source area.”

Comment: Later in the document we are told that a small storm water sediment basin will be constructed adjacent to this site. Although this is an introduction section, the information regarding the Site 7B Borrow Area should be complete regarding all of the activities associated with the GWFD. Details regarding the Site 7B Borrow Area storm water sediment basin dimensions, storage water volume, and discharge point could not be found in either the DOE *Phase 3 (Borrow Areas) Characterization Report for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (DOE/OR/01-2832&D1) or the *Remedial Design Report/Remedial Action Work Plan for the Environmental Management Disposal Facility, Oak Ridge, Tennessee: Early Site Preparation Activities* (DOE/OR/01-2934&D2). Please add the design/construction details necessary to the GWFD to convey specific activities that will occur at Site 7B.

8. Section 3.1, p. 5. The first sentence should reference Figure 7 (p. 18).

9. Section 3.2, p. 5, third paragraph. The text should be revised to indicate if the well pairs with upward hydraulic gradients have a consistently upward hydraulic gradient (this would then be consistent with the statement about consistent downward gradients in the second sentence of the paragraph). There should also be a statement in this paragraph about any well pairs where there are fluctuating upward and downward hydraulic gradients, including any comment about a seasonality to the orientation of such fluctuating gradients.

10. Section 3.2, p. 5, fourth paragraph. A new figure should be added (similar to Fig. 7) and referenced at the end of this sentence. A wet season piezometric surface map (plane view) should be superimposed on the topographic elevation contours to show how the surface of the groundwater follows elevation contours as is claimed in the text. The GWFD is being conducted to address this problem.

11. Section 3.2, p. 5, fourth paragraph, last sentence/Figure 3. This figure has no qualifiers to understand the changing groundwater elevation at each monitoring well. Please add the ground elevation in the appropriate matching color so that the reader can understand the groundwater changes relative to the corresponding ground surface.

12. Section 3.2, p. 7, Figure 3. The figure is titled “Seasonal change and response to precipitation in selected shallow piezometers.” Seasonal water-level elevational changes can be observed because the x axis of the figure gives measurement dates. The precipitation response cannot be observed because Figure 3 shows no precipitation data. It needs to be added to the figure or the figure caption should be changed to more accurately reflect the subject of the figure.

13. Section 3.4, p. 9, fifth paragraph, last sentence. The text states:

“Prior to performing construction activities, streams will be walked down and sensitive resources, including Tennessee dace, will be relocated.”

Comment: How will this “relocation” be performed? Please cite the appropriate U.S. Fish and Wildlife Service/State of Tennessee guidance document(s) describing how this activity will be conducted.

14. Section 4.1, p. 15, fifth paragraph. The text states:

“The preliminary design of the landfill liner system was based on groundwater modeling that takes into account a decline in shallow groundwater elevations from placing the impermeable liner system over the landfill area, eliminating localized recharge from precipitation. The landfill design assumed that without local recharge to the knoll, shallow groundwater elevations would decrease to levels similar to the elevations of NT-11 and NT-10, lower than the design base of the geologic buffer.”

Comment: No specific groundwater elevations are provided by DOE based on the “preliminary design of the landfill liner system.” However, since it is referenced as a specific target elevation in this paragraph it must be known by DOE (via groundwater modeling?) and it should be presented in this section. If there is more than one “target” groundwater elevation at the knoll then they should be identified and explained. Provide a table with the following groundwater elevations, 1) the anticipated final geologic buffer elevation at the knoll, 2) the present wet-weather groundwater elevation across the knoll, 3) the DOE modeled wet-weather groundwater elevation necessary at the knoll to maintain a 15-ft separation between the bottom of emplaced wastes and the seasonal high-water table of the uppermost unconfined aquifer, which includes 5 ft of liner system and 10 ft of geologic buffer, consistent with TDEC 0400-11-01-.04(4)(a)(2), and 4) the wet-weather groundwater elevation at the knoll corresponding to surface water elevations at NT-11 and NT-10. Having a table with these specific groundwater elevations will allow EPA to determine if the final design of the EMDF will need to be modified from the DOE modeled design based on the results of the GWFD.

15. Section 4.1, p. 15, sixth paragraph. The text states:

“As previously noted, the current peak groundwater elevations in the highest areas of the knoll are occasionally higher than the elevation of the base of the geologic buffer in the preliminary design (piezometers locations are shown in Fig. 7).”

Comments:

1. Please correct Figure 7 to show (by a different color) the specific groundwater monitoring wells that are “higher than the elevation of the base of the geologic buffer in the preliminary design.” That clarification will help the reviewer better understand the area of the knoll that has problems with elevated groundwater.

2. Figure 7 (p. 18). A solid gray line occurs offset from the GWFD cover on the southeast side. Hash lines occur between the GWFD cover and the gray line. Nothing is mentioned in this section of the GWFD about these features. The text should be revised to explain these features and the legend corrected to identify them.

16. Section 4.1, p. 15, seventh paragraph. The text states:

“The GWFD area is based on the current Phase 1 Preliminary Design layout of the landfill in the knoll area, including the associated berms.”

Comment: This sentence indicates DOE has based decisions on the GWFD design from this unreviewed document. Please provide this document to EPA for review as part of the review of the GWFD.

17. Section 4.2, p. 17, second full paragraph. The text states:

“The preliminary landfill liner system and geologic buffer design are above the elevation of the surrounding drainages, eliminating the potential for groundwater recharge from surface water and allowing groundwater beneath the disposal cells to stabilize to the adjacent tributary elevations. This design feature is not expected to change as a result of the GWFD. As a note, the base of the geologic buffer in the preliminary design was set 5 ft above the modeled post-construction seasonal high groundwater table to be more conservative.”

Comment: A table should be added showing these elevations and include the groundwater elevation in

relation to the final landfill bottom elevation at the knoll, the bottom elevation of the geologic buffer at the knoll, the groundwater position “set 5-ft above the modeled post-construction seasonal high groundwater table,” and surface water elevations at NT-11 and NT-10 adjacent to the knoll. Obviously, DOE has calculated the anticipated groundwater elevation values and those elevations should be part of this document to better understand the expectations of the GWFD.

18. Section 4.3, p. 17. The text states:

“Therefore, an alternative cover design was selected to simulate the effect of the landfill liner on groundwater in the knoll area by minimizing infiltration in the landfill disposal cell area.”

Comments:

1. The text preceding this sentence and cited text above are unclear whether the top of the knoll will be reduced in elevation (i.e., flattened) to the anticipated elevation of the base of the geologic buffer or some other elevation. Please clarify the text and provide an elevational cross-section showing the GWFD final design for the knoll, the location of the cover across the knoll area, and the projected location of the base of the geologic buffer if the knoll will not be flattened to that elevation.
2. The text states the alternative cover design was selected to simulate the effect of the landfill liner on groundwater in the knoll area by minimizing infiltration in the landfill disposal cell area; however, the performance metric or standard (i.e., hydraulic conductivity) the alternative cover design should meet to simulate the effect of the landfill liner is not discussed. Please revise the text to include a performance standard for the alternative cover to ensure the landfill liner is adequately simulated.

19. Section 4.3, p. 17. The text states:

“In addition, stormwater controls will be designed and incorporated into the GWFD to minimize impacts to the NTs and Bear Creek, such as construction of the sediment ponds that will also be used for landfill construction and operation (Fig. 5).”

Comment: Nothing in the D1 GWFD presents stormwater control information – when will it be added? The referenced “Fig. 5” is a map of the “EMDF natural resource evaluation and EMDF activities” and does not address stormwater controls or surface water management. While sediment ponds are shown in other figures (e.g., Fig. 7), there are no details regarding their capacity or where the storm water is discharged to Bear Creek. If the UCOR document (UCOR-5620) contains all of the information then it should be included as an appendix to this work plan and reviewed by EPA to determine its relevance and sufficiency in GWFD stormwater/surface water management. Please provide that document for review/comment before submitting the revised GWFD.

20. Section 4.4, p. 17. Several issues are identified in this section:

A. The text states:

“Upgradient stormflow also must be diverted and infiltration must be limited across the knoll area to approximate the effects from installation of the EMDF landfill liner system, resulting in anticipated higher stormwater flows and stream flow within the adjacent drainages.”

Comment: This statement references surface water/stormwater management. The details of this plan are not presented and must be added to the GWFD.

B. The text states:

“Wetlands will be avoided as much as possible along NT-11, but will be removed within D-10W...”

Comments:

1. Figure 5 should be cited and discussed since it identifies the locations of these wetlands relative to NT-11 and D-10W.
2. According to Figure 5 (p. 11), a portion of the wetland associated with D-10W underlies the EMDF waste footprint and berm. The wetland will be covered over (p. 12) but no details are provided to explain the steps necessary to stabilize the ground surface across this feature. Explain how the wetlands will be removed so the integrity of the EMDF waste footprint/berm will not be impacted by this wetland in the future.

C. The text states:

“...to provide a stable subgrade for the GWFD temporary cover, and eventually to place the eastern landfill berms.”

Comment: Reference is made to “eastern landfill berms” but they are not described in detail in the preceding section (4.3 GWFD Design) and they are not described in this section either. Where are the berm(s) described by engineered design or anticipated placement in details necessary to understand if they will function properly. These features are a major part of the GWFD and must be identified, structurally defined, and discussed to understand their role in surface water/stormwater management across the GWFD.

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

“Because this action consists of new construction in a clean area, verification, monitoring and operations, and maintenance plans are not required. GWFD activities will be performed under the purview of UCOR’s existing programs and procedures, including health and safety, quality assurance (QA)/quality control (QC), and waste management. In addition, GWFD activities will comply with environmental laws and regulations identified in the EMDF ROD as ARARs.

Comment: The GWFD is required under the CERCLA EMDF ROD. Therefore, DOE cannot claim the activities listed above as exempt from CERCLA-regulatory oversight. While no hazardous waste is expected in the construction activities the “existing programs and procedures” must be consistent with EPA guidance and policy. Where deviation from EPA guidance and policy may occur, the DOE will need EPA approval before any activities occur. The health and safety, quality assurance (QA)/quality control (QC), and waste management plans must be submitted and approved by EPA as part of the GWFD activities. Please provide a schedule in the revised GWFD when these documents will be submitted to EPA for review and approval.

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

“The *Stormwater Management Requirements for Groundwater Field Demonstration for the Onsite Waste Disposal Facility, Oak Ridge, Tennessee* (UCOR-5620) supports the GWFD clearing and grading activities and presents erosion and sediment control best management practices (BMPs).”

Comment: The DOE intends to use aspects of this stormwater/surface water management plan in the GWFD and for future EMDF operations. Therefore, this document should be reviewed/approved as part of the GWFD. Please submit this document for review/comment before the revised GWFD is provided.

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

“Sediment/erosion control measures will be designed in accordance with the guidance presented in the *Tennessee Erosion and Sediment Control Handbook* (TDEC 2012).”

Comment: These sediment/erosion control measures should be included in the GWFD. Sediment ponds, eastern landfill berms, and the various stormwater controls necessary to minimize impacts to the North Tributaries (NTs) and Bear Creek should be explained in detail (with figures as appropriate) and

included in this GWFD. Please address all of these missing components in the revised GWFD.

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

“Design drawings and specifications for the key design elements are provided in Appendix C. These include site grading, the upgradient stormflow ditch, and the temporary cover system. Field QCs are included with the specifications as appropriate.”

Comment: There is insufficient technical information provided in Appendix C specific to important engineered components of the GWFD. The sediment ponds lack specifics regarding water storage capacity, how surface water/stormwater will be diverted to them (ditch or culvert?) and where they will discharge into Bear Creek. Missing is all of the technical information about the “eastern landfill berms” a key component in directing surface water/stormwater from the top of the engineered cover over the knoll. A plan view drawing/figure should show the cut/fill footprint around the knoll created by reducing its elevation. How thick will the fill be and in what areas will it be emplaced? What other surface water/stormwater management features will be installed along NT-11 (and possibly D-10W) to manage the precipitation from the top of the engineered cover? The Borrow Area (7B) will have a small sediment basin constructed to manage surface water/stormwater but it is not addressed in Appendix C. All of these technical features and any others necessary for the GWFD should be addressed in the revised document.

25. Section 6.1., p. 21. Several issues are identified in this section:

A. The text states:

“Prior to construction of the GWFD design features, the initial stormwater controls will be installed.”

Comment: What are the specific initial stormwater controls?

B. The text states:

“...the existing grade in the GWFD area will be stripped to a depth of approximately 4 ft to remove unsuitable materials and provide a safe, stable working surface. Additional cuts will be required in certain areas to develop the appropriate grades (Appendix C).”

Comment: Appendix C does not provide a map showing the area to be stripped down four feet from the existing ground surface (the wording of the text is confusing). The areas with additional cuts are also not identified. Please provide a figure or drawing (plan view) showing the areas where soil will be excavated across the EMDF site and where soils may be spread and/or where clean fill will be added.

C. The text states:

“...this material will be stockpiled for later use as topsoil.”

Comment: Show the proposed location of the mixed colluvium and residual soil stockpile on a map and identify it.

D. The text states:

“The exact depth of stripping will be determined in the field based on the materials encountered, and could be increased in areas where organic, soft/saturated, and highly transmissive materials are present after stripping the upper 4 ft.”

Comment: The text is not clear if the entire area is regraded to the final depth of required soil stripping (to level the ground surface) or if isolated areas will be excavated deeper than the four-foot depth and remain holes across the ground surface. Clarify the text.

E. The text states:

“This material is also unsuitable for subgrade and will be stockpiled for later use as nonstructural fill material.”

Comment: Show the location of the organic, soft/saturated, and highly transmissive materials stockpile on a map.

26. Section 6.2, p. 22. The text states:

“The stormflow interceptor channel will be installed at the northern boundary of the GWFD and the D-10W diversion, which will convey flow to dual 48-in. culverts.”

Comment: This sentence is not clear. Is a stormflow channel being installed at the D-10W diversion ditch or across it to divert precipitation to NT-10 (see Fig 7)? Will two 48-in. culverts be installed along the purple line (see Fig 7) to discharge surface water/stormwater to NT-10 and NT-11? The diversion ditch is shown in Figure 7 as one long feature. Also, nothing is mentioned about the NT-11 Bypass Ditch which appears to discharge to one of the sediment ponds (this is not stated but inferred by the reviewer based on Fig 7 and Appendix C). Please clarify all of this in the revised text.

27. Section 6.2, p. 22. Several issues are identified in this section:

A. The text states:

“On the south side of the interceptor channel, the channel serves as an anchor trench for the north side of the GWFD cover system (Figs. 9 and 10).”

Comments:

1. Figure 9 - An examination of Fig 9 shows a gap between the diversion ditch and the GWFD cover. This is not consistent with the text. Please correct.
2. Figure 9/Appendix C – The diversion ditch along the northeast side of the GWFD cover appears to require elevation moving from the GWFD to NT-10. Will this require a buildup of the ditch between D-10W and the point of discharge at NT-10? If so, could this serve as a point of weakness in moving stormwater toward NT-10 and create a place where an erosional breach could form? Please explain.
3. Figure 9/Appendix C - Will the southeast side of the Douglas Cemetery adjacent to NT-10 need to be reinforced (sheet piling?) to prevent erosion of the hillside due to the addition of what could be significant volumes of surface water/stormwater from Pine Ridge and the top of the GWFD (and eventual EMDF)? The slope in the area of the cemetery appears susceptible to erosion. Please explain.
4. Figure 10 - Figure 10 needs to have the north and south sides of the diversion ditch labeled. The riprap on the side of the GWFD temporary cover does not extend to the top of the diversion ditch. This could serve as a point of erosion and weakness in linking the two engineered features. Explain in the text and show in this diagram how the DOE intends to stabilize this contact to ensure the integrity of the contact and overlap.
5. A figure should be added to show the anticipated surface water/stormwater discharge path along the northern diversion ditch – show the divide where surface water flows toward NT-11 and NT-10. Provide a table showing the amount of water that could be discharged both toward NT-10 and NT-11 for the “25-year 24-hour storm event with enough capacity to convey the 100-year 24-hour storm event.” This volume of water will have impact to both NT-10 and NT-11 and points downstream and DOE should explain how this volume of stormwater will be addressed along sensitive points of the two Northern Tributaries and Bear Creek.

B. The text states:

“Grading for the GWFD, and also for the future disposal cells, will cover the former D-

10W channel. Therefore, the D-10W headwaters will be diverted to NT-10.”

Comment: Consistent with the situation at the Environmental Management Waste Management Facility (EMWWMF), simply covering a former natural discharge channel (EMWWMF NT-4) did not eliminate its adverse impact to the EMWWMF. The NT-4 channel covered with soil at the EMWWMF later served to create unacceptable groundwater conditions beneath Cell 3 that required the eventual installation of a permanent underdrain. The DOE must explain the steps that will be taken along the entire course of D-10W (not just headwaters) to cut off the natural flow of groundwater along this approximate 950-ft long channel on the southeast side of the GWFD. The D-10W surface channel cannot simply be buried beneath a soil cover during the GWFD and then covered over with a berm in the construction of the EMDF – it is a naturally occurring geologic feature. A plan to manage this natural geologic feature should be presented in the GWFD since it is discussed as part of the GWFD activities.

28. Section 6.3, p. 25. Several issues are identified in this section:

A. The text states:

“Establish a subgrade elevation that removes the high-infiltration stormflow zone and organics layer to support effective cover infiltration control, and removal of additional material below this zone to support an efficient earthwork balance (provide embankment fill for backfill).”

Comments:

1. Is the intent to construct a relatively flat GWFD surface or one that is sloped? Please provide a topographic map showing the anticipated final elevational surface across the GWFD area and show changes in elevation that will be used in precipitation management.
2. Please explain the meaning of “support an efficient earthwork balance (provide embankment fill for backfill)” as this sounds like DOE intends to infill areas of lower elevation with geologic materials removed during excavation. If this is intended then add a figure that shows the areas of “cut” and the areas of “fill” so that a clear understanding of the site conditions can be made before the temporary GWFD cover is added. These two conditions (cut/fill) will have different hydrogeologic conditions in the subsurface and groundwater monitoring in these areas can assist in determining groundwater elevation and the final EMDF design.

B. The text states:

“Establish grades such that the final cover system, stormwater features, berms, and access roads are stable, both globally and locally, within the cover system.”

Comments

1. A topographic map/figure must be added to the GWFD that shows the final cover system, stormwater features, berms, and access roads. The drawings presented in Appendix C do not present this information. Use fewer contour lines so that all of these topographic features can be understood collectively by elevation.
2. What is the difference between “globally and locally” as used in this sentence? Clarify the text.

C. The text states:

“Establish grades sufficient to route all overland stormwater to two newly constructed sediment ponds south of the old Haul Road.”

Comments:

1. Berms are shown in various figures but their function/relationship to the surface grading is missing. Please explain and show how the berms will be used to direct overland stormwater to

the sediment basins. A figure showing the precipitation flow path across the surface of the GWFD surface directed to the two sediment basins (or the NTs?) would be helpful.

2. Missing is information how precipitation will be managed in the two proposed sediment basins. While we are informed that water will be directed into them there is no explanation regarding the management and discharge of that water at points along Bear Creek (or the NTs?) and that information must be added.

D. The text states:

“Figure 11 provides a cross-section view of the cut and fill required across the knoll to develop a stable, well graded surface to place the temporary cover system.”

Comments:

1. The DOE-projected base of the geologic buffer elevation must be added to the cross-section (Figure 11) to allow an understanding of the highest point for groundwater elevation allowed under the GWFD. If this is a line crossing multiple elevations then it should be shown as such relative to the “GWFD Cover System.”

2. It is not clear how the final GWFD topographic hill (covered by the GWFD Cover System) with an approximate 70-ft elevational difference across the EMDF footprint can be used to define a groundwater elevation 15-ft beneath a final, flat-lying geologic buffer. This hill cannot represent the assumed near-flat lying cell elevation for each of the four EMDF disposal cells in the final EMDF design (see Appendix A, Figure A.6., p. A-14) so how can the groundwater elevation under this variable surface be used to define the 15-ft of separation ARAR. Please explain.

3. A map (plane view) showing the areas of cut and fill should be added in addition to Figure 11.

29. Figure 11, GWFD south-north cross-section through temporary cover, Page 26 and Section 6.3.3, Subgrade preparation, Page 28. The RDWP/RAWP states, “The finished grade is shown in Fig. 7 and Fig. 11 (cross-section). While the graded surface reflects a cut of about 4 ft to remove highly transmissive material, due to the knoll configuration, excavation as deep as 30 ft below existing grades will be required in some areas prior to construction of the cover system, as well as embankment construction as high as 24 ft above existing grades;” however, the RDWP/RAWP does not discuss how grades will be verified and does not include any description, or specification section for survey control. Please revise the RDWP/RAWP to include a discussion of how grades will be verified and include a specification section for survey control, in Appendix C.

30. Section 6.3.1, p. 25. The text states:

“The temporary cover system will be placed over a prepared subgrade to provide a stable working surface. The area will be graded to provide positive drainage away from the cover and to direct stormwater flow to the sediment ponds. In addition, roads for piezometer access and maintenance will be developed as part of the grading.”

Comments:

1. Please provide a topographic map showing the anticipated final subgrade GWFD working surface and identify the features (e.g., berms, and access roads) atop this surface.

2. Please provide a cross-section showing the DOE-defined landfill design in relationship to the cross-section presented in Figure 11. It is not clear how the EMDF would be defined within the context of the anticipated GWFD cover system. Having the elevation of the cell floors, underlying leachate collection system and geologic buffer in profile will assist in understanding the GWFD and any possible design adjustments necessary for the effective construction and operation of the EMDF.

31. Section 6.3.1, p. 27. The second bullet states:

Ensure seismic design of the project follows TDEC Earthquake Evaluation Guidance Document (TDEC 1994) for design and operation of Class I and Class II solid waste landfills in Tennessee and Resource Conservation and Recovery Act of 1976 (RCRA) Subtitle C/D guidance (40 CFR 258.14).”

Comment: While it is not clear whether this citation should have been an ARAR for the landfill (it was not identified as an ARAR), it appears to be establishing criteria for this project. Please clarify whether it should have been an ARAR for the landfill and, in the meantime, add to the ARARs table for this project as a relevant and appropriate requirement. In addition, please add the TN guidance as a TBC. Note that it is not necessary to cite every guidance document as a TBC, but since it was described in this “Requirements” section, it appears to be appropriate to do so.

Solid waste landfills in seismic impact zones	New MSWLF units and lateral expansions shall not be located in seismic impact zones, unless the owner or operator demonstrates to the Director of an approved State/Tribe that all containment structures, including liners, leachate collection systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.	Construction or expansion of landfills in seismic impact zones – relevant and appropriate	40 CFR 258.14
Solid waste landfills in seismic impact zones	[Add appropriate text or merge into the above cell]	Design and operation of Class I and Class II solid waste landfills - TBC	Earthquake Evaluation Guidance Document (TDEC 1994)

32. Section 6.3.2, p. 27. The text states:

“Topsoil will be stripped from areas that will be disturbed by excavation, filling, or compaction and will be stockpiled/staged in an area such as the Spoils Area. Topsoil will be reused for the project areas or placed into the Spoils Area. Where practical, wetlands soils will be reused for other sites and projects. Soils unsuitable for fill material will be stripped from the project site and staged in the Spoils Area for future use as possible nonstructural fill material.”

Comment: Figure 6 (p. 13) shows two spoils areas (East Spoils and UPF Spoils). Neither is defined in the GWFD. The cited text indicates a single spoils area. Please identify the location of the referenced Spoils Area and explain any differences between the two spoils areas identified in Figure 6. What does UPF mean and how is it defined regarding topsoil spoil areas?

33. Section 6.3.3, p. 28. The text states:

“The finished grade is shown in Fig. 7 and Fig. 11 (cross-section). While the graded surface reflects a cut of about 4 ft to remove highly transmissive material, due to the knoll configuration, excavation as deep as 30 ft below existing grades will be required in some areas prior to construction of the cover system, as well as embankment construction as high as 24 ft above existing grades.”

Comments:

1. The “finished grade” feature shown in Fig 7 (and in Fig 11) is too small and the topographic contours are too numerous and not labeled. The road across the GWFD area appears to climb and descend across several contours implying considerable relief across the finished GWFD site? Additional figures and text are necessary for clarification.
2. The areas of excavation extending 30-ft below existing grades are not indicated in either Figure 7 or

Figure 11. Likewise, no figure presents embankment construction as high as 24 ft above existing grades. Additional figures are necessary to present/explain these areas/features.

3. The text in the cited paragraph needs to be simplified to convey clearer meaning about the activities being discussed.

34. Section 6.3.4, p. 28. The text states:

“Anchor trenches will be excavated into the prepared subgrade after the perimeter embankments and prepared subgrade are complete.”

Comment: Identify the location(s), purpose(s), and function of an “anchor trench.”

35. Section 6.3.5, p. 28. The text states:

“The GWFD temporary cover system consists of (from bottom to top) an HDPE geomembrane, an engineered turf, and overlying sand infill of the turf layer for the ballast (Fig. 12).”

Comment: Figure 12 conveys an idealized cross-section through an area of embankment fill. Above the fill is a 6-inch earth-fill layer labeled “Prepared subgrade.” Neither the embankment fill nor the prepared subgrade are described. The prepared subgrade earth-fill has a reference to “Note 1” that could not be located for this figure. Please edit the figure and revise the text to be consistent between the figure shown and the description of each feature. Explain what properties each layer presents and how it will function in the GWFD. The term “ballast” is used only this one time and another word with a clearer meaning should replace that word – or define ballast so its meaning can be understood.

36. Section 6.3.5, p. 29. The text states the key design requirements for the GWFD cover system were to:

“Approximate the conditions of the final landfill liner system configuration such that infiltration and lateral recharge is prevented within the GWFD footprint.”

Comment: This sentence needs clarification. The GWFD is apparently not taking place across a flat surface (or near a flat surface) which is expected in the final EMDF landfill cell design. The GWFD is taking place across an area with up to 70-ft of elevational difference. Therefore, this sentence should more appropriately read “Create a cover system across the GWFD knoll site that provides a landfill liner system configuration such that infiltration and lateral recharge is prevented.” Please change the text to clarify the design requirement and the location.

37. Section 6.3.5.1, p. 29. Text should be added to report the expected hydraulic conductivity of the HDPE geomembrane.

38. Section 6.3.5.1, HDPE geomembrane, Page 29 and Table 2, HDPE geomembrane properties, Page 30. The RDWP/RAWP states, “The selected HDPE will contain no plasticizers, fillers, extenders, reclaimed polymers, or chemical additives, except 2% carbon black to provide ultraviolet resistance and not more than 1.5% antioxidants and heat stabilizers, as required for manufacturing;” however, Table 2 indicates that the minimum average roll (MARV) requirement for carbon black may be 2-3%. Please revise the RDWP/RAWP accordingly to resolve this discrepancy.

39. Section 6.4, p. 31. The second paragraph states:

“Initial site preparation at the Site 7b Borrow Area will be performed as part of the ESP activities and will be completed prior to start of the GWFD Project. The previously constructed features include construction of an access road, a staging area, and stormwater management measures (sediment pond and ditches).”

Comment: The stormwater management measures cited in the text for Site 7b are not included in the

GWFD. Additionally, the work related to stormwater measures could not be found in (1) *Remedial Design Report/Remedial Action Work Plan for the Environmental Management Disposal Facility, Oak Ridge, Tennessee: Early Site Preparation Activities* (DOE/OR/01-2934&D2) or (2) *Phase 3 (Borrow Areas) Characterization Report for the Environmental Management Disposal Facility, Oak Ridge, Tennessee* (DOE/OR/01-2832&D1). If DOE has already provided this information, then please cite the approved document. If it has not been reviewed and approved then it should be included in the revised GWFD since it is part of the GWFD and will continue in use during EMDF operations.

40. Section 6.4, p. 31. The fourth paragraph references a single sediment basin approximately 1.1 acres in size. This feature is not referenced to any figure in the GWFD and one could not be found that shows the sediment basin adjacent to the Borrow Area 7B. Please add this basin to one or more figures as appropriate and define its dimensions, point of infill, and point of discharge in relation to the GWFD project.

41. Section 6.4, p. 31. The text states that specifications for the sedimentation basin construction are "...based on a 5-year, 24-hour design storm." Is this design a regulatory requirement (if so, it should be cited) or the state guidance document cited in Section 6.5? If a regulation or the state guidance is not the basis for this level of design, what is the basis for proposing this specification?

42. Section 6.5, p. 32. The text states:

"The Stormwater Management Requirements for Groundwater Field Demonstration for the Onsite Waste Disposal Facility, Oak Ridge, Tennessee (UCOR-5620, in progress) supports the GWFD clearing and grading activities and presents erosion and sediment control BMPs."

"Sediment/erosion control measures will be designed in accordance with the guidance presented in the Tennessee Erosion and Sediment Control Handbook (TDEC 2012)."

Comment: All of the project work associated with the GWFD must be included for review and comment. The DOE cannot defer a significant portion of the GWFD activities (stormwater/surface water management) to documents that have not been reviewed and approved. Please submit the documents/sections relevant for the GWFD for review/comment before the revised GWFD is provided.

43. Section 6.5, p. 32. The text states:

"GWFD construction activities are to be phased to minimize the amount to disturbed areas exposed at any given time."

Comment: None of the stormwater/surface water management activities are described in Section 9 (p. 49). No Gantt chart is presented in Section 9 to show how the GWFD work will be "phased" to keep the project organized and moving forward. In the revised GWFD, the DOE must include a Gantt chart with specific component timelines to demonstrate how the GWFD activities will progress in a phased approach.

44. Sediment and Erosion Control, Pages 32-33. The RDWP/RAWP references seeding to stabilize soils following disturbance by clearing, grubbing, excavation, and grading activities but, no seed mix, or specification section, is provided to clarify the required seed mix, temporal seeding windows, seed/mulch application density requirements, etc. Please revised the RDWP/RAWP to clarify seeding requirements and include an associated specification section in Appendix C.

45. Section 6.5, Sediment and Erosion Control, Page 33. The RDWP/RAWP indicates that dust control will be performed using a water truck to apply water to disturbed areas; however, excessive water must

not be introduced to the temporary cover system, or it may affect the quality of the data obtained during implementation of the GWFD. Please revise the RDWP/RAWP to ensure excessive water will not be introduced during dust control measures, including appropriate mitigation measures, to ensure that data quality is not adversely affected during implementation of the GWFD.

46. Sediment and Erosion Control, Page 33. The RDWP/RAWP states, “Stormwater ponds will be placed for sediment control for the GWFD and the landfill disposal cells. These stormwater ponds are expected to be placed in the vicinity of the existing Haul Road, which will be rerouted as part of the ESP activities for the EMDF landfill (Fig. 7);” however, on Figure 7, these features are identified as sediment ponds, not stormwater ponds. Please revise the RDWP/RAWP to consistently refer to either stormwater, or sediment, ponds throughout the plan.

47. Sediment and Erosion Control, Page 33. The RDWP/RAWP states, “Run-on to the GWFD from the cemetery hill east of the GWFD will be controlled by a drainage ditch that is located over the cover in the in-filled former D-10W channel and routed to discharge into the newly constructed Pond 2 south of the old Haul Road;” however, no figures clarify which pond is Pond 1 versus Pond 2. Based on the description in the text, it can reasonably be assumed that Pond 2 is the eastern most pond, but Figure 7 should be revised to make this distinction. Please revise Figure 7 in the RDWP/RAWP to clearly identify Ponds 1 and 2.

48. Section 7, p. 35. The first paragraph, last sentence states, “While contaminated waste streams are not anticipated, if discovered or generated, DOE will notify EPA and TDEC and those waste streams will be evaluated and characterized for disposal at the Environmental Management Waste Management Facility or other suitable disposal facility.” As noted in the General Comments, ARARs identified in the ROD apply to this project, where the prerequisite has been met. The waste characterization, management, temporary storage, treatment, and disposal requirements identified in the ROD also apply to this project whether identified in this report or not. If it is decided that an ARARs table should be included, please add it for completeness.

49. Section 7, Table 4. p. 35. Beneath the “Planned disposition site” column is the acronym “ORRL.” Below the table is a list of the acronyms and ORRL is defined as “Oak Ridge Reservation Landfills.” This needs further clarification because there are multiple RCRA landfills along with a single CERCLA operating landfill at the DOE-ORR. Please add in parenthesis the term (RCRA or CERCLA) to help the reader understand where the solid waste is planned for disposal.

50. Section 7, Table 4. p. 35. The acronym “PK” is defining as “process knowledge.” However, the meaning of this term is never defined. Explain what PK means and how it will be used in the characterization of wastes generated by GWFD activities.

51. Section 7, Table 4. p. 35. Beneath the “Characterization basis” column, radiological surveys are listed. However, what this entails is not described in this document. Please explain how this work is conducted, what it identifies, and how waste disposal will occur as a result.

52. Section 7, Table 4. p. 35. The acronym “cy” is used here and at a few others places in the text. It is not listed in the acronyms and the term cannot be identified in the document. Please correct this omission.

53. Section 7, p. 35. The last paragraph states, “It is assumed that unused materials (e.g., surplus

materials) from the construction of the temporary cover system will be removed from the site by the subcontractor performing the work and will not be a waste stream managed during this activity. If it is disposed onsite, it will be disposed at the ORRLs.” Please ensure that any waste disposed offsite has an acceptability determination issued by EPA.

54. Section 8.2, p. 37. Reference is made to “shallow” and “deep” piezometers. However, no table identifies which piezometers are shallow and which are considered deep. Please add a table providing this information and define the difference in the text.

55. Section 8.2, Piezometers, Page 37. The text in the second paragraph states the piezometers are shown on Figure 11; however, Figure 11 (GWFD south-north cross-section through temporary cover) depicts a cross-section of the GWFD and does not include piezometers. The piezometers are shown on Figure 13 (Changes to piezometer network) as stated in the third paragraph. Please revise the text to provide an accurate reference to the figure showing the piezometers.

56. Section 8.2, p. 37. The text states:

“Deeper piezometers will also be protected and maintained, as practical, but will not be used for determining the post-construction groundwater elevation at the base of the geologic buffer.”

Comment: Which specific deep piezometers will be protected and maintained? Reference the new table identifying both shallow and deep piezometers.

57. Figure 13, Changes to the piezometer network, Page 39, and Section 8.2.2, Piezometer, Seismic Boreholes, and Well to be Abandoned, Page 41. The second set of three seismic boreholes is listed in the text as west of SF-1, but Figure 13 shows seismic boreholes EBH-01 A, C, and C as located east of SF-1 and within the sediment pond. Please revise the RDWP/RAWP to consistently identify the location of these seismic boreholes.

58. Section 8.2.1, p. 40. The text references the construction of three new piezometers. Please identify if these new piezometers are considered shallow or deep.

59. Section 8.2.1, p. 40. The text states:

“MW-4 and -5, shallow/deep pair replacements for abandoned piezometers GW-978 and -979”

Comment: Table 6 records MW-4 with a total depth of 70 ft below ground surface (bgs) and MW-5 with a total depth of 40 ft bgs. Please correct the text.

60. Section 8.2.1, p. 40. The text states:

“Three new piezometers are expected to be installed...”

“The shallow piezometers will be constructed of 2-in. PVC pipe with the base of the well screens at the approximate elevation of the bottom of the geologic buffer zone.”

Comments:

1. Which of the three new piezometers are considered “shallow?”

2. Why are the “shallow piezometers” only screened to the base of the geologic buffer zone and not deeper to allow a full understanding of the actual groundwater position across the geologic buffer zone and beneath it? If the measured seasonal high groundwater elevation is within one foot of the base of the geologic buffer and rainfall conditions are considered dryer than normal then some design adjustments must be made to ensure that a wetter season does not raise groundwater into the geologic buffer.

Redesign the new piezometer monitoring network wells to extend below the base of the geologic buffer to be able to clearly define the position of groundwater table and aid in determining if design changes

are necessary based on an acceptable wet seasonal understanding of the groundwater surface beneath the geologic buffer.

61. Section 8.2.1, p. 40. The text states:

“Selected construction details are provided in Table 6. Note, a 5-ft screen interval was selected to ensure that groundwater elevations measured were targeted to the base of the geological buffer that is critical to the design and reduce the possibility of having to interpret results.”

Comment: A cross-sectional figure must be added showing the GWFD site with the projection of the bottom of the geologic buffer at each of the monitoring wells and to show where the seasonal groundwater position will be measured for both wet seasons. Simply placing the bottom of the well screen at the base of the geologic buffer will not allow an accurate measurement of the groundwater position (spanning two calendar years) beneath the geologic buffer. The measured groundwater position must be compared to the expected wet-weather seasonal average to ensure the final design can meet the required 15-ft separation between the bottom of flat-lying emplaced wastes and the seasonal high-water table of the uppermost unconfined aquifer.

62. Section 8.2.1, New Piezometers to be Installed, Page 40. It is unclear if the two new piezometers MW-4 (deep) and MW-5 (shallow) planned as replacements for abandoned piezometers GW-978 and GW-979 will be installed within the same geologic formation (i.e., aquifer). According to the information in Table 6 (GWFD additional piezometer construction information), replacement piezometers MW-4 and MW-5 are planned to be installed within the Rogersville Formation; however, the information on Figure 2 (EMDF area existing piezometers and other features) indicates piezometers GW-978 and GW-979 are located at the contact between the Rutledge/Rogersville Formations. Therefore, the representativeness of the replacement piezometer locations is unclear. Please revise the RDWP/RAWP to discuss the representativeness of the new piezometers, including if they will be installed within the same geologic formation (aquifer) as the piezometers that will be abandoned

63. Section 8.3, p. 41/42. The text states:

“These piezometers are shown on Fig. 14 and will be used to determine whether the preliminary design elevation of the base of the geologic buffer is appropriate to maintain 15 ft separation between the seasonal high groundwater elevations, or whether design changes are warranted.”

Comment: The purpose of the GWFD is to determine a “final landfill design that will meet the RAO to maintain a 15-ft separation between the bottom of emplaced wastes and the seasonal high-water table of the uppermost unconfined aquifer, which includes 5 ft of liner system and 10 ft of geologic buffer, consistent with TDEC 0400-11-01-.04(4)(a)(2)” [p. 16]. Please change text to be consistent with the EMDF ROD stated objective.

64. Section 8.3, p. 42. The text states:

“If seasonal variation is suspected to be influencing the results from the listed piezometers, then an approach to correcting for seasonal variation will be discussed and agreed upon by the triparty technical team.”

Comment: What is “seasonal variation” (groundwater levels or precipitation)? It is unclear how seasonal variation would be influenced from piezometer data, if they are monitoring groundwater levels that respond to precipitation which varies seasonally. Moreover, if water levels from the “wettest month” are being used to determine the seasonally highest groundwater elevation, how does seasonal variation factor into calculations based on water levels collected from the wettest month? Please clarify the text.

65. Section 8.3, Interpretation of Monitoring Results, Page 42. This section does not clearly describe

how the data generated for the groundwater levels measured at each well will be interpreted and used. The text states that median monthly groundwater elevations measured in the month with the highest groundwater elevations will be used, but the text also states that the seasonal high groundwater elevation will be based on 80th percentile of groundwater elevations and discusses an average seasonal high groundwater elevation. From the information presented, it is unclear how the wettest month will be determined and how multiple median elevations may be used, or how the average seasonal high groundwater elevation will be calculated. According to Section 8.2.1 (New Piezometers to be Installed), hourly measurements of groundwater elevation will be recorded at each well. As such, the text should discuss how the hourly results will be interpreted at each well and any equations used in the interpretation of the data should be provided. Please revise Section 8.3 to describe how the wettest month will be determined and how the seasonal average groundwater elevation will be calculated based on the hourly measurements from each well.

66. Section 8.3, Interpretation of Monitoring Results, Page 42: The text states, “Please note, although not required to determine impacts from EMDF construction on the knoll area water levels, the other piezometers in the EMDF area will continue to be monitored, as possible and practical;” however, it is unclear if this refers to the other shallow piezometers identified in Table 5 (EMDF average seasonal high and low groundwater elevations—shallow piezometers/GWFD area), or if the deep piezometers in the area will also be monitored. Please revise the text to clarify the other piezometers referenced in this statement.

67. Section 8.6, p. 44. Pumping Test.

Comments:

1. Reference is made to a pumping test in the vicinity of the knoll to establish hydraulic conditions in the zone of groundwater saturation. However, it is also stated that the pump test will establish hydraulic characteristics in saturated zones within the EMDF footprint. The text needs to be revised to clarify whether the pump test only covers the knoll area or if other wells will also be pumped or monitored to allow an understanding of the hydraulic characteristics within the entire EMDF footprint. Identify all the wells planned in this pump test.

2. Will the pump test occur during a wet season or dry season? Explain.

3. Will the pump test occur for two wet seasons if the first wet season has a lower than recent past measured groundwater level? Some contingency for more than one pump test must be identified and planned.

68. Section 8.6.1, p. 45. The text states:

“Table 8 shows the selected wells for the testing. This table includes the pumping locations, the observation piezometers, and depths related to total piezometer depth, screen intervals, and approximate groundwater levels.”

Comment: The table references five piezometers but Figure 14 (p. 43) shows six piezometers. Please correct as appropriate.

69. Section 8.6.3, p. 47. The text states:

“Results of the pumping tests will be included in the Technical Memorandum that presents the results of the GWFD monitoring. The pumping test results are expected to support and add clarity to the GWFD monitoring results.”

Comment: Text needs to be added to convey that the EPA/TDEC project team members will be kept informed of the pumping tests with the results reviewed as soon as the data allows.

70. Section 9, p. 49. A Gantt chart must be added presenting all phases of work to occur across the EMDF under the GWFD. The highlights (pump test and groundwater monitoring) presented in the text are insufficient to understand the many field/construction activities associated with the GWFD.

71. Section 9, p. 49. While the focus of the GWFD remains on the knoll area, EPA expects that all of the groundwater data collected concurrently across the EMDF footprint (p.16) will be analyzed by the EMDF project team. That analysis will ensure the DOE modeled EMDF preliminary landfill liner system design does not require modification to meet the EMDF RAO to maintain a 15-ft separation between the bottom of emplaced wastes and the seasonal high-water table of the uppermost unconfined aquifer.

72. Appendix, Section A.2, p. A-5. The text states:

“A detailed natural resource evaluation and wetland delineation study was performed over most of the EMDF footprint (Fig. F.2).”

Comment: The reference to Figure F.2 both here and at the bottom of the page could not be found. Please correct.

73. Appendix A, Figure 2, p. A-5. The area of the natural resource evaluation is shown. Confusing is what constitutes “EMDF activities.” Are these activities associated with early site activities or the GWFD or portions of both? Please clarify. Recommend focus solely on natural resource evaluation.

74. Appendix A, Table A.1, p. A-6. An asterisk occurs at the end of the word “impacted” but it is not defined. Please correct.

75. Appendix A, p. A-7. The text states:

“The most impacted wetland is in Drainage (D)-10W. The wetland from the saddle from the upgradient diversion ditch to Bear Creek Road (D-10WB) will be completely removed by GWFD and balance of landfill construction activities and will be replaced with structural fill material.”

Comment: The simple infilling of the D-10W drainage feature and associated wetland is unacceptable. These features are the result of natural geologic-directed drainage across the EMDF footprint and they contribute to subsurface directional groundwater flow. The DOE must completely cut off the surface ditch/wetland features and include the underlying groundwater flow path. Otherwise, groundwater will continue to travel within the subsurface along the natural D-10W flow path and adversely impact the EMDF consistent with what has occurred at the EMWFM beneath Cell 3 in association with NT-4. The DOE has committed to not using permanent underdrains at the EMDF (EMDF ROD, Section 2.10.8, p. 2-36). A failure to address the natural groundwater flow path along D-10W could require the use of one or more permanent underdrains which would be unacceptable.

76. Appendix A, Fig. A.3, p. A-8. The figure shows the grouting of the NT-10 culvert at the intersection with old Bear Creek Road. No new culvert is shown at this same location. How will surface water flowing along NT-10 move past this plugged intersection?

77. Appendix B, Table B-1, Location-specific ARARs. The following citations, which were in the ROD at page A-14, are missing from the document. Please include.

<p>Presence of floodplain as defined in 10 CFR 1022.4</p>	<p>Incorporate floodplain management goals into planning, regulatory, and decision-making processes, and, to the extent practicable, reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; restore and preserve natural and beneficial values served by floodplains; require the construction of DOE structures and facilities to be, at a minimum, in accordance with FEMA National Flood Insurance Program building standards; and promote public awareness of flood hazards by providing conspicuous delineations of past and probable flood heights on DOE property that is in an identified floodplain.</p> <p>Undertake a careful evaluation of the potential effects of any proposed floodplain action. Identify, evaluate, and, as appropriate, implement alternative actions that may avoid or mitigate adverse floodplain impacts.</p> <p>Avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. Avoid direct and indirect development in a floodplain wherever there is a practicable alternative.</p> <p>Consider alternatives to the proposed action that avoid adverse impacts and incompatible development in the floodplain, including alternate sites, alternate actions, and no action. DOE shall evaluate measures that mitigate the adverse effects of actions in a floodplain including, but not limited to, minimum grading requirements, runoff controls, design and construction constraints, and protection of ecologically sensitive areas.</p> <p>If no practicable alternative to locating or conducting the action in the floodplain is available, then before taking action design or modify the action in order to minimize potential harm to or within the floodplain, consistent with the policies set forth in Executive Order 11988.</p>	<p>DOE actions that involve potential impacts to, or take place within, floodplains— applicable</p>	<p>10 CFR 1022.3(a)(1) through (6)</p> <p>10 CFR 1022.3(b) and (d)</p> <p>10 CFR 1022.3(c)</p> <p>10 CFR 1022.13(a)(3)</p> <p>10 CFR 1022.14(a)</p>
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78. Appendix B, Table B.1, Location-specific ARARs, p. B-14. Please add the following text after the citation to 40 CFR 230.10(b): “CWA Regulations – Sect. 404(b) Guidelines.” DOE merged the rows, which is acceptable, but apparently missed this text.

(End of Comments)