



**STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION**

Division of Remediation - Oak Ridge
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October 8, 2021

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TDEC Comment Letter: 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&D1)

Dear Mr. Petrie

The state of Tennessee continues to recognize the importance of selecting a waste disposal option to support U.S. Department of Energy (DOE) environmental cleanup and building demolition projects on the Oak Ridge Reservation (ORR). The draft (D1) Record of Decision (ROD) presents the waste disposal option anticipated by DOE, the Tennessee Department of Environment and Conservation (TDEC), and the U.S. Environmental Protection Agency (EPA), collectively referred to as the Federal Facility Agreement (FFA) Parties. That option is to build and operate the proposed Environmental Management Disposal Facility (EMDF) at Central Bear Creek Valley (CBCV) Site 7c.

According to *EM Strategic Vision: 2021-2031* (p. 36-37), DOE plans to demolish many high-risk facilities at the Y-12 National Security Complex (Y-12) and the Oak Ridge National Laboratory (ORNL) and dispose of the waste in the proposed EMDF.¹ The document states these sites have DOE's largest inventory of high-risk contaminated facilities, including "former research reactors, isotope production facilities, and former process buildings considered to be the worst of the worst" and "areas with dense mercury contamination." Mercury contamination within Y-12's West End Mercury Area (WEMA) is the greatest known environmental risk on the ORR.²

¹ Available at <https://www.energy.gov/sites/default/files/2021-04/EM-Strategic-Vision-2021-2031.pdf>.

² *Strategic Plan for Mercury Remediation at the Y-12 National Security Complex Oak Ridge, Tennessee* (DOE/OR/01-2605&D2/R1); <https://doeic.science.energy.gov/uploads/F.0608.006.0982.pdf>.

As an important step in the process of selecting a waste disposal option, TDEC reviewed the D1 ROD cited above pursuant to the FFA for the ORR. This letter meets the FFA review cycle protocol of 90 days, including a 30-day extension. The review produced the following comments that require resolution to finalize the ROD.

Negotiations are underway among the FFA Parties to resolve concerns identified during TDEC's review. Agreements have been, are being, and will continue to be reached on these issues at various levels within the organizations. Meanwhile, this letter documents TDEC's review of the D1 ROD as submitted on July 12, 2021 for inclusion in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Administrative Record. TDEC anticipates the final ROD will reflect resolution of concerns identified in this letter.

General Comments

1. **Remedy Protectiveness**

Per 40 CFR 300.430(f)(5)(ii)(A) the ROD must describe how the selected remedy is protective of human health and the environment. This D1 ROD lacks the information needed to demonstrate protective landfill wastewater discharge limits and waste acceptance criteria (WAC). The ROD does not include remediation goals to be met in adjacent groundwater, surface water and other affected environmental media per 40 CFR 300.430(f)(5)(iii)(A).

2. **Key Concerns**

In the *Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste* (DOE/OR/01-2695&D2/R1), the state of Tennessee identified seven outstanding issues to be resolved before a ROD selects onsite disposal as the preferred waste management alternative for future ORR waste generated under the CERCLA. This general comment summarizes each issue and evaluates the status of efforts to resolve the concern.

a. Site Characterization

TDEC requested that DOE investigate the suitability of the proposed landfill location, known as the CBCV Site 7c. A particular concern was the potential for high groundwater levels in portions of the planned landfill to facilitate contaminant release into streams.

In response to TDEC's request, DOE collected data on hydrologic conditions at the site and summarized the information in two reports: a "Pre-published Technical Memorandum #1" (TM-1) and a follow-on document called "Technical Memorandum #2" (TM-2). DOE placed the reports and the data in the Administrative Record.

TM-2 (p. 1-2) provides a link to the data in Oak Ridge Environmental Information System (OREIS), but the link is broken. The web address for OREIS has changed several times since TM-2 was issued. DOE should redirect OREIS visitors from the old address to the new one.

Site characterization data revealed high groundwater levels in portions of the planned landfill, which indicate the conceptual EMDF design presented in the Proposed Plan may need revision to elevate the landfill. Per agreement among the FFA Parties, DOE will complete a groundwater field demonstration (GWFD) after ROD approval to establish the elevation of the base of the landfill. Section 2.14.3 of the D1 ROD provides additional information.

b. Identification of Applicable or Relevant and Appropriate Requirements (ARARs)

The FFA Parties must agree upon legal requirements to govern the siting, construction, operation, closure, and monitoring of EMDF. Under CERCLA, these requirements are called ARARs. Compliance with these requirements, including waivers and exemptions approved with adequate justification, is a threshold criterion of CERCLA.

The approved ROD will list the ARARs agreed upon for EMDF. Under CERCLA, the ROD will function similar to a waste management permit under other regulatory programs, so the ARARs are similar to permit requirements. In the D1 ROD, ARARs are listed in Appendix A, and Section 2.13.2 discusses ARAR compliance, including waivers and exemptions DOE is requesting.

Appendix G in the December 7, 2017 Dispute Resolution Agreement (DRA) included a preliminary list of ARARs and supplemental guidance documents To Be Considered (TBC). TDEC understood the 2017 list was a foundation upon which to build as the FFA Parties worked toward the ROD. On December 31, 2020, the EPA Administrator issued a Dispute Resolution Decision (DRD) concerning a long-standing dispute regarding the discharge of CERCLA landfill wastewater to Bear Creek from the Environmental Management Waste Management Facility (EMWMF) and the proposed EMDF. In conjunction with the DRD, EPA provided additional ARARs to be included in the RODs for both landfills.

Throughout 2021, the FFA Parties have met several times in an effort to agree on the final list of ARARs and TBCs to be included in the EMDF ROD. Currently, no agreement has been reached.

When the ARAR section of the ROD is finalized, it should note 1) the absence of language to address a specific situation as an aspect of the remedy in a CERCLA decision document, including ARARs to be either met or appropriately waived, means the scope of the remedy does not include the situation and requirements

pertaining to it, and 2) the state of Tennessee retains its authority to impose the standards of the legal requirement both substantive and procedural outside the context of CERCLA and the FFA.

c. Waste Acceptance Criteria (WAC)

WAC are limits on the kinds and amounts of waste that may be placed in the landfill. WAC determine which wastes require treatment and/or disposal at suitable offsite facilities due to their radioactivity, toxicity, or hazardousness. WAC are important for protecting the public and the environment over the long term, when engineered infrastructure, access restrictions, and other controls may deteriorate or fail.

It is TDEC's expectation the approved ROD will list WAC meeting CERCLA requirements and any additional limitations agreed upon for EMDF. Several comments included below address the CERCLA threshold criterion for protectiveness of public health based on meeting the EPA's risk management range of 1×10^{-4} to 1×10^{-6} cumulative excess lifetime cancer risk (ELCR) and hazard index (HI) less than or equal to 1.³

During June 2020, TDEC provided comments on preliminary draft WAC information provided by DOE. During September and October 2020, TDEC met with DOE and EPA to reiterate key concerns expressed in the EMDF Proposed Plan. In particular, TDEC reminded DOE that state acceptance of the preferred alternative—building and operating EMDF at CBCV Site 7c—relies heavily on consideration of site-specific data, assumptions, and exposure scenarios used to develop WAC for radionuclides and other contaminants.

TDEC repeated its intent to evaluate whether WAC meet CERCLA requirements, Remedial Action Objectives (RAOs), and performance objectives in Tennessee Division of Radiological Health (DRH) rule 0400-20-11-.16. TDEC highlighted the need to evaluate potential toxic effects of uranium in addition to potential cancer risks associated with exposure to isotopes of uranium and other radionuclides.^{4,5}

³ Although EPA's risk management range is 10^{-4} to 10^{-6} cumulative ELCR and the all-pathways dose assessment is allowed to meet EPA's 10-mrem/year dose limit, it is TDEC's position that evaluations of the groundwater-to-surface-water pathway used to develop WAC must meet a cumulative ELCR of 10^{-5} . This is based on TDEC's interpretation of the DRD issued by the EPA Administrator on December 31, 2020 and compliance with Tenn. Comp. R. & Regs. § 0400-20-11-.16(2) [10 CFR 61.41], which will be an EMDF ARAR.

⁴ The toxicity of depleted uranium to be disposed in EMDF poses about four times more risk of health (kidney) effects than its cancer-causing (radiological) effects, based on CERCLA guidance and the cancer risk threshold of 1×10^{-5} ELCR applied to surface water by the state of Tennessee.

⁵ Neptune and Company, Inc., 2019, *Comparison of Uranium Water Criteria Derived on the Basis of*

As explained in an enclosure with TDEC's October 15, 2020 letter, DOE has not provided a basis for analytic WAC development that satisfies the CERCLA threshold criterion for protectiveness. Moreover, DOE has not developed WAC (or landfill wastewater discharge limits) that protect against the toxic effects of uranium or non-radiological contaminants.

Despite a commitment from DOE Headquarters technical review managers to work with TDEC to resolve WAC concerns, that effort was delegated to the Oak Ridge Office of Environmental Management (OREM), which deferred the effort. TDEC advocated for WAC resolution discussions on a regular basis, but DOE elected to defer those conversations. Despite TDEC's position that protective WAC comprise a key concern to be resolved before ROD signature, recognizing that implementation details may be addressed in a post-ROD WAC compliance plan, DOE representatives periodically said DOE would discuss WAC after the D1 ROD was issued and/or that protective WAC would be finalized after the FFA Parties signed a ROD.

A letter from OREM to TDEC dated February 4, 2021 (revised March 8, 2021 with no date change) states "the CERCLA process is a separate regulatory path from the DOE O 435.1 process that ensures protectiveness through the PA and CA evaluations, and the development of the WAC will be addressed with the FFA Parties outside of DOE O 435.1 efforts." At that time, the D1 ROD was schedule for submittal on July 12, 2021.

During May, July, August, and September 2021, DOE hosted several 60- to 90-minute sessions during which TDEC proposed approaches to develop WAC that satisfy CERCLA's protectiveness criterion in a defensible and transparent manner. The goal of TDEC's recommendations was to derive WAC shown to be protective for groundwater and surface water within EPA's risk management range of 1×10^{-4} to 1×10^{-6} cumulative ELCR and HI less than or equal to 1.³ Currently, agreement has not been reached on modeling scenarios needed to set protective WAC inventory limits.

d. DOE Assessments

Separate from CERCLA, DOE Orders require completion of a Performance Assessment (PA) to predict the proposed landfill's ability to protect the public from radionuclide releases in the first 1,000 years following landfill closure (capping). DOE Orders also require completion of a Composite Analysis (CA) to evaluate the potential combined effects of multiple contaminant sources.

Radiological Dose, Radiological Cancer Risk, and Chemical Toxicity, Technical Memorandum, March 8.

DOE completed these technical assessments and used the PA results to develop WAC for radionuclides in accordance with DOE Orders. DOE Headquarters issued a Preliminary Disposal Authorization Statement (PDAS), authorizing construction of EMDF for the disposal of radiological waste. Although the PA and CA are not CERCLA documents, DOE included them in the CERCLA Administrative Record at TDEC's request because the state evaluated findings from these documents to inform a CERCLA decision on the proposed landfill.

TDEC's evaluation of the PA/CA is also part of the Administrative Record. While the work documented in those reports was sufficient to obtain a PDAS from DOE Headquarters, TDEC found additional work is needed to develop WAC meeting CERCLA requirements, as described in subsequent comments below.

e. Mercury Disposal

DOE plans to dispose of demolition waste from Y-12 in the proposed EMDF. Mercury contamination within Y-12's WEMA is the greatest known environmental risk on the ORR, according to the *Strategic Plan for Mercury Remediation at the Y-12 National Security Complex Oak Ridge, Tennessee* (DOE/OR/01-2605&D2/R1). The state is concerned about disposal of waste from Y-12 because of its potential to release mercury into landfill wastewater discharged into Bear Creek.

Fish in Bear Creek and downstream in East Fork Poplar Creek already contain excessive mercury. Both streams are included on Tennessee's list of impaired and threatened waters, known as "the 303(d) list," in part because of elevated concentrations of mercury. Bear Creek is impaired by mercury levels in fish tissue. Both streams are posted by the state to discourage fish consumption.

From a public health perspective, the greatest potential threat of mercury disposal in the EMDF would be increased risks to people who eat fish caught downstream. The ROD must describe how the FFA Parties will manage mercury disposal to comply with the intent of the Tennessee Water Quality Control Act (TWQA) and the state's Antidegradation Statement (Tenn. Comp. R. & Regs. § 0400-40-03-.06) and avoid adverse impacts from eating fish caught downstream of EMDF landfill wastewater discharges.

DOE's D2 *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee* (DOE/OR/01-2664&D2) predicted high concentrations of mercury in landfill leachate, ranging between 10,000 and 90,000 parts per trillion (ppt) [see p. E-14]. Although the calculations depended on a mercury disposal strategy DOE termed *macroencapsulation within the landfill cell* that is no longer proposed for use, TDEC remains concerned that disposal of large volumes of nonhazardous mercury wastes within EMDF could create concentrations of mercury in landfill wastewater that overwhelm the

treatment system capacity and result in exceedances of mercury discharge limits. Accordingly, DOE should consider application of treatment technologies that decrease the toxicity and/or mobility of nonhazardous mercury waste to ensure discharge limits remain attainable and to protect the receiving stream. Application of such treatment technology to nonhazardous mercury waste would reflect CERCLA's preference for a remedial action that "permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants" [42 U.S.C. § 9621(b)].

Currently, the FFA Parties are collaborating to develop and agree on an approach for managing mercury discharges to Bear Creek.

f. Underdrains

Tennessee does not allow drainage features to permanently suppress the water table at proposed landfill sites. This is consistent with Tennessee rules, including Tenn. Comp. R. & Regs. §§ 0400-11-01-.04(3), 0400-11-01-.04(4)(a)(2), 0400-20-11-.16(5), and 0400-20-11-.17(1)(h). Failure of such underdrains could make the landfill less stable and allow water into the waste. Underdrains also provide routes for any leakage to escape quickly. Either problem could result in contamination of local streams.

The D1 ROD distinguishes between *permanent* underdrains the landfill design would rely on at some of the onsite disposal locations evaluated previously and *temporary* drainage features to be used during construction and operation at CBCV Site 7c. Revise the text to include a clear statement that temporary drainage features will only be used to control surface water, perched groundwater, and infiltration. The ROD should also state that EMDF will not rely on drainage features under the waste, including underdrains to permanently suppress the water table.

g. Landfill Wastewater Discharge Limits

The ROD must establish discharge limits for radionuclides and other chemicals in landfill wastewater, consistent with CERCLA and the EPA Administrator's DRD. This is necessary to comply with TWQA regulations and to protect people using downstream water for recreational activities, including fishing. The FFA Parties are working to establish such limits and develop consensus on how to manage the landfill wastewater. General Comment 9 provides additional detail on TDEC's position.

Despite general guidance provided by the EPA Administrator's DRD, the FFA Parties have reached an impasse in efforts to agree on a process for establishing landfill wastewater discharge limits in accordance with CERCLA.

- h. Although DOE opened a public comment period from September 2018 into January 2019 and hosted a public meeting and information sessions, the FFA Parties agreed additional public involvement will help address public concerns about information developed or updated since that time.

DOE will provide updated information on the following topics.

- WAC
- Landfill wastewater discharge limits
- Site selection
 - Groundwater levels (TM-1 and TM-2)
 - GWFD and associated landfill design basis (ROD Section 2.14.3)
 - ARAR waivers and exemptions.

Information will be provided online and presented in a virtual public meeting in concert with a 30-day public comment period.

3. **Code of Federal Regulations (CFR) Citations**

Citations of 30 CFR should be corrected to 40 CFR.

4. **Remedial Investigation/Feasibility Study (RI/FS)**

- a. The RI/FS was not approved by EPA nor the state and is therefore not a final document. Ensure this is clarified in all references to the RI/FS.
- b. Should references to the Remedial Investigation/Feasibility Study (RI/FS) cite the 2018 "errata" version of the fifth (D5) draft of the RI/FS instead of the 2017 version?

5. **Waste/Groundwater Separation**

As noted in Section 1.3 (p. 1-5) and Section 2.8 (p. 2-17), the ROD will include the following RAO:

Maintain a 15-ft separation between the bottom of emplaced waste and the seasonal high-water table of the uppermost unconfined aquifer, which includes 5 feet (ft) of liner system and 10 ft of geologic buffer consistent with TDEC 0400-11-01-.04(4)(a)(2).

Language citing a 15-ft unsaturated zone should be revised for consistency with this wording. Examples include p. 1-5 (last bullet), p. 2-37 (first bullet), p. 2-38 (second paragraph in Section 2.12.2.1), p. 2-53 (middle and last paragraphs), p. 2-54 (first sentence), and p. 2-60 (first paragraph in Section 2.14.3).

6. **Land-Use Designation**

The D1 ROD makes several references to the need to amend the future land-use designation of Bear Creek Valley (BCV) Zone 2 from “recreational” to “DOE-controlled industrial.” Does the BCV Phase I ROD also need to be amended to reflect this change?

7. **Bear Creek Valley Wells**

The ROD mentions “hundreds of wells in Bear Creek Valley” on p. 2-3, 2-12, 3-75, 3-106, 3-140, 3-145, 3-152, 3-161, 3-178, 3-195, 3-196, and 3-200. Wells and other borings throughout the valley provide valuable information relevant to understanding the regional hydrogeological setting, but they do not substitute for the data collected at the CBCV site. The site-specific data collected for TM-1 and TM-2 indicate the natural position of the water table is up to 30 ft higher than anticipated by the conceptual model presented in the draft RI/FS reports. This revelation highlighted the need for the GWFD described in Section 2.14.3 of the D1 ROD.

8. **Landfill Wastewater Definitions**

The ROD should be revised to apply a legally correct definition for landfill wastewater, as provided in 40 CFR 445.2(f), which should be included in the ROD as an ARAR.

The rule defines landfill wastewater as follows:

(f) Landfill wastewater means all wastewater associated with, or produced by, landfilling activities except for sanitary wastewater, non-contaminated storm water, contaminated ground water, and wastewater from recovery pumping wells. Landfill wastewater includes, but is not limited to, leachate, gas collection condensate, drained free liquids, laboratory derived wastewater, contaminated storm water and contact wash water from washing truck, equipment, and railcar exteriors and surface areas which have come in direct contact with solid waste at the landfill facility.

The ROD should use the term “landfill wastewater” instead of “wastewater” for consistency with this legal definition. The ROD includes incorrect terminology at locations including, but not necessarily limited to the following:

- p. 2-11: 2nd paragraph (revise “clean water” to “non-contaminated stormwater”)
- p. 2-18: 4th paragraph after the bullets (“contact water”)
- p. 2-38: 4th and 5th paragraphs in Section 2.12.2.1 (“contact water” & “wastewater”)
- p. 2-39: 3rd paragraph under Phase 1 Construction (“contact water”)
- p. 2-56: 2nd paragraph on the page (“contact wastewaters”).

9. **Landfill Wastewater Treatment: TDEC Position**

The FFA Parties have committed to ensuring this ROD establishes protective discharge limits for releases of contaminated landfill wastewater from the proposed EMDF and

discharging into nearby waterways. A lot of ground has been covered on this issue over the past few years. Most recently, the EPA Administrator issued a DRD concerning radiological discharge limits. Limits are also needed for the discharge of other chemicals, including but not limited to mercury and polychlorinated biphenyls (PCBs).

The DRD directly addresses the development of radionuclide limits for landfill wastewater discharges into Bear Creek from EMWMF and the proposed EMDF, and it clearly directs the FFA Parties to establish limits based on site-specific conditions in Bear Creek. The decision also clearly cites the relevance of ARARs such as the Clean Water Act (CWA) and NRC regulations when establishing the site-specific limits. For instance, the decision states, “EPA supports the DOE’s application of the *as low as reasonably achievable* [ALARA] approach within the relevant and appropriate NRC regulations to ensure that application of a NRC regulation also achieves a risk level no less stringent than 10^{-5} .”

DOE is currently leading an effort with EPA and TDEC to examine and understand how site-specific conditions in Bear Creek affect potential discharge limits. For example, the team has collected data suggesting the number of fish *currently* in the upper sections of Bear Creek may not support default assumptions found in a standard recreational fishing scenario for fish ingestion. These findings might be interpreted to suggest a higher level of contamination could be discharged into Bear Creek than would normally be acceptable using default CERCLA risk assessment assumptions. In addition, the EPA Administrator recommended the acknowledgement of land-use designations during the development of discharge limits. Because DOE currently controls the land in some of the same areas where fish availability does not presently support default fishing assumptions, development of site-specific discharge limits related to exposure assumptions for these areas appears appropriate. However, for portions of Bear Creek in areas where DOE does not control the land use (e.g., unrestricted land use) and where past studies document actual fishing, it would be inappropriate to develop discharge limits based on alterations of default fishing assumptions.

Although TDEC can generally support the establishment of discharge limits based in part on site-specific conditions in portions of Bear Creek, TDEC does not prefer the single approach of modifying default assumptions throughout Bear Creek in areas controlled by DOE and areas outside DOE control (which have known fishing). Instead, TDEC recommends a multi-faceted approach for protection of environmental resources and the health of people who eat fish caught downstream.

It is TDEC’s position that landfill wastewater treatment could be adopted for protection of both portions of Bear Creek—i.e., those where DOE does not control the land use as well as those where land use is currently restricted, and it would avoid needless, protracted arguments when there is lack of scientific certainty to establish site-specific

risk assumptions. As described in TDEC's July 23, 2021 letter,⁶ although the EPA Administrator's DRD did not specifically apply the CWA technology-based approach to the Bear Creek decision, treatment of landfill wastewater is consistent with the DRD when discussing the NRC ALARA approach and the preference for water treatment in the CWA and CERCLA. Both facets should be used to develop protective discharge limits: adjusting standard default assumptions (e.g., fish consumption rates) for areas controlled by DOE and landfill wastewater treatment to protect downstream users.

In recent discussions with EPA and TDEC, DOE appears to embrace the position that the landfill wastewater would only require treatment if it does not meet the to-be-established discharge limits after the site-specific conditions are considered. In addition, DOE is recommending the modification of default exposure assumptions for areas of the stream flowing through property not controlled by DOE. DOE bases these recommendations on current fish availability in the stream and recent sampling results for contaminants in fish downstream in Bear Creek. While TDEC acknowledges the value of these results for evaluating past discharges of contamination from other sources in BCV (e.g., EMWMF and Bear Creek Burial Grounds [BCBG]), TDEC questions the reliability of this data to predict future fish tissue contamination originating from EMDF releases. The EMDF will receive the bulk of its waste from ORNL and Y-12 instead of the former K-25 site at the East Tennessee Technology Park (ETTP). Moreover, the EMWMF has discharged only a fraction of the total allowable DOE limits.

Again, TDEC does not concur with DOE's recommended, single-faceted approach for establishing radiological discharge limits. TDEC is confident that when a reasonable treatment methodology is defined in the EMDF ROD and implemented along with site-specific assumptions for Bear Creek fish consumption scenarios, the FFA Parties should have little trouble agreeing upon final discharge limits that are protective at the point of exposure described in the Administrator's decision. TDEC believes agreement on appropriate treatment will allow quick resolution of this issue while continuing to move the project forward.

Therefore, the FFA Parties should immediately begin discussing appropriate treatment methodologies for the contaminants planned for EMDF disposal which would exceed human health risk criteria for a recreational user with default risk assessment assumptions in portions of Bear Creek. Clearly, the FFA Parties should utilize the flexibility provided by site-specific conditions (e.g., modified fish consumption rates for stream locations with limited fish populations controlled by DOE) while evaluating regulatory compliance at the EMDF. However, site-specific conditions should be used with appropriate treatment, not instead of treatment.

⁶ TDEC Comment Letter: *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee* (DOE/OR/01-2664&D3), July 23, 2021; available at <https://doeic.science.energy.gov/uploads/F.0600.029.0856.pdf>.

A version of ion exchange treatment using media such as resins is the generally accepted approach for removing radiological constituents prior to discharge. DOE has and continues to use such wastewater treatment methods across the ORR and can lead the discussion of appropriate treatment media for radionuclides projected to be disposed in the EMDF.

10. **Landfill Wastewater Treatment: Text Inconsistencies**

Consistent with the previous comment, the EMDF ROD must commit to the full treatment of radionuclides and hazardous/toxic chemicals in all EMDF landfill wastewater using technologies agreed by the FFA Parties. Treated effluents should be managed consistent with state regulations prohibiting bypasses—e.g., Tenn. Comp. R. & Regs. § 0400-40-05-.07(2)(l).

Active treatment of all landfill wastewater is necessary to meet the CERCLA criterion requiring reduction of toxicity, mobility, or volume through treatment. A commitment to treat the landfill wastewater in this manner would protect Bear Creek and people who use the stream for its designated recreational use, including the consumption of fish caught downstream of EMDF. A documented commitment to appropriate treatment would also facilitate resolution of this long-standing impediment to progress on a CERCLA decision for the proposed EMDF.

The D1 ROD provides inconsistent information regarding DOE's plans for landfill wastewater treatment. Section 2.12.2.4 (p. 2-46, second paragraph) states EMDF landfill wastewater may be discharged directly to Bear Creek or a tributary *without* treatment. However, other parts of the document contradict this statement by stating landfill wastewater will be treated. Examples include, but may not be limited to, the following.

- a. Table 2.1, p. 2-22 & 2-23, Reduction of toxicity, mobility, or volume through treatment: For all onsite waste disposal alternatives, including the remedy proposed for selection, the table entry indicates landfill wastewater treatment would reduce contaminants to levels required for discharge. TDEC agrees and notes this is not consistent with the statement on p. 2-46.
- b. Section 2.10.4, p. 2-26, 3rd paragraph: This paragraph states onsite waste disposal would reduce contaminant levels by treating landfill wastewater. This is not consistent with the statement on p. 2-46. TDEC requests the addition of the following sentence to the paragraph: "Discharges from the site will be treated to ensure state use classifications for the receiving water bodies are not affected."
- c. Section 2.13.3, p. 2-55, 1st paragraph: The last sentence in the paragraph states the overall remedy effectiveness is determined in part by its ability to meet the

CERCLA criterion for reduction in toxicity, mobility, or volume. TDEC agrees and notes this is not consistent with the statement on p. 2-46.

- d. Section 2.13.5, p. 2-56, 1st full paragraph on page: The text is not consistent with the statement on p. 2-46.

11. **Monitoring of Bear Creek Fish, Surface Water, and Sediment**

Considering the assessment of potential future risks posed by discharges of radioactive landfill wastewater from the EMWMF and EMDF, the EPA Administrator's DRD finds: 1) the individual with the potential maximum exposure to radionuclides in landfill wastewater would be a recreational fisherman who fishes Bear Creek and 2) default assumptions regarding fish consumption, and perhaps other default assumptions, do not represent reasonable maximum exposure at ORR. Based on those findings, the DRD directs DOE to complete fish tissue studies to support the development of preliminary remediation goals (PRGs) to support the establishment of discharge limits for radionuclides in landfill wastewater.

There are uncertainties regarding actual risks to people who will eat fish caught downstream of the EMWMF and EMDF landfill wastewater discharges. Therefore, it is TDEC's position the EMDF ROD should commit to the implementation of a program to routinely monitor levels of radionuclides and other contaminants, such as mercury and PCBs, in Bear Creek fish tissue, surface water, and sediment. The program would provide a straightforward way to demonstrate compliance with Tenn. Comp. R. & Regs. § 0400-40-07-.04(7)(a), which will be an ARAR in the ROD.

At a minimum, the program should continue throughout the operational period of the landfills, and the results should be presented at the appropriate frequency in the annual Phased Construction Completion Reports (PCCRs) for the landfills. Upon closure of each landfill, the FFA Parties will evaluate the data and agree upon any warranted post-closure monitoring.

DOE already completed an initial monitoring effort in the summer of 2021. The results and those from additional samples collected before EMDF begins discharging landfill wastewater should be used to establish baseline conditions, against which data from the future monitoring should be compared.

12. **DOE Directives and CERCLA**

The ROD should document how CERCLA requirements are met by the remedy being selected, including the role of five-year reviews (FYRs) for as long as the EMDF site cannot be used in an unrestricted manner. The D1 ROD includes several references to DOE Directives and associated requirements, including a 1000-year post-closure performance period evaluated by the PA. TDEC recognizes DOE requires compliance with DOE Directives, but the Directives, performance period, and PA dose metrics are not necessarily consistent with CERCLA requirements. If the ROD includes references

to non-CERCLA requirements that are not ARARs, it should accurately reflect these requirements are not intended to demonstrate compliance with CERCLA.

13. **Safety**

The D1 ROD includes numerous references to the ability to “safely” operate and dispose of waste in the EMWMF and proposed EMDF landfills. As stated correctly in Section 2.13.2 (p. 2-50), requirements for a CERCLA ROD are designed to protect the environment and the public. This is separate from and does not include compliance with occupational safety requirements, which is required independently and regulated by the Occupational Safety and Health Administration (OSHA), not TDEC or EPA. Revise the language to focus the ROD more clearly on compliance with CERCLA criteria.

14. **Waste Minimization**

The D5 draft RI/FS (p. ES-6) states the ROD will contain a commitment to waste minimization if an onsite disposal alternative is selected. The proposed plan (p. 13) also includes this assurance. Language in Section 2.12.2.4 (p. 2-46) of the D1 ROD falls short of a commitment, stating:

Sequencing of waste generation, as much as possible, will be a priority to reduce the amount of clean fill required by using contaminated soil waste as fill during the disposal of debris waste. Segregating waste at the generator site and maximizing recycling also will be used. This ROD has a goal for all waste-generating projects to maximize waste minimization.

TDEC appreciates prioritization of minimizing the disposal of clean material in the proposed EMDF. However, the ROD should clarify how a goal in the EMDF ROD meets the commitment when waste-generating projects are not within the scope of the EMDF ROD, as stated in Section 2.4 (p. 2-11).

15. **Offsite Waste**

The EMDF should not accept wastes generated outside the Oak Ridge Reservation (USDOE) National Priorities List (NPL) site boundary, even if they were contaminated by the receipt or transport of material from past ORR operations. The EMDF CERCLA remedy is an onsite action to be conducted entirely within the ORR. Revise the text accordingly, including but not limited to the following:

- Section 2.4, Page 2-11, 5th paragraph on page
- Table 2.4, Page 2-41, 1st row in table
- Section 2.13.2, Page 2-50, 4th paragraph in section.

Preface

16. **Page iii, Last Sentence**

Revise the sentence to clarify the ROD also summarizes and relies on information from the *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee*.

Part 1: Declaration

17. **Section 1.2, Page 1-3, last paragraph on page**

- a. The EMDF D1 ROD states the BCV ROD needs to be modified to change the land use. In conjunction with that effort, the EMDF ROD and BCV Phase 1 ROD must commit DOE to accelerating cleanup of other contaminant sources in BCV. As noted in TDEC's April 17, 2019 letter to DOE, uranium contamination already exceeds risk-based levels in Bear Creek. The EMDF CA assumes future cleanups will resolve this problem by the time EMDF operations cease. Therefore, the EMDF and BCV RODs must commit DOE to achieving substantial cleanup of other BCV contaminant sources before EMDF closure. Accelerated timeframes for cleaning up contaminant sources in BCV must be reflected in the FFA (Appendices E and J). If appropriate, describe how the cleanups would support the antidegradation compliance approach (also known as the mercury strategy).
- b. The FFA Parties should discuss and agree upon a Zone 1 land-use designation. Regardless of the designated land use, the stream designation is determined by the Tennessee Board of Water Quality, Oil & Gas.
- c. Revise the last sentence to clarify DOE prohibits fishing in the upstream portion of the Bear Creek watershed. It is not accurate to claim fishing is prohibited within the whole watershed. As stated in the previous sentence, fishing *advisories* exist for downstream portions of Bear Creek.

State of Tennessee advisories against fish consumptions are not prohibitions. Available information indicates anglers catch and eat fish caught downstream of Bear Creek, which receives landfill wastewater discharged from EMWMF and is anticipated to receive landfill wastewater discharged from EMDF.

The U.S. Department of Health and Human Services (1998) reports, "Most participants of an exposure investigation conducted for the Tennessee River portion of Watts Bar Reservoir continued to eat the same amounts and kinds of fish or turtles even when they were aware of the consumption advisories."⁷

⁷ U.S. Department of Health and Human Services, 1998, *Serum PCB and blood mercury levels in consumers of fish and turtles from Watts Bar Reservoir, Watts Bar Reservoir/Clinch River Operable Unit, Oak Ridge Reservation (USDOE), Oak Ridge, Anderson County Tennessee, CERCLIS No. TN1890090003*,

Campbell et al. (2002) found 48 percent (%) of the people interviewed believed the fish caught in the study area were safe to eat.⁸ The study area included the Clinch River arm of Watts Bar Reservoir, downstream of Melton Hill Dam, and Poplar Creek up to the Blair Road access point. The survey found 90% of anglers fishing in Poplar Creek when interviewed had heard about the fish consumption warnings, and 40% thought the fish were safe to eat. Fewer than 5% of anglers who knew about the fish consumption advisories talked about limiting fish consumption. Similarly, Burger and Campbell (2010) found 38% of anglers ate fish they caught in the same survey area.⁹

- d. Preventing fishing on Bear Creek within Zone 1 requires enforcement of land use controls. Currently, fishing would involve criminal trespass on restricted federal land. The ROD should clarify that any future decision to transfer ownership of land in Zone 1 would require reevaluating the remedy for risks associated with additional potential exposure pathways.
- e. The fishing advisory is not a “prohibition” because the nature is more of a warning than an enforceable restriction. Although *prohibition* is not defined, the advisory only warns through signage that leads to information describing contamination in the creek via a Quick Response (QR) code.

If DOE has posted “No Trespassing” signs on its property, has it considered whether the signs are posted in accordance with Tenn. Code Ann. § 39-14-405 for state criminal prosecution of criminal trespass? Is there sufficient fencing in Bear Creek Valley west of Y-12 to constitute the element of “enclosed” property under 42 USC § 2278a? While these are criminal misdemeanors at state and federal levels, have charges ever been filed against trespassers in this area to enhance the deterrent effect? Are there systematic patrols in this area to look for trespassers?

The threshold question to be answered before discussion of trespassing is ownership of the creek bed. The determination of ownership of the creek bed depends on navigability. There is little case law about this subject. Existing cases are generally old, but they have not been overruled. See Tennessee Attorney

Atlanta, GA: Agency for Toxic Substances and Disease Registry, Division of Health Assessment and Consultation, Exposure Investigation and Consultation Branch.

⁸ Campbell, K.R., Dickey, R., Sexton, R., and Burger, J., 2002, *Fishing along the Clinch River arm of Watts Bar Reservoir adjacent to the Oak Ridge Reservation, Tennessee: behavior, knowledge and risk perception*, Science of The Total Environment, v. 299, Issues 1-3, November, p. 145-161.

⁹ Burger, J., and Campbell, K.R., 2008, *Fishing and consumption patterns of anglers adjacent to the Oak Ridge Reservation, Tennessee: higher income anglers ate more fish and are more at risk*, Journal of Risk Research, 11:3, 335-350, DOI: 10.1080/13669870701795560.

General's Office, AG Opinion 11-75, October 21, 2011, and *State v. West Tenn. Land Co.*, 19 Cates 575,158 S.W. 746 (Tenn. 1913).

The Tennessee Supreme Court dealt with ownership and use of streams by placing streams in the category of either navigable or non-navigable. The concept of navigability is further divided into navigable in the legal sense and navigable in the ordinary sense. The state owns the bed of streams that are navigable in the "legal sense" and "ordinary sense."

If the river be a public navigable stream, in the legal sense, the soil covered by the water, as well as the use of the stream, belongs to the public. But if 'it be not navigable in the legal meaning of the term, — as is the case in England as to all streams above the flow of the tide — the ownership of the bed of the stream is in the riparian proprietors, but the public have an *easement* therein, for the purposes of transportation and commercial intercourse.' A distinction is taken, by the common law, between streams which, in the common acceptance of the term, are suited to some purposes of navigation, and small, shallow streams which are not so. In respect to the former — which, though not navigable in the sense of the law, are yet of sufficient depth, naturally, for valuable floatage, as for rafts, flat-boats, and perhaps small vessels of lighter draft than ordinary, — while it is settled, that the right of property, in the bed of the stream, is vested in the riparian proprietor, and in that respect it is to be regarded as a private river; still it is equally well settled, that the public have a right to the free and uninterrupted use and enjoyment of such stream, for all the purposes of transportation and navigation to which it is naturally adapted. And this *easement*, or "servitude of public interest," in the phrase of the Roman law, is as absolute and unlimited in the public, in reference to this class of rivers, as to rivers navigable in the technical meaning of the term.

But as to shallow streams, unfit for such purposes of transportation and commerce, both the right of property and use are wholly and absolutely in the owner of the adjoining lands. Angel on Watercourses, §§ 535, 539, and authorities there—referred to 3 Kent's Com. 411, 427.¹⁰

It is impossible to imagine Bear Creek as a navigable stream in either the legal or ordinary sense in its upper reach. Unless there is the servitude of public interest, the rights of ownership also carry the ability to exclusively possess the property and the ability to exclude others. So, the changes made in land use to "restricted recreational" are inherently part of its ownership of property. It is DOE's prerogative to change its future plans for the property, but relevance of the land use change is doubtful. The risk from fishing is not managed by limiting access

¹⁰ *Stuart v. Clark's Lessee*, 32 Tenn. 9, 17 (1852).

because the fish themselves have mobility, and the contaminants bioaccumulate through the ecosystem, which knows no property boundary.¹¹

There has also been a consideration of the extent of public access under the servitude. The recent case dealt with the right to float on the river in question and the right of portage, but it did not establish rights to wade in the stream and fish. It is the difference between floating on the water still owned by the public and touching the bottom in wading.¹²

The conclusion is that DOE likely can control access by obstruction, and any access would be made illegally and subject to penalties for trespassing.

18. **Section 1.2, Page 1-4, 1st sentence on page**

The cited sentence (and a similar one on p. 2-33) states DOE removes beavers and their habitat from Bear Creek as a best management practice (BMP) to discourage fishing.

- a. Clarify whether DOE removes beavers and their habitat from the entirety of Bear Creek, or identify specific stream reaches. In either case, habitat destruction and wildlife removal do not comprise a BMP, particularly as a goal of an environmental cleanup program. Removal of contamination from the ecosystem is an example of a BMP. If removal of beaver dams is a part of the remedy, the ROD needs to provide further explanation regarding the rationale and implementation plans.
- b. Has DOE evaluated the ostensible merits of beaver habitat removal (discouragement of fishing) relative to the merits such habitat may provide (reducing downstream transport of mercury-contaminated sediment)?
- c. TDEC notes the practice of habitat alteration though beaver dam removal might need to comply with the substantive requirements of a general Aquatic Resource Alteration Permit (ARAP).

19. **Section 1.2, Page 1-4, last paragraph on page**

- a. Delete the term *permanent* from the first sentence. As CERCLA waste is disposed in the proposed EMDF, ongoing monitoring of EMDF discharges may cause the permanence of disposal of a problematic waste stream to be questioned.
- b. The waste disposal remedy selected in the ROD must address CERCLA's preference for cleanup through active treatment of all landfill wastewater, not just individual waste lot decisions in other CERCLA documents.

¹¹ *Miller v. State*, 124 Tenn. 293, 137 S.W. 760, 1910 Tenn. LEXIS 56, 16 Cates 293 (1910).

¹² *City of Townsend v. Damico*, 2014 Tenn. App. LEXIS 302 (Tenn. App. 2014).

20. **Section 1.2, Page 1-5, last sentence in section**

Add the following sentence to the end of Section 1.2.

In addition, the EMDF facility will include active treatment of landfill wastewater generated at the site to minimize contaminant transport to downstream receptors.

21. **Section 1.3, Page 1-5, 1st paragraph in section**

Revise the third sentence as follows:

Onsite disposal of most building demolition debris and soil supports timely and cost-effective cleanup, while waste that does not meet WAC will be disposed offsite.

22. **Section 1.3, Page 1-5, 2nd bullet**

An ARAR can be applied even if it limits availability of the entire CERCLA risk range. EPA guidance provides that in most instances, ARARs are considered protective without a separate consideration of compliance with the risk range, except when there are multiple contaminants and pathways of exposure, which is the case for EMDF. For surface water the ARAR does not allow the full use of the risk range, capping risk to 1×10^{-5} , per the EPA Administrator's DRD.¹³

23. **Section 1.3, Page 1-5, last bullet (Footnote 1)**

Modify the footnote to read: "In this document...across the EMDF footprint, and agreed upon by the FFA Parties (DOE, EPA, and TDEC)."

24. **Section 1.3, Page 1-5, last paragraph**

Explain how the CBCV site offers the distinct advantage of "...addressing technical challenges related to protection of surface water and groundwater resources...."

25. **Section 1.4, Page 1-6, 1st full bullet**

- a. Point the reader to the location of the WAC within the document.
- b. TDEC and EPA should be involved with DOE in defining and approving operations-based WAC. Consensus and transparency would eliminate conflicts of interest that exist when the party generating the waste has sole responsibility for deciding whether the material meets WAC at a landfill operated by the same party. Regulator involvement in the process, consistent with the FFA for the ORR, would support the oversight needed to ensure WAC compliance. If operational constraints are intended to protect the public and the environment to DOE

¹³ EPA, 1997, *Clarification of the Role of Applicable, or Relevant and Appropriate Requirements in Establishing Preliminary Remediation Goals under CERCLA*, OSWER 9200.4-23, August 22.

standards and not CERCLA requirements, the ROD should state such constraints are not being relied on for CERCLA compliance.

Radionuclide inventory limits comprise a key element of protective WAC. Therefore, radionuclide inventory limits must be included in the ROD, as promised in the D5 RI/FS (p. ES-7), not established in a future (post-ROD) document.

26. **Section 1.4, Page 1-6, 3rd full bullet**

Consistent with other statements in the document (e.g., Section 2.12.2.1), revise the first sentence to state “up to 2.2 million cy” instead of “approximately 2.2 million cy.”

27. **Section 1.4, Page 1-6, 4th full bullet**

In the first sentence, change “permanently isolate the waste from human and environmental receptors” to “isolate the waste from human and environmental receptors over the long term.”

28. **Section 1.4, Page 1-6, 6th full bullet**

Elaborate on the “groundwater and surface water drainage features” to be constructed or cite the appropriate section where the features are described.

29. **Section 1.4, Page 1-6, 8th full bullet**

Expand this bullet to read:

Construction and operation...consistent with ARARs to minimize the release of contaminants into adjacent and downstream surface water bodies for uptake by potential receptors. The discharge limits are presented...

30. **Section 1.4, Page 1-7, 1st bullet on page**

Modify this bullet to read: “Routine performance...consistent with ARARs to inform the need for any necessary corrective actions during EMDF operation.”

31. **Section 1.4, Page 1-7, last bullet in section**

- a. The FFA Parties should discuss and agree upon a Zone 1 land-use designation other than “restricted recreational use.” Additional discussion may be warranted regarding any potential effects the designation will have on classified uses of the stream.
- b. Once the land use designation is changed for Zone 1, how will DOE enforce restricted recreation (i.e., no fishing)? The ROD should clarify how DOE will ensure the integrity of the Zone 1 restricted recreation designation will be maintained.

32. **Section 1.5, Page 1-7, 1st paragraph in section**

The text should clarify DOE seeks waivers for *two* TSCA requirements in 40 CFR 761.75(b)(3), which is quoted below. One is the hydraulic connection, and the other is the separation between the bottom of liner system and the historical high-water table.

(3) Hydrologic conditions. The bottom of the landfill shall be above the historical high groundwater table as provided below. Floodplains, shorelands, and groundwater recharge areas shall be avoided. There shall be no hydraulic connection between the site and standing or flowing surface water. The site shall have monitoring wells and leachate collection. The bottom of the landfill liner system or natural in-place soil barrier shall be at least fifty feet from the historical high-water table.

The text should also state that DOE seeks a waiver for 40 CFR 761.75(b)(5), which deals with the topographic relief of the disposal site to prevent erosion and landslides or slumping. See the Proposed Plan (p. 18, 22, and A-3).

The text mentions the waivers would be invoked under 40 CFR 761.75(c)(4). For consistency with the Proposed Plan, the text should also state that DOE is not requesting any statutory waivers under CERCLA 121(d)(4) or Section 300.430(f)(1)(ii)(C) of the National Contingency Plan (NCP).

33. **Section 1.5, Page 1-7, 2nd sentence in section**

The cited sentence states, "There is no Principal Threat Waste to be addressed as part of this action." The ROD needs to clarify this statement. Various DOE documents, including annual Remediation Effectiveness Reports (RERs) for the ORR, indicate the presence of principal threat source material at Y-12 and ORNL. If disposal of principal threat waste is not in the scope of the remedy, the prohibition should be listed among the administrative WAC in Table 2.4.

34. **Section 1.6, Page 1-7, 1st bullet in section**

While noting the reference to waste generation project contaminants of concern (COCs), the text states that Section 2.7 includes COCs and their respective concentrations. Section 2.7 provides no list of COCs and no concentrations. The text should be revised to reflect COC projections assumed in developing WAC and establishing discharge limits for landfill wastewater. At a minimum, the ROD should document key chemicals (e.g., mercury, beryllium, and asbestos) and classes of chemicals (e.g., PCBs and dioxins/furans) anticipated to be placed in EMDF.

35. **Section 1.6, Page 1-7, 2nd bullet in section**

Clarify how waste generation project risk assessments are relevant to EMDF, considering those site-specific assessments are conducted for sites other than EMDF.

36. **Section 1.6, Page 1-7, 4th bullet in section**
Also, Section 2.7, Page 2-16, 2nd paragraph in section
The ROD needs to document how WAC keep potential future risks to the public within EPA's risk management range of 1×10^{-4} to 1×10^{-6} cumulative ELCR and HI less than or equal to 1, in accordance with CERCLA's protectiveness threshold criterion.³ The cited text states no baseline risk assessment was conducted for EMDF. CERCLA decisions (RODs) are usually supported by human health and ecological risk assessments. Section 2.7 discusses risk assessments performed in the context of site-specific waste generation projects, but the relevance of those evaluations to the EMDF ROD is not clear, as the EMDF will amass the COCs collected from those projects in a new location, where the risks associated with those COCs have not been assessed.

Part 2: Decision Summary

37. **Section 2.1, Page 2-3, last sentence in section**
Revise the sentence to clarify whether EMDF operations are projected to support the cleanup mission for at least three decades. A draft of DOE's 2021 Appendix J Non-Enforceable Out-Year Planning Targets includes a Remedial Action Report (RAR) for EMDF in 2047, which indicates about two decades of projected operation, based on initiation of operations in the late 2020s.
38. **Figure 2.2, Page 2-5**
Use different colors, cross-hatching or some other symbology to distinguish Site 7A from Site 7C. Because these sites overlap, the boundaries of each site are not clear.
39. **Section 2.2.1, Page 2-7, 2nd paragraph**
Revise the first sentence to acknowledge DOE continued monitoring groundwater levels beyond the initial year required by the approved sampling plan.
40. **Section 2.2.1, Page 2-7, 4th bullet**
Delete the portion of the last sentence that discusses the use of groundwater models to predict groundwater levels after the landfill is constructed. As described in Section 2.14.3, the FFA Parties agreed to determine the seasonal high water table elevation through a field study rather than through groundwater modeling.
41. **Section 2.2.1, Page 2-7, 1st paragraph after bullets**
a. Revise the first sentence as follows:

Results of the Phase 1 site characterization support final site selection. The results also confirm the CBCV site is suitable for a new, low-level (radioactive) waste (LLW) landfill with the incorporation of an RAO to maintain a 15-ft separation between the bottom of emplaced waste and the seasonal high-water table (see Sect. 2.8).

In the context of site suitability, it is imperative to note incorporation of this RAO. Without implementation of the RAO, the CBCV Site would not be suitable, as conceptual designs presented in the RI/FS and subsequent meetings would place waste below current groundwater levels, as stated in Table 2.1.

- b. The ROD must specify waste disposal in the EMDF would be prohibited if there is a failure to achieve 15 ft of separation between the waste and the seasonal high-water table, as required by the RAO. Per 40 CFR 300.435(b), DOE must ensure all ARARs and terms of ARAR waivers are met and must conform all Remedial Design/Remedial Action (RD/RA) activities to the ROD. TDEC cannot legally approve the landfill design if the remedy does not conform with RAOs and ARARs (including waiver conditions) in the ROD.

42. **Section 2.2.1, Page 2-7, last paragraph**

- a. Delete the first sentence or revise it for accuracy. Given the wide range of well completion details and potentiometric surface elevations in BCV, the potential relevance of the statement is unclear.
- b. The sentence also requires correction because it is not accurate to state groundwater [water table] elevations are similar to predictions in the RI/FS. Although the D5 RI/FS did not present predicted water table elevations in tabular/numerical form, it provided diagrams showing water table elevations as much as 30 ft lower than levels measured during the subsequent investigation (reported in TM-1 and TM-2 reports). Water levels measured in subsequent years were even higher.

43. **Section 2.2.2, Page 2-9, 4th paragraph in section**

- a. Should the first sentence cite the 2021 RER instead of the 2020 report?
- b. The last sentence in the cited paragraph states contaminant concentrations in BCV have improved as a result of actions taken to date and notes final remediation goals have not been met. TDEC requests clarification of this text because final remedial goals are not established in the BCV ROD, which is a Phase 1 document.
- c. Would it be more accurate to state concentrations of *some* contaminants in Bear Creek have decreased over the long term? The 2021 RER states uranium discharges were more than four times the ROD goal for annual flux, and average uranium-238 (U-238) concentrations also exceeded the risk-based goal. It states EMWMF landfill wastewater discharges increased technetium-99 concentrations in Bear Creek to levels much higher than typical during November 2019.

44. **Section 2.3, Page 2-10, 2nd bullet**
Cite the final *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee* instead of the 2016 (D2) version.
45. **Section 2.4, Page 2-11, 4th paragraph**
The cited paragraph states treatment of CERCLA waste to meet the EMDF WAC (e.g., Land Disposal Restrictions [LDRs]) is outside the EMDF scope. Statements throughout the D1 ROD indicate the responsibility for documenting hazardous waste treatment will be the waste generator's responsibility. That responsibility should be documented in this paragraph, along with a general description of which CERCLA reports will document such treatment. The paragraph should also be revised to acknowledge generation of mixed CERCLA waste will be reported in conjunction with the Site Treatment Plan.
46. **Section 2.4, Page 2-11, last paragraph**
The last sentence on the cited page states DOE has completed the required public review and comment on all information associated with the evaluation presented in the Proposed Plan. TDEC anticipates this will be a factual statement upon signing the final ROD. However, as of the D1 ROD (summer 2021), DOE has not completed the required public review and comment on WAC, as the Proposed Plan did not present that information. It is also TDEC's perspective that additional public review and comment is warranted on updated groundwater information, approaches for establishing landfill wastewater discharge limits, and significant changes the D1 ROD incorporates in the ARAR table.
47. **Section 2.5.2, Page 2-13, 1st paragraph**
- a. Delete the sixth full sentence, beginning with "Piezometric surface," or revise it for accuracy. Given the wide range of well completion details and potentiometric surface elevations in BCV, the potential relevance of the statement is unclear.
 - b. The sentence also requires correction because it is not accurate to state groundwater [water table] elevations are similar to predictions in the RI/FS. Although the D5 RI/FS did not present predicted water table elevations in tabular/numerical form, it provided diagrams showing water table elevations as much as 30 ft lower than levels measured during the subsequent investigation (reported in TM-1 and TM-2 reports). Water levels measured in subsequent years were even higher.
 - c. The seventh sentence states, "The piezometric surface responds to rainfall events, indicating recharge is occurring on the site." TDEC's analysis of the piezometer data suggests direct recharge from infiltrating precipitation accounts for a small

proportion of the measured water level fluctuations, relative to seasonal effects from the dry season (summer/fall) to the wet season (winter/spring).

48. **Section 2.5.3, Page 2-13, last paragraph on page**

Cite the reference for the U.S. Geological Survey base flow data mentioned in the second sentence. TDEC requests that DOE provide a copy of the information or a link to its location.

49. **Section 2.5.4, Page 2-14**

Per Tenn. Comp. R. & Regs. § 0400-40-07-.04(7)(a) (an applicable regulation per Table A.2), mitigation is required when an activity results in an appreciable permanent loss of resource value such as the fill of wetlands. In what primary document will DOE propose its mitigation plans for these wetland impacts?

The following general comments were developed during TDEC's review of the EMDF Natural Resource Assessment report. These comments are among several submitted to DOE on November 29, 2018. They are repeated here because TDEC identified several deficiencies in the assessment that serves as the basis for statements in Section 2.5.4 of the D1 ROD. The report was not a primary FFA document, and DOE elected not to respond to TDEC comments.

The assessment described in [the Natural Resources] report is inadequate to comprehensively inventory flora and fauna species in the proposed EMDF area. Examples of key deficiencies include the following:

- Collectively, DOE, TDEC, and Domain 07 National Ecological Observatory Network (NEON) assessments documented 11 state and federally listed flora and fauna species in the CBCV area since 2015. However, the DOE assessment does not document four of these species.
- The report provides insufficient information for several surveys associated with DOE's assessment. For example, the report provides minimal justification to explain the rationale for sampling site choices, and DOE did not sample some parts of the survey area.
- The report does not present species accumulation curves or rarefaction analyses to demonstrate whether the assessment sufficiently represented species living in ecological community at the CBCV site.
- The assessment did not include a benthic macroinvertebrate survey or address the structure or condition of this community. TDEC recommends DOE survey the benthic macroinvertebrate community at the CBCV site, including spring and fall samples, before construction activities affect these communities.

- Upper headwater streams often provide habitat for taxa not typically found further downstream in the watershed. The diversity of fish species is likely limited in headwater streams, so macroinvertebrates are often critical members of healthy stream ecosystems. DOE should identify macroinvertebrates at the lowest taxonomic levels possible. A cursory examination will not provide the necessary information to determine impacts to the aquatic communities during and after landfill construction.
- DOE conducted plant surveys only along streams and tributaries and not within the proposed EMDF footprint. Rare plant species likely exist throughout the survey area, not just along streams and tributaries.
- The assessment did not document at least two common vertebrate species and more than five threatened and endangered (T&E) vertebrate species (among all vertebrate taxa) known or likely to exist in the CBCV area.
- The assessment may have not have adequately sampled cavity-roosting bat species which are often underrepresented by acoustic surveys. Four state and federally listed T&E bat species in the area are cavity-roosting species. DOE should conduct mist-netting and/or direct roost searches to represent T&E bat species at the CBCV site more completely.
- The assessment did not document five species of shrews, four T&E species and one common species, known or likely to live in the CBCV site area. Sherman live traps are not well suited for evaluating fossorial and semi-fossorial species (e.g., moles and shrews). DOE's assessment should use additional methods to produce a more complete inventory of the small mammal community.
- The report states Sherman live traps were set in "strategic locations at each point," but it does not describe how DOE selected the strategic locations. While this approach is common practice, it may inadvertently bias the species captured. For example, setting Sherman traps along fallen logs is a great way to target certain species of rodents that utilize fallen debris as thoroughfares to travel above leaf litter, but setting traps in this manner is likely to miss species that prefer to navigate under the cover of the leaf litter itself.
- The report should provide more detailed information about the duration of the small mammal survey. It appears the survey was not sufficient to characterize the small mammal community. If so, DOE should complete a more thorough inventory of the small mammal community to document other species that may be present, particularly rare species.
- The report indicates 48 Sherman traps (three traps per site at 16 sites across the survey area) were set for a single night. Typical return on small mammal

trapping effort is approximately 10% trap success. For 48 traps, DOE was likely to capture only four to five animals per night of trapping. This is not sufficient to describe the small mammal community of any area, especially the CBCV community, which is dominated by a single species (>90% deer mouse, *sensu lato*).

- The report should include more detailed information about cover board sampling for reptiles and amphibians.
 - The report provides no information about cover board placement or location selection. If field crews placed cover boards at strategic locations, as described for the Sherman live traps, the survey may have biased the reptile and amphibian inventory to species that favor microhabitats represented by the selected locations.
 - It is unclear whether field crews placed cover boards on the same night as the Sherman traps. If so, the sampling activities may have interfered with each other if locations for cover boards were near the small mammal trap locations.

50. **Section 2.7, Page 2-16, 3rd paragraph in section**

The cited paragraph suggests the choice is to build EMDF at the CBCV Site or accept risks of no action. This text should be clarified to be consistent with the draft RI/FS reports. The RI/FS drafts evaluated other alternatives and determined them to be protective. As stated in Section 2.9 and summarized in Table 2.1, protective alternatives included a Dual Site Alternative (construction of two smaller onsite landfills), a Hybrid Disposal Alternative (significant disposal at onsite and offsite landfills), and an Offsite Disposal Alternative (offsite disposal of all CERCLA waste exceeding the capacity of EMWMF).

51. **Section 2.8, Page 2-17, 1st & 2nd bullets**

The ROD does not explain how the remedy will prevent “exposure that exceeds a human health risk of 1×10^{-4} to 1×10^{-6} cumulative ELCR or HI of 1” required by two of the RAOs.³

52. **Section 2.9.2, Page 2-18, 3rd paragraph below bullets**

As noted in General Comment 2(f), revise the text to include a clear statement that the temporary drainage features will only be used to control surface water, perched groundwater, and infiltration. The ROD should also state that EMDF will not rely on drainage features under the waste, including underdrains to permanently suppress the water table.

53. **Table 2.1, Pages 2-22 & 2-23**

- a. Overall protection of human health and the environment: The entry for the CBCV site states “Would meet all RAOs.” However, the ROD does not explain how the

remedy would meet the first two RAOs listed on p. 2-17—namely, preventing “exposure that exceeds a human health risk of 1×10^{-4} to 1×10^{-6} ELCR or HI of 1.”³

- b. In the row titled *Long-term effectiveness and permanence* at the top of p. 2-22, the last CBCV Site bullet states, “Temporary drainage features are not expected to be used long term. Temporary drainage features.” Revise the bullet to state, “Drainage features are temporary.”
 - c. For CBCV site (Implementability), Table 2.1 states “Reliance on drainage systems expected to be required only during construction.” Revise this text for consistency with the language in Section 2.9.2—i.e., that temporary drainage features will only be used to control surface water, perched groundwater, and infiltration and that EMDF will not rely on drainage features under the waste to permanently suppress the water table.
 - d. Public acceptance: Update for consistency with Section 2.10.9.
54. **Page 2-28, Table 2.2**
For consistency with CERCLA guidance, the table should present capital (construction) costs and operation and maintenance (O&M) costs separately.
55. **Section 2.10.2, Page 2-25, last paragraph in section**
As noted in Comment 32, the text should clarify that DOE:
- Seeks waivers for *two* TSCA requirements in 40 CFR 761.75(b)(3)
 - Seeks a waiver for 40 CFR 761.75(b)(5)
 - Is not requesting statutory waivers under CERCLA 121(d)(4) or NCP 300.430(f)(1)(ii)(C).
56. **Section 2.10.8, Page 2-29, last paragraph in section**
The cited paragraph states DOE and the state worked together to resolve concerns listed in the preceding bullets. The long-term risk evaluation will hinge on agreements regarding the evaluated scenarios, the locations of points of compliance, and key assumptions, such as flow paths and distribution coefficients. The text should identify specific ROD sections that resolve the state’s key concerns.
57. **Section 2.10.8, Page 2-29**
For clarity and completeness, revise text in the six bullets to more accurately reflect the sequence and wording of the seven key concerns documented in the State Acceptance section of the 2018 Proposed Plan. The first three bullets are acceptable. The fourth bullet combines the third and fourth key concerns; the fifth bullet addresses the seventh key concern; and the sixth bullet addresses the fourth key concern again and combines it with the fifth key concern. The sixth key concern is not mentioned. Consider revising to avoid confusion.

58. **Section 2.10.9, Page 2-29, 2nd paragraph in section**

- a. The text states DOE received comments from 194 individual commenters. The compilation of comments DOE sent to TDEC on January 16, 2019 included comments from 195 entities (individuals or organizations), accounting for multiple comments from five entities. TDEC and DOE should compare notes to ensure all comments are considered.
- b. Consider revising the first sentence in this paragraph as follows to clarify that Part 3 *summarizes* public comments. It is important for the public to understand the ROD does not present all comments in their entirety.

The Responsiveness Summary in Part 3 of this ROD summarizes comments received during the public review and comment period and presents DOE's responses to those comments.

59. **Section 2.10.9, Page 2-29, 3rd paragraph in section**

See subsequent comment titled "Page 3-4, Summary of Comments and Responses, 3rd paragraph."

60. **Section 2.11, Page 2-32**

The cited section states, "...the concept of principal threat waste does not apply to this decision." The ROD needs to clarify this statement. Various DOE documents, including annual RERs for the ORR, indicate the presence of principal threat source material at Y-12 and ORNL. If disposal of principal threat waste is not in the scope of the remedy, the prohibition should be listed among the administrative WAC in Table 2.4.

61. **Section 2.12, Page 2-33, 2nd and 3rd paragraphs**

As noted in Comment 17(b), the FFA Parties should discuss and agree upon a Zone 1 land-use designation. The stream designation will continue to be determined by the Tennessee Board of Water Quality, Oil & Gas.

62. **Section 2.12.1, Page 2-35, 2nd Paragraph**

- a. The cited paragraph states CERCLA's preference for treatment as a principal element of the remedy is not germane to a disposal decision. The waste disposal remedy selected in the ROD must address CERCLA's preference for cleanup through active treatment of all landfill wastewater, not just individual waste lot decisions in other CERCLA documents.
- b. The cited paragraph also states the CERCLA preference will be addressed through treatment required on waste generated under other CERCLA decisions. Since DOE is managing substantial parts of the Y-12 cleanup as a removal action, as

contrasted with a remedial action, clarify which CERCLA reports will document the required treatment for the waste generating projects.

63. **Section 2.12.1, Page 2-35, Last Bullet**

The text states:

The need for underdrains is limited to consideration under berms. Any/all groundwater intercepts in use during disposal operations are conceptualized as not necessary or operational following closure and will not be under the waste.

For clarity, revise the language as follows:

Permanent underdrains are not required to control the groundwater table, although temporary drainage features may be necessary to divert surface water, perched groundwater, and infiltration from excavations and improve ground conditions to aid construction.

64. **Section 2.12.2, Page 2-37, 2nd bullet**

TDEC and EPA should be involved with DOE in defining and approving operations-based WAC. While TDEC and EPA are involved in waste characterization decisions, consensus and transparency regarding operational constraints would eliminate potential conflicts of interest that exist when the party generating the waste has sole responsibility for deciding whether the material meets operational constraints at a landfill operated by the same party. Regulator involvement in that part of the process, consistent with the FFA for the ORR, would support the oversight needed to ensure waste is managed in a protective manner.

65. **Section 2.12.2.1, Page 2-38, 1st paragraph**

The second sentence states the landfill berm may be placed over a stream identified as D-10W. This would require compliance with substantive requirements in Tenn. Comp. R. & Regs. § 0400-40-07, which are listed as ARARs in the D1 ROD. The requirements must remain as ARARs in the final ROD.

66. **Section 2.12.2.1, Page 2-38, 4th paragraph**

Add "prior to treatment" to the end of the sentence.

67. **Section 2.12.2.1, Page 2-38, 5th paragraph**

Include treatment when discussing landfill wastewater management.

68. **Section 2.12.2.2, Page 2-39, Last paragraph under Phase 1 Construction**

The ROD should clarify plans for phased construction of the landfill and the projected sequencing of waste-generating cleanup and demolition projects.

- a. How does the phased construction approach align with the preliminary design information in the March 4, 2021 EMDF Leachate/Contact Water Treatment Overview, which includes a 2.75-million-gallon collection pond in Cell 4? TDEC requests a copy of any subsequent landfill wastewater treatment plans DOE has developed.
 - b. Which waste was being referred to on May 12, 2021 when an OREM representative told the Oak Ridge Site Specific Advisory Board (ORSSAB), “some of our waste is heavy and needs to be on the floor of the disposal cell”?¹⁴
69. **Section 2.12.2.3, Page 2-39, 3rd sentence**
- a. Modify to: “The WAC will be implemented through the WAC Compliance Plan, an FFA primary document”
 - b. The current FFA notes a WAC Attainment Plan for the EMWMF. The FFA would need a minor modification for clarity.
70. **Section 2.12.2.3, Page 2-40, 2nd bullet**

TDEC recognizes DOE completed the PA, from which many of the WAC limits are derived, under its internal Directives. However, WAC must be shown to be protective in accordance with CERCLA to support the ROD. CERCLA requires a remedial alternative to be protective of human health by meeting EPA’s risk management range of 1×10^{-4} to 1×10^{-6} cumulative ELCR and HI less than or equal to 1.³

Although not directly related to WAC, which provide long-term protectiveness after landfill closure, the EPA Administrator’s December 31, 2021 the EPA Administrator’s DRD directs DOE to develop limits for radionuclides in EMDF landfill wastewater to be discharged during the decades of landfill operation to meet 1×10^{-5} ELCR based on Tenn. Comp. R. & Regs. § 0400-40-03-.03.

As explained in a PA review enclosed with TDEC’s October 15, 2020 letter to DOE, the PA base case alone does not provide a basis for analytic WAC development that satisfies the CERCLA threshold criterion for protectiveness. Moreover, the PA does not evaluate the toxic effects of uranium or of non-radiological contaminants projected for disposal.

In an effort to facilitate resolution of this concern, TDEC offered several suggestions to help DOE develop protective WAC acceptable to TDEC. These approaches focus on WAC development for radionuclides and chemical contaminants. Additional technical analysis (e.g., bioconcentration) are needed for certain chemical contaminants projected to be in the waste, including mercury and PCBs.

¹⁴ Barber, W., 2021, Proposed Landfill Called Central to Y-12, Oak Ridge National Lab Cleanup, *Weapons Complex Monitor*, v. 32, no. 19, May 14.

(1) Quantitatively evaluate the likelihood of bathtubbing after the institutional control period, based on modeling of liner infiltration with hydraulic head resulting from bathtubbing. Develop inventory-limit WAC from radionuclide concentrations in surface water and groundwater due to modeled estimates of liner overflow rate. This approach should address both compliance with ARARs, such as groundwater and surface water protection standards (e.g., uranium maximum contaminant level [MCL] and ambient water quality criteria [AWQC] values), as well as protectiveness under CERCLA ELCR and chemical hazard criteria, including site-specific assessment of fish-ingestion and agricultural exposure pathways.

(2) Apply WAC derived from the PA intruder analysis (Appendix I) as limits on concentrations in each waste lot.

(3) Modify PA inputs/assumptions in accordance with critical issues identified the PA review enclosed with TDEC's October 15, 2020 letter to DOE to calculate total-inventory WAC that provide 95% confidence that ARAR concentrations (MCL, AWQC, etc.) are not exceeded, that the 1×10^{-5} ELCR threshold is met, and that the HI of 1 is met.

(4) Modify the all-pathways model PA inputs/assumptions for evaluating impacts to Bear Creek surface water to calculate WAC that 1) do not cause exceedance of MCLs or AWQCs, 2) assure compliance with other ARARs, and 3) demonstrate protectiveness for the CERCLA thresholds (1×10^{-5} ELCR and HI less than or equal to 1) for all exposure pathways, including site-specific assessment of the fish-ingestion exposure pathway.

(5) Apply a more thorough analyte list for initial characterization efforts of individual waste lots, modified as appropriate based on process knowledge, to avoid the risk of missing important radionuclides by analyzing a shorter list. Then, scale the analytical list back to those radionuclides determined to be relevant for each waste lot.

(6) Calculate rolling WAC that change as the landfill is filled, as has been suggested for the Nevada National Security Site (NNSS) Area 5 Radioactive Waste Management Site (RWMS). This approach may be useful when there is uncertainty about the radionuclide content of future waste lots. Rolling WAC involves adjusting WAC as waste is disposed to optimize the remaining "radiological capacity" as the facility fills. It requires characterization of all waste disposed, but it provides for efficient use of the resource (landfill) and allows protectiveness to be demonstrated.

71. **Section 2.12.2.3, Page 2-40, 1st paragraph after bullets**

This paragraph states each waste stream will be certified by the generator as complying with all WAC before being allowed to send waste to EMDF. DOE Manual (M) 435.1-1 requires implementation of a waste certification program to ensure WAC are met. The program shall designate officials who have the authority to certify and release waste for shipment.

TDEC understands a post-ROD WAC compliance plan will present additional details, but several questions are relevant to the decision in light of lessons learned from EMWMF operations and weakness identified in DOE's July 2020 report, *Enterprise-wide Assessment of the Department of Energy's Packing and Shipping of Radioactive Waste*.¹⁵

- a. Is waste certification authority held by DOE officials or contractor personnel?
- b. If waste certification authority resides with personnel employed or subcontracted by the contractor that builds and operates the landfill and staffs the WAC Acceptance Team, what safeguards will be established to minimize potential conflicts of interest, where the same entity controls waste generation; landfill construction, operation and monitoring; waste certification; and waste transportation?
- c. Other than contracting, what role does DOE play in the waste certification process?
- d. Would DOE be willing to consider more independent review of WAC compliance by trained personnel not employed or subcontracted by the contractor that builds and operates the landfill?

72. **Section 2.12.2.3, Page 2-40, 2nd paragraph after bullets**

TDEC and EPA should be involved in defining and approving operations-based WAC. If operational constraints are intended to protect the public and the environment to DOE standards and not CERCLA requirements, the ROD should state such constraints are not being relied on for CERCLA compliance.

73. **Section 2.12.2.3, Page 2-40, Administrative WAC**

This paragraph states hazardous waste must be treated to meet LDRs before disposal. Using mercury as an example, how much contaminant mass would the LDRs allow to be disposed in EMDF?

74. **Table 2.4, Page 2-41, EMDF Administrative WAC**

- a. Wherever possible, the table should cite legal requirements rather than Triparty (FFA Party) agreements. Those requirements should be included as ARARs in

¹⁵ Available at <https://www.energy.gov/ea/downloads/enterprise-wide-assessment-department-energys-packaging-and-shipping-radioactive-waste>.

Appendix A of the ROD, which will become the final agreement upon approval by the FFA Parties.

- b. Administrative WAC in Table 2.4 should prohibit onsite disposal of reactor components, process equipment/piping, and laboratory equipment. This would be consistent with the Secretary of Energy's statement during a Congressional hearing on May 6, 2021 that the EMDF is designed to hold low-risk construction waste from building demolition at Y-12 and ORNL.^{16,17}
- c. The second row should cite the definition of radioactive waste in Tenn. Comp. R. & Regs. § 0400-20-11-.03(21), which specifically excludes transuranic (TRU), high level (radioactive) waste (HLW), spent nuclear fuel (SNF), and 11e(2) byproduct waste. Disposal of TRU waste at EMDF would also be prohibited by Public Law 102-579, The Waste Isolation Pilot Plant [WIPP] Land Withdrawal Act.
- d. In addition to listing NRC Class C limits for certain radionuclides in Table 2.4, list all numerical WAC in a single table. This could be in addition to or in lieu of inventory limits in Table 2.5 and intrusion-based activity concentration limits in Table 2.6. The table should include limits for all relevant radionuclides and chemicals, including limits derived from LDRs and other ARARs. TDEC provided a template for such a table for DOE consideration on August 26, 2021.

Criteria for disposal of hazardous waste constituents are presented in WAC for every DOE and commercial low-level radioactive waste (LLRW) facility researched by TDEC, including EMWMF. Some implementation details may be presented in the WAC compliance plan, but the EMDF ROD needs to provide more detail regarding waste types to be addressed by the CERCLA remedy. Pending agreement on the ARARs to be included in the ROD, uncertainty remains about administrative WAC.

- e. The fourth row of the table should cite Tenn. Comp. R. & Regs. § 0400-20-11-.17(7)(a) in its entirety—not just the sixth paragraph. For example, the fourth paragraph addresses the capability of waste to detonate, decompose explosively, or react with water; and the eighth paragraph addresses infectious material.
- f. The fifth row of the table should cite Tenn. Comp. R. & Regs. § 0400-20-11-.17(3)(d), (7)(b)(1), and (7)(b)(3), which should be listed as ARARs in Appendix A in lieu of citing a negotiated agreement.

¹⁶ Barber, W., 2021, Granholm Backs Oak Ridge Landfill, Hears Portsmouth Contamination Concerns in Budget Hearing, *Weapons Complex Monitor*, v. 32, no. 18, May 7.

¹⁷ Barber, W., 2021, EPA Taking Second Look at Planned New Landfill for Oak Ridge, *Weapons Complex Monitor*, v. 32, no. 27, July 9.

- g. In the last row of the table, DOE should consider adding Tenn. Comp. R. & Regs. § 0400-20-04-.04(1)(uuu) [10 CFR 150.11(a)] as an ARAR. The rule defines “Special nuclear material in quantities not sufficient to form a critical mass.” The federal requirement at 40 CFR 761.65(c)(6)(i)(C) should also be considered. It states, “Containers used to store both liquid and non-liquid PCB/radioactive wastes must meet all regulations and requirements pertaining to nuclear criticality safety.” This rule is an ARAR in RODs for other DOE CERCLA landfills, including the EMWMF¹⁸ and the Portsmouth On-Site Waste Disposal Facility (OSWDF).¹⁹
- h. In addition, it is reasonable for the ROD to include more detail, or at least commit to providing more detail in the WAC compliance plan. Similar documents provide such information for other CERCLA landfills. For example:

EMWMF: The WAC attainment plan describes wastes for which a Criticality Safety Evaluation (CSE) shall be performed.²⁰

Portsmouth OSWDF: The WAC implementation plan provides at least three conditions that must be met to maintain nuclear criticality safety.²¹

75. **Section 2.12.2.3, Page 2-42, Analytic WAC, 2nd paragraph on page**

The D1 ROD cites the PA as the basis for inventory limits intended to protect people if contaminants are released to groundwater and Bear Creek in the future. The D1 ROD is a CERCLA document, but it does not provide WAC for chemicals and radionuclides that are demonstrated to be protective of public health in accordance with the CERCLA threshold criterion. The PA is not a CERCLA document, and it does not address non-radiological contaminants, such as mercury and PCBs. The review enclosed with TDEC’s October 15, 2020 letter highlights the state’s concerns about applying the PA as the sole basis for a CERCLA decision.

A letter from DOE to TDEC dated February 4, 2021 (revised March 8, 2021 with no date change) states “the CERCLA process is a separate regulatory path from the DOE

¹⁸ *OU-13 Record of Decision for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act of 1980 Waste, Oak Ridge, Tennessee* (DOE/OR/01-1791&D3); <https://doeic.science.energy.gov/uploads/F.0600.031.0184.pdf>.

¹⁹ *Record of Decision for the Site-Wide Waste Disposition Evaluation Project at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (DOE/PPPO/03-0513&D2); <https://www.energy.gov/sites/default/files/2015/07/f24/2015%2006-30%20PPPO-03-3018616-15%20FINAL%20ROD%20for%20the%20WD%20Evaluation%20Project%20at%20PORTS.pdf>.

²⁰ *Attainment Plan for Risk/Toxicity-Based Waste Acceptance Criteria at the Oak Ridge Reservation, Oak Ridge, Tennessee* (DOE/OR/01-1909&D3); <https://doeic.science.energy.gov/uploads/F.0600.033.0087.pdf>.

²¹ *Waste Acceptance Criteria Implementation Plan for the On-Site Waste Disposal Facility at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (DOE/PPPO/03-0728&D3); <http://edocpub.epa.ohio.gov/publicportal/ViewDocument.aspx?docid=1338381>.

O 435.1 process that ensures protectiveness through the PA and CA evaluations, and the development of the WAC will be addressed with the FFA Parties outside of DOE O 435.1 efforts.” During May, July, August, and September 2021, DOE hosted several 60- to 90-minute sessions during which TDEC proposed approaches to develop WAC that satisfy CERCLA’s protectiveness criterion in a defensible and transparent manner. The goal of TDEC’s recommendations was to derive WAC shown to be protective for groundwater and surface water within EPA’s risk management range of 1×10^{-4} to 1×10^{-6} cumulative ELCR and HI less than or equal to 1.³

The last sentence of the cited paragraph states inventory (WAC) limits in Table 2.5 are the *maximum* public doses allowed by Tenn. Comp. R. & Regs. § 0400-20-11-.16(2) [10 CFR 61.41]. The paragraph should also acknowledge the ARAR states “Reasonable effort shall be made to maintain releases of radioactivity in effluents to the general environment *as low as is reasonably achievable.*” As noted in the EPA Administrator’s DRD, limits set in accordance with this ARAR can be used in combination with the ALARA approach to produce radionuclide effluent concentrations that would be as stringent as those derived through application of CWA and TWQA regulations, ensuring protectiveness of human health and the environment consistent with CERCLA.

The last sentence of the paragraph also states the public protection annual dose limits derived from Tenn. Comp. R. & Regs. § 0400-20-11-.16(2) [10 CFR 61.41]—i.e., 25 millirem (mrem) to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ of any member of the public—have been deemed protective under CERCLA by EPA.

TDEC notes a regulation is not *inherently* protective; rather, protectiveness depends on *compliance* with the ARAR. Also, EPA provides an approximate Effective Dose Equivalent (EDE) of 10 mrem/year to assist with applying this requirement to radiation risk assessment at CERCLA sites.²²

Cleanup levels based on some older ARARs that use a 25/75/25 mrem/yr standard (i.e., 25 mrem/yr to the whole body, 75 mrem/yr to the thyroid, and 25 mrem/yr to any other critical organ) may appear to permit greater risk than those based on 15 mrem EDE but on average correspond to approximately 10 mrem/yr EDE, using current risk methodologies.

TDEC provided a template for a WAC table for DOE’s consideration on August 26, 2021 that included groundwater pathways analytic WAC based on RESRAD-OFFSITE single radionuclide soil guidelines that are derived from ELCR calculations employing radionuclide slope factors.

²² See Footnote 11 in *Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination*, OSWER No. 9200.4-18, August 22, 1997. Available at <https://semspub.epa.gov/work/HQ/176331.pdf>.

TDEC recognizes that DOE must also comply with DOE Orders and other Directives and may choose to apply Derived Concentration Standards (DCS) as metrics for operating a landfill, but DCS are not directly relevant as a basis for demonstrating compliance with CERCLA threshold criteria such as the risk management range. If DOE wants to base a CERCLA protectiveness demonstration, in part, on DOE Directives, those Directives must be listed in the ROD as TBC.

Landfill wastewater discharge limits based on the CWA and the 10-millirem (mrem) EDE supported by EPA guidance, per the EPA Administrator's DRD, will be more protective than DCS values, which are based on an annual dose limit of 100 mrem. All landfill wastewaters must be treated using technologies agreed by the FFA Parties to meet discharge limits that are protective of human health and the environment under CERCLA for each contaminant present.

Additionally, DCS values establish media-specific concentration limits for a single exposure pathway, such as ingestion of water or inhalation of air. They do not include all relevant and applicable exposure pathways that would be considered under CERCLA, such as fish ingestion. Nor do DCS address concerns for bioaccumulation, biomagnification, or chemical toxicity which are pertinent to projected EMDF contaminants such as mercury and PCBs. Moreover, the DOE standard clearly states that DCS "are not intended to be used to infer the dose to members of the public, nor to demonstrate compliance with DOE radiation protection dose limits."

76. **Section 2.12.2.3, Page 2-42, Analytic WAC, 2nd paragraph on page & Table 2.5**
Table 2.5 presents inventory limits for only three highly mobile radionuclides, which is not adequate, as outlined in the review enclosed with TDEC's October 15, 2020 letter and summarized in Comment 70. Inventory limits may be warranted for additional radionuclides, including those listed in Attachment 1 to TDEC's June 15, 2020 WAC comments. The table provides a list of radionuclides that may need inventory limits to protect people who eat fish caught downstream of EMDF in the future. TDEC provided a template for such a table for DOE consideration on August 26, 2021.
77. **Section 2.12.2.3, Page 2-42, Analytic WAC, 2nd paragraph on page**
a. The first sentence of the cited paragraph states the PA evaluated a conservatively estimated radionuclide inventory to predict potential exposure/dose to future hypothetical receptors. TDEC understands the PA introduces some conservatism in the total inventory limit WAC by assuming 2.2 million cubic yards (cy) of waste will be placed in EMDF, even though the volume of waste projected for disposal is only 1.6 M cy.

TDEC appreciates ongoing efforts to develop WAC shown to be more protective in a CERCLA context because TDEC remains concerned about the inventory uncertainties acknowledged in the PA. In part, this is because some waste lots

projected for disposal have yet to be fully characterized. Another concern is the use of data from unspecified EMWMF waste lots derived primarily from ETPP to estimate radionuclide concentrations in future EMDF waste streams to be generated primarily at Y-12 and ORNL. This is particularly concerning given that radioactivity is tracked for only 13 radionuclides at EMWMF. An additional concern is that EMDF WAC will be developed based on assumptions that future waste lots will contain lower amounts of radionuclides than might actually be encountered. In this case, it is unclear that future waste characterization efforts will adequately address potential risks to public health and the environment, given that such efforts are outside the scope of this decision and WAC compliance will be addressed in a future (post-ROD) document. The result could be more radioactivity in EMDF for potential release in the future. Even more concerns regarding inventory uncertainties are provided in a review of the PA enclosed with TDEC's October 15, 2020 letter to DOE.

- b. Based on a workshop held on July 22, 2021, TDEC understands a "waste lot" will be the unit of the waste used to determine WAC compliance for disposal in the EMDF and the ROD will be revised to clarify this point. "Waste lot" should be defined or explained in the ROD. Discussion of "waste packages" may still be warranted in other contexts.

The last sentence in the paragraph states the PA did not evaluate any future residential scenario in which there is direct exposure to the waste. However, TDEC remains concerned erosion with the potential to degrade the cap was not modeled realistically. Moreover, a resident need not have a basement or directly contact the waste to be exposed to radiation. For example, if the waste is just below a basement floor, there could be exposure without direct contact.

78. **Section 2.12.2.2, Page 2-43, 4th full paragraph**

Modify the first sentence of the cited paragraph to read:

The basis for WAC use and implementation will be detailed in the WAC Compliance Plan, which will be an FFA primary document with a schedule milestone in Appendix E of the FFA.

79. **Section 2.12.2.3, Page 2-43, 2nd full paragraph on page**

The first sentence of the cited paragraph states intrusion-based WAC concentration limits do not dictate the amount of a radionuclide allowed for disposal because they are evaluated (averaged) for the landfill as a whole.

Waste acceptance limits based on intrusion scenarios should be hard limits on a per-package or per-truckload basis since these scenarios are based on exposure to waste in discrete areas of the landfill. Based on the information presented in the D1 ROD, some of these limits would allow large inventories of radionuclides to be disposed,

since DOE has proposed to limit the total inventory limits for only the three radionuclides listed in Table 2.5.

Total inventory limits are needed for additional radionuclides to protect from future risks posed by contaminants transported in groundwater and/or surface water. For example, the U-238 limit in Table 2-6 would allow for disposal of much more U-238 than is in the projected inventory of waste to be disposed at EMDF, and it would also allow for disposal of much more uranium than was disposed in the BCBG. TDEC will continue working with DOE to develop more complete and defensible WAC based on CERCLA requirements and guidance.

80. **Section 2.12.2.3, Page 2-43, 3rd full paragraph on page**

The third sentence in the paragraph requires clarification. It states activity concentration limits in Table 2.6 could allow a much greater inventory than is projected, but the limits will be applied on individual waste lots to optimize use of the facility. Explain how activity concentrations that could allow more than the projected radionuclide inventory are "limits." Also, clarify where it is shown that maintaining a sum-of-fractions at 1 for the entire facility ensures the CERCLA risk range is met at closure, as stated in the last sentence of the paragraph.

81. **Section 2.12.2.3, Page 2-43, 4th full paragraph on page**

The last sentence in the paragraph states the WAC Compliance Plan will outline a method for managing a situation in which waste proposed for disposal contains a radionuclide that had not been previously evaluated through PA modeling or included in the WAC.

TDEC is concerned that radionuclides for which WAC have not been proposed may be present in a waste lot but not discovered if waste characterization is driven solely by existing WAC. For this reason, TDEC recommends applying a more thorough analyte list for *initial* characterization of individual waste lots and/or particular waste streams originating from various processes, modified as appropriate where process knowledge can be used to rule out the presence of some radionuclides. Waste Handling Plans (WHPs) for waste that may be disposed in EMDF would specify a thorough analyte list for initial characterization of relevant portions of the waste lot, but they would also allow use of an optimized analytical suite for the remainder of the waste lot if supported by the data.

Adopting this approach as part of the waste management remedy selected by the EMDF ROD would minimize the chance of failing to account for unexpected radionuclides in the waste. As noted in the PA, some radionuclides were not evaluated precisely because of a lack of data. Therefore, process knowledge may not be sufficient to make protective waste characterization decisions on a project-specific basis.

82. **Section 2.12.2.3, Page 2-43, last paragraph on page**

The paragraph states DOE will maintain the landfill in perpetuity, as required by CERCLA. Given DOE's reliance on WAC derived from the PA, which was completed under DOE Orders, the paragraph should also point out that WAC provide protection beyond the timeframe during which CERCLA reviews, monitoring, and corrective actions are expected to occur. Although the PA is based on a performance period that extends 1,000 years after closure of the landfill, it also assumes institutional controls end 100 years after closure.

83. **Table 2.6, Page 2-44**

- a. Add a footnote clarifying the maximum volume over which the limits in the table apply.
- b. Activity concentration limits presented in the table would allow radionuclides to comprise a significant portion of the total landfill mass. For long-term protectiveness, inventory limits like those presented in Table 2.5 may be warranted for isotopes of uranium, thorium, and others that contribute substantially to the total mass allowed by the concentration limits in Table 2.6.
- c. As a primary COC at Y-12 found in multiple buildings planned for demolition, beryllium metal also warrants limits. The EMWMF WAC includes a requirement for beryllium to be wetted, double-bagged in quantities not to exceed 40 pounds and shipped separately or with adequate soil.
- d. According to the D5 RI/FS (Table 2-9), beryllium is among the chemicals which have been found in the waste disposed at EMWMF. The RI/FS also projects that beryllium will be in the EMDF waste inventory, and considerable beryllium contamination is present at Y-12.²³ However, the only criterion listed in the D1 ROD is an intrusion-based limit for beryllium-10 (Table 2.6). The concern is potential harm from inadvertent intrusion, given the documented role beryllium plays in lung diseases among DOE workers.²⁴
- e. Separately, WAC may be warranted to manage beryllium's potential to pose nuclear criticality safety hazards due to its function as a neutron moderator and a neutron reflector, both of which increase the likelihood of fission.

DOE established requirements for beryllium at CERCLA landfills, including EMWMF and the Portsmouth OSWDF, and it is a component of the WAC at DOE's NNSS and WIPP, as well as the EnergySolutions facility in Utah and the Waste Control Specialists (WCS) facility in Texas.

²³ URS | CH2M Oak Ridge LLC (UCOR), 2015, *Considerations for Characterization, Pre-demolition, and Disposition of Y-12 Mercury-Contaminated Debris, Oak Ridge, Tennessee*, UCOR-4653/R1, June.

²⁴ For example, see <https://www.cdc.gov/niosh/ocas/ocaseeoi.html>.

84. **Section 2.12.2.3, Page 2-45, 1st paragraph after bullet near top of page**

TDEC and EPA should be involved in defining and approving operations-based WAC. Solid and hazardous waste rules include substantive operational requirements for permitted facilities. The D1 ROD provides no justification for ceding all authority on physical WAC and other operations-based protections to DOE.

Alternatively, the ROD should explain how EMDF operations will differ from EMWMF, where operations-based criteria are part of the facility WAC. Experience at EMWMF demonstrates regulatory approval of operations controlling precipitation run-on/run-off and physical WAC impacting the long-term stability of the waste should involve regulatory review and approval. Any waivers from such requirements should be agreed by TDEC and EPA. If operational constraints are intended to protect public health and the environment to DOE standards and not CERCLA requirements, the ROD should state such constraints are not being relied on for CERCLA compliance.

85. **Page 2-45, Mercury Management Approach**

- a. This section lacks the necessary detail for a ROD. As noted in TDEC's general comments, the absence of specific remediation goals in surface water as required by 40 CFR 300.430(f)(4)(iii)(A) prevents proper evaluation of this section.
- b. The approach to mercury management in the D1 ROD states DOE will treat and dispose of all mercury hazardous waste offsite, so D009 waste should be excluded by the administrative WAC in Table 2.4.
- c. Although the D1 ROD would prohibit disposal of D009 mercury waste, large volumes of untreated mercury-bearing waste could be disposed at concentrations below the LDR. Such waste should be treated and/or disposed offsite, or the ROD should indicate how much mercury the EMDF will accept.
- d. Bioaccumulative parameters such as mercury require loading limits as well as concentration limits to protect aquatic life. A loading limit for mercury discharges to Bear Creek is necessary.

86. **Page 2-45, Mercury Management Approach, 2nd bullet, 1st sub-bullet**

- a. This text disregards Bear Creek's inclusion on the state's List of Impaired and Threatened Waters for mercury, thereby requiring application of Tenn. Comp. R. & Regs. § 0400-40-03-.06 for antidegradation. An antidegradation calculation and approach must be developed to discharge mercury into Bear Creek, as well as PCBs, which are also bioaccumulative in fish.
- b. In addition to mercury and PCBs, the ROD should also acknowledge that Bear Creek is impaired for cadmium and nitrate/nitrite.

87. **Page 2-45, Mercury Management Approach, 2nd bullet, 2nd sub-bullet**

The second sub-bullet references meeting the “most stringent applicable water quality criteria, including recreational, with consideration of the stream mixing zone at the point of discharge.”

- a. Tenn. Comp. R. & Regs. § 0400-40-03-.05(2) should be added to the ARAR list. This rule includes seven restrictions for the application of a mixing zone that must be considered. In addition, a mixing zone cannot be applied to the discharge of bioaccumulative pollutants for which risk-based factors are exceeded.
- b. How will it be determined which parameters require discharge limits? In the past five years, more than 250 constituents have been analyzed in EMWMF leachate.
- c. Many constituents have no state or federal AWQC. When developing the most appropriate discharge limits and ARAR list for the EMDF ROD, DOE must consider all state and federal regulations, including but not limited to effluent limitation guidelines; state anti-degradation regulations for all parameters included on Tennessee’s list of impaired and threatened waters, known as “the 303(d) list”; Best Available Technology Economically Achievable;²⁵ Water-Quality Based Effluent Limit (WQBELs); and Technology Based Effluent Limits (TBELs).
- d. Per the EPA Administrator’s decision, “the point of compliance for meeting the final effluent limits must be at the point of discharge.” If the proposed discharge point is Bear Creek or one of its tributaries, the limitations of a mixing zone must be considered.
- e. The 7Q10 and 30Q5 flow conditions in Bear Creek near the landfill must be calculated to evaluate the assimilative capacity for each parameter.²⁶
- f. AWQC are concentration limits in the state regulations but implemented as loading limits for bioaccumulative parameters. In the ROD, concentration limits must be converted to loading limits for all bioaccumulative parameters.
- g. Water quality criteria for EMDF landfill wastewater should include whole effluent toxicity testing to manage uncertainties associated with numerous COCs with potential toxic effects.

88. **Page 2-45, Mercury Management Approach, 2nd bullet, 3rd sub-bullet**

Elaborate on water management practices that could be considered to “reduce the volume of water needing treatment.”

²⁵ Set in accordance with Tenn. Comp. R. & Regs. § 0400-40-05-.09.

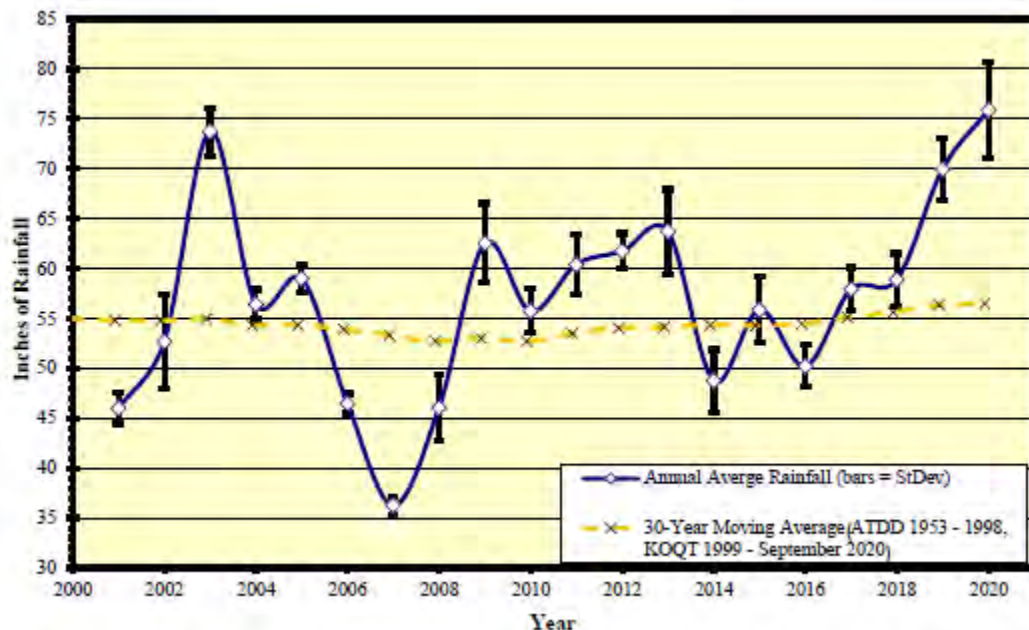
²⁶ 30Q5 = lowest 30-consecutive-day average flow that occurs (on average) once every 5 years;
7Q10 = lowest 7-consecutive-day average flow that occurs (on average) once every 10 years.

89. **Section 2.12.2.4, Page 2-46, 1st paragraph**

TDEC appreciates prioritization of minimizing the disposal of clean material in the proposed EMDF. However, the ROD should clarify how a goal within the document meets this commitment when waste-generating projects are not within the scope of the EMDF ROD, as stated in Section 2.4 (p. 2-11).

90. **Section 2.12.2.4, Page 2-46, 2nd paragraph**

- a. The waste disposal remedy selected in the ROD must address CERCLA's preference for cleanup through active treatment of all landfill wastewater.
- b. What are DOE's plans for landfill wastewater storage capacity at EMDF? Regarding design considerations, the March 4, 2021 EMDF Leachate/Contact Water Treatment Overview states, "Minimum requirement is a 25-year 24-hour storm event, but additional consideration has been given to both 100-year 24-hour storm and historical precipitation" and "The most challenging storage tank/collection pond fill scenarios are driven by the back-to-back storm conditions from 2003." 2003 was an extremely wet year, but the past two years have experienced similar rainfall. Per the 2021 RER (see chart below), rainfall in federal Fiscal Year (FY) 2020 was 20 inches greater than the 30-year average. Precipitation levels similar to those in 2003 are no longer extreme events, but rather the norm, and this must be taken into consideration for storage and treatment design.



91. **Section 2.12.2.4, Page 2-46, 4th paragraph**

- a. The text states radiological discharge limits comply with the 10^{-5} risk. The ROD must document how this compliance is demonstrated or cite a document in the Administrative Record that provides the assessment.
- b. The text states, "Compliance with ARARs is required at the nearest point of public exposure, which is downstream from the facility." Revise the wording for consistency with the DRD (p. 13):

While the point of exposure to radionuclides used for identifying risk and setting appropriate effluent limits may be downstream of the discharge point (which has not yet been determined), the point of compliance for meeting the final effluent limits must be at the point of discharge.

- c. The EPA Administrator's DRD is specifically referencing a point of compliance for discharge limits, whereas this section of the D1 ROD is more broadly referencing ARARs associated with "discharge of radionuclides contained in landfill wastewater." The next sentence cites the DRD.

How different are these two issues, or are they one in the same? If the latter, this text should be edited to reflect the intent of the DRD, rather than taking credit for several kilometers of stream in order to comply with ARARs.

92. **Section 2.12.2.6, Page 2-47**

Consider moving the last paragraph of the section to the beginning of the section to discuss activities in chronological order.

93. **Section 2.12.4, Page 2-49, 1st paragraph**

The text states EMDF construction at the CBCV site provides onsite disposal that will be protective of human health and the environment and waste disposal in EMDF will protect human and ecological receptors. The ROD must document how this protectiveness is demonstrated in accordance with CERCLA or cite a document in the Administrative Record that provides the demonstration(s).

94. **Section 2.12.4, Page 2-49, 2nd paragraph**

Consider providing examples of how wetland impacts might be mitigated (restoration, enhancement, preservation, creation, etc.) and/or citing the page number where the reader can find the ARARs related to wetland mitigation (e.g., page corresponding to p. A-7 in the D1 ROD).

95. **Section 2.13.1, Page 2-50, 1st paragraph**

The text states the selected remedy [EMDF construction and operation] will be protective of human health and the environment. The ROD must document how this

protectiveness is demonstrated in accordance with CERCLA or cite a document in the Administrative Record that provides the demonstration(s).

96. **Section 2.13.2, Page 2-50, last paragraph on page**

This comment may not warrant a revision in the document, but TDEC agrees identification of ARARs helps ensure the selected remedy is protective of human health and the environment, as stated in the first paragraph in the section. It is unclear why the cited paragraph highlights only two TDEC regulations used to support development of landfill wastewater discharge limits when the first paragraph on p. 2-51 states all ARARs are presented in Appendix A. Modify the last sentence to state limits on radiological discharges during operations will ensure protection of human health and the environment in compliance with TDEC water quality criteria regulations for carcinogens in Footnote (c) of Tenn. Comp. R. & Regs. § 0400-40-03-.03(4)(j), which the EPA Administrator determined is a relevant and appropriate requirement.

97. **Section 2.13.2.1, Page 2-51, Waiver to TSCA 40 CFR 761.75(c)(4)**

DOE seeks a waiver of 40 CFR 761.75(b)(3) under 40 CFR 761.75(c)(4). The waiver justification is incomplete and should include a defensible demonstration that risks to the public via contaminant transport by surface water are acceptable.

Toxic Substances Control Act (TSCA) 40 CFR 761.75(b)(3) states in part, "Floodplains, shorelands, and groundwater recharge areas shall be avoided. There shall be no hydraulic connection between the site and standing or flowing surface water." On p. 2-52, the waiver of the requirement for no hydraulic connection of the site to surface water is justified by suggesting the rule is intended to separate waste from groundwater following landfill construction. The requirement is also intended to separate waste and surface water to minimize contaminant transport. The rule protects the public from contaminants released above the liner and subsequently transported by surface water.

98. **Section 2.13.2.1, Page 2-52, 1st & 2nd paragraphs on page**

This portion of the ROD or some document in the CERCLA Administrative Record needs to provide a quantitative demonstration, as required by 40 CFR 761.75(c)(4), that the liner system and geologic buffer offer performance superior to the required 50-ft separation required by the ARAR being waived. For example, the demonstration might compare contaminant migration times for the planned design with travel times for the configuration required by the ARAR, assuming the presence of 50 ft of unsaturated material like that found at the CBCV Site 7c.

The liner system is thicker than required and contains low-permeability synthetic components, but the argument is that the liner and geologic buffer in the preliminary design provide equivalent or better protection than required. Rather than merely specifying a minimum separation between the waste and the groundwater, the final

design will specify low-permeability layers in the liner and geologic buffer that can be shown to perform better than a larger separation with no permeability specifications.

Given the waiver standard of “unreasonable risk,” TDEC asks for a quantitative demonstration that the combined effect of the thicker liner system underlain by a geologic buffer with at least 10 ft of clay allowing downward movement of liquid at no more than 1×10^{-5} centimeters per second will not allow “unreasonable risk” for PCBs.

As noted in the D5 RI/FS and the December 7, 2017 DRA (Appendix G), PCBs are relatively immobile in soil because adsorption reduces their migration. The justification for the waiver should provide a quantitative demonstration and arguments related to the properties of PCBs to show that the low-permeability materials in the liner and geologic buffer will not allow “unreasonable risk”.

99. **Section 2.13.2.1, Page 2-52, 4th paragraph on page**
TSCA 40 CFR 761.75(b)(3) for which DOE is seeking a waiver under 40 CFR 761.75(c)(4) requires “There shall be no hydraulic connection between the site and standing or flowing surface water.” The cited paragraph states the objective of this requirement will be met by landfill construction that separates water from waste. However, the ROD (p. 2-46, second paragraph) also states EMDF landfill wastewater may be discharged directly to Bear Creek or a tributary without treatment. Considering this, explain how landfill construction will separate water from waste.
100. **Section 2.13.2.2, Page 2-54, 1st paragraph**
As noted in Comment 98, there should be a quantitative demonstration element to support the point about “extended travel time.” How much is the travel time extended? Do the PA or CA rely on the 15-ft vadose (unsaturated) zone to support projections of landfill performance?
101. **Section 2.13.2.2, Page 2-54, 3rd paragraph**
The text states WAC will ensure human and environmental protectiveness are met per RAOs. The ROD must document how this protectiveness is demonstrated in accordance with CERCLA or cite a document in the Administrative Record that provides the demonstration(s).
102. **Section 2.13.2.2, Page 2-54, 4th paragraph on page**
- a. For accuracy, change “unique” to “specific” or a similar word. Descriptions throughout the draft ROD indicate EMDF will be constructed and operated similarly to the existing EMWMF, so it is not accurate to describe EMDF as a unique CERCLA remedy.
 - b. As noted in previous comments, the ROD must present a quantitative demonstration that supports a finding of “undue hazard.” The waiver must be

supported by more than a conclusory statement about the isolation of short-lived radionuclides to cause decay in place.

Like the argument about the vertical buffer zone associated with the TSCA waiver, the siting requirement for a horizontal buffer zone around the disposal unit is based on distance, which is not necessarily a barrier to contaminant migration by itself. Distance, time and shielding work together to protect against radiation exposures. The CERLCA ROD relies partly on the PA/CA, but the review enclosed with TDEC's October 15, 2020 letter highlights the state's concerns about applying the PA as the sole basis for a CERCLA decision. In general, the concern is the PA/CA assumptions are sufficiently realistic to conclude the modeled radiation doses are within the CERCLA risk range.

103. **Section 2.13.2.3, Page 2-54, 2nd paragraph in section**

In addition to the EPA Administrator's DRD, the ROD should cite the final *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee* (FFS), where the technical methodology for determining radiological discharge limits will be documented.

104. **Section 2.13.4, Page 2-55, 2nd paragraph**

Consider removing this paragraph or clarifying the purpose for including the two statements it contains. Text throughout the ROD (e.g., p. 2-11, third and fourth paragraphs; p. 2-17, first paragraph of Section 2.8; and Section 2.13.5) already explains exclusions from the EMDF project scope.

As presented in Section 2.13.4, the cited paragraph contradicts the premise for selecting onsite disposal outlined in the preceding paragraph and the previous section. If onsite disposal represents the most cost-effective alternative and offers economy of scale, the same benefits will accrue from consolidating decisions about resource recovery and recycling, if not waste treatment. It may make sense to remove this paragraph since the ROD scope is waste disposal rather than a more holistic approach to waste management.

105. **Section 2.13.5, Page 2-56, 1st full paragraph on page**

The single sentence in the cited paragraph states landfill wastewater treatment is a key remedy component that will reduce the *toxicity* of the waste. For accuracy, revise the text to state landfill wastewater treatment would reduce the *mobility* of contaminants released from the waste.

106. **Section 2.13.6, Page 2-56 and Section 2.14, Page 2-56, 1st sentence in section**

For consistency with other sections of the ROD, these sections should state 5-year reviews will be required in perpetuity. The phrase is included in Sections 2.6.2 (p. 2-16), 2.12.2.3 (p. 2-43), 2.12.2.6 (p. 2-47), and Table 2.7 (p. 2-48).

107. **Section 2.14, Page 2-56, 3rd paragraph in section**

- a. This paragraph indicates DOE completed three additional evaluations in response to public comments. The document provides additional details about two of the evaluations: impacts of offsite waste disposal on ETPP reindustrialization and the production of greenhouse gases associated with offsite waste transportation. However, the document provides no such detail about the third evaluation: a re-estimation of onsite and offsite disposal costs. Such information should be included as a subsection or appendix in the ROD or another document to be included in the administrative record because it addresses a CERCLA balancing criterion and public comments on the Proposed Plan. For example, it would support the response to sub-comment #3 on p. 3-75.
- b. Remove the word “ongoing.” At the time a final ROD is signed, it will not be accurate to characterize delays in a decision as ongoing.

108. **Section 2.14.2, Page 2-59**

- a. TDEC agrees offsite waste transportation would generate more greenhouse gas emissions than transportation associated with onsite disposal. DOE estimates excess emissions would be 113,143 carbon-dioxide-equivalent metric tons (Mt CO₂e) over the 22-year project life, which is 5,143 Mt CO₂e per year. For context, this is a relatively small loading of greenhouse gas, considering employees commuting to and from Y-12 generate about 3.5 times that amount, based on the most recent publicly available data from FYs 2008 and 2012 (17,447 and 18,005 Mt CO₂e per year, respectively).²⁷

Consider updating the information in Section 2.14.2. For example, the citation of EPA’s March 2018 emission factors for greenhouse gas inventories could be updated to reflect values published in April 2021. Similarly, this section cites a June 2019 version of EPA’s calculator for greenhouse gas equivalencies, which could be updated to the more recent version, dated March 2021. Updating this section would result in a moderate increase (about 20%) in the projected emissions associated with transportation to off-site facilities, but there would be negligible change (less than 1%) in the equivalencies presented.

- b. Section 2.14.2 evaluates the production of greenhouse gases associated with offsite waste transportation, but it does not consider the net increase in greenhouse gases related to the construction of a new landfill. Landfill construction equipment will emit greenhouse gases that would not be associated with offsite disposal, and additional greenhouse gases will remain in the atmosphere due to a reduction in CO₂ sequestration caused by deforestation of

²⁷ Y-12 National Security Complex, 2012, *Y-12 National Security Complex FY 2013 Site Sustainability Plan*, U/IA-451/Rev.1, December, p. 1-6. Available at <https://digital.library.unt.edu/ark:/67531/metadc844673/>.

the 67-acre CBCV Site 7c. These impacts may be smaller than those associated with offsite waste transportation, but a complete evaluation would include them, particularly considering the intended permanence of the landfill footprint.

109. **Section 2.14.3, Pages 2-60 & 2-61**

Following nearly two decades of effort to determine groundwater levels under the existing EMWMF landfill, TDEC has uncertainties about the position of the water table with respect to the geologic buffer under the liner system.

- a. The EMDF ROD should commit to the development of a clear plan for monitoring the seasonal high-water table under the EMDF with more certainty. Given the plan to build the landfill in phases, it should be clearly state how the seasonal high-water table will be monitored under the knoll, where pre-construction water levels are high, as well as under lower parts of the landfill, where fill placement and waste loading may restrict groundwater discharge—a lesson learned from EMWMF.
- b. Section 2.14.3, Page 2-61, 2nd & 3rd bullets:
Piezometer data should be collected prior to clearing the area and installing the temporary liner system. Clearing the study area and installing the temporary liner system may independently impact the seasonal high-water table by reducing evapotranspiration and direct recharge. Without controlling for both effects, it will be difficult to distinguish the liner impact from the impact of clearing the area.
- c. Section 2.14.3, Page 2-61, 8th bullet:
The ROD should elaborate on what is meant by “adjustment.” Provide additional explanation of how this adjustment may occur.

Part 3: Responsiveness Summary

110. **Page 3-4, 2nd line on page**

It would be more accurate to replace “which had members from TDEC present” with “which had a TDEC representative present.”

111. **Page 3-4, Summary of Comments and Responses, 2nd paragraph**

The cited text (and text on p. 2-29) states DOE received comments from 194 individual commenters. The compilation of comments from DOE to TDEC on January 16, 2019 included comments from 195 entities (individuals or organizations), accounting for multiple comments from five entities. TDEC and DOE should compare notes to ensure all comments are considered.

112. **Page 3-4, Summary of Comments and Responses, 3rd paragraph**

In this comment, *comments* and *commenters* are italicized to emphasize the distinction because some commenters provided more than one comment.

The cited text on p. 3-4 states “a majority of the *comments* were in favor of the preferred remedy.” Revise the text to reflect that a larger number of *comments* expressed opposition or neutrality, rather than support for the preferred alternative presented in the Proposed Plan. Based on TDEC’s evaluation, 102 *comments* supported onsite disposal, while a larger number expressed opposition (91) or neutrality (59), based on the information available at the time.

Alternatively, revise the text for consistency with p. 2-29 which states “the majority of *commenters* were in favor of the preferred remedy.” In this case, it would be more accurate to recognize the nearly even split between the 101 *commenters* (52%) supporting the preferred remedy and the 94 *commenters* (48%) who were opposed or neutral, based on the information available at the time.

Qualitatively, commenters who were opposed or neutral wrote longer, more substantive comments. Based on the number of words, comments from neutral entities averaged 15 times the length of comments from supporters, while comments from opposed entities were eight times longer. On average, both groups addressed six times the number of issues as commenters who supported the preferred remedy. Issues addressed included CERCLA evaluation criteria, state key concerns, and other topics.

113. **Page 3-7, last paragraph, 2nd sentence**

- a. The text mentions an example of recent disposal costs. The ROD should provide the example.
- b. For clarity, revise the sentence as follows, if this is accurate.

One example of recent offsite disposal costs was just below the range of offsite costs presented in the Proposed Plan....

114. **Page 3-8, 1st paragraph**

This paragraph states the PA and CA demonstrate the long-term protectiveness of EMDF as a LLW landfill, but the D1 ROD does not provide sufficient information to support this statement. DOE completed the PA and CA under internal Directives. They are *not* CERCLA documents. The state appreciates DOE completing the PA and CA through a process independent from CERCLA and obtaining a PDAS for building a radioactive waste disposal landfill. However, the state requires a demonstration of CERCLA protectiveness and compliance with ARAR pertaining directly to the CERCLA threshold criteria.

Revise the text to explain how CERCLA *protectiveness* has been demonstrated. Alternatively, clarify the PA demonstrates long-term *performance* of the landfill for radionuclide disposal and the CA evaluates the collective impact of potential exposure

to radionuclides from EMWMF, EMDF, and all other ORR sources that might, in combination with the landfills, contribute to radiation doses to members of the public.

115. **Page 3-69, Response #4**

Like statements throughout the D1 ROD, the response indicates decisions on mercury treatment or waste volume reduction are responsibilities of the waste generating projects and associated decision documents. The ROD, including this response, should 1) describe which CERCLA reports will document such efforts and 2) acknowledge generation of mixed CERCLA waste will be reported in conjunction with the Site Treatment Plan.

116. **Page 3-76, Response #3**

The response states mercury contamination is a national/global concern due to atmospheric deposition of mercury from non-DOE sources. The text should be corrected to acknowledge legacy mercury operations and waste disposal on the ORR.

117. **Page 3-96, Response #1, 1st sentence**

The sentence states "data from nearly 1000 wells in Bear Creek Valley support the conclusion that any contamination in the valley cannot reach residential areas." Based on DOE's publicly available database, the OREIS, there are 407 wells in BCV, 197 of which are active.

- a. Correct the response to reflect the actual number of wells DOE is relying on to support the statement.
- b. TDEC requests a list of the BCV wells DOE is relying on to support the statement with an indication of which wells remain available for groundwater monitoring.
- c. Wells may provide data on current and past groundwater conditions, but the response should be revised to clarify how the data from the wells "support the conclusion that any contamination in the valley cannot reach residential areas."
- d. While TDEC is not aware of any current risks posed by off-site migration of groundwater from BCV, uncertainty remains regarding potential future risks. Has a regional groundwater flow model evaluated potential off-site transport via deep groundwater flow zones as is being done for Bethel Valley and Melton Valley?

118. **Page 3-96, Response #1, 2nd sentence**

The sentence states the law requires groundwater monitoring to identify releases around any disposal facility. TDEC agrees and notes the ROD, including this response, should commit to full compliance with those legal requirements.

EMWMF has operated since 2002, and TDEC continues working with DOE to ensure requirements in the ROD are met. Although the FFA Parties have

discussed the issue for several years, DOE has not initiated groundwater monitoring southwest of the landfill—a well-documented possible direction of groundwater flow through soil and bedrock fractures on the ORR.

119. **Page 3-113, Response #1, 2nd to last sentence**

The response states safety-basis WAC will consider nuclear criticality issues. The response could be strengthened by committing to address nuclear criticality safety through the addition of legal requirements, identified in previous comments above, into the ROD.

120. **Page 3-130, Response near end of page**

- a. The response states “Current mercury levels in Bear Creek are on the order of those in reference streams throughout the state.” While TDEC Division of Water Resources (DWR) data indicate the presence of mercury in fish throughout Tennessee, mercury levels in Bear Creek fish are two to three times higher than elsewhere in the state. For rock bass, an indicator species monitored by DOE in Bear Creek, mercury levels are about five to six times higher than those in fish from other parts of Anderson and Roane Counties.²⁸ Include the fish-tissue mercury concentrations comparisons in this response.
- b. The response also states, “DOE will control levels of mercury in landfill wastewater through treatment if necessary to meet Clean Water Act limits, prior to discharge to Bear Creek.” Remove “if necessary” from the response. The EMDF ROD should commit to the full treatment of radionuclides and hazardous/toxic chemicals in all EMDF landfill wastewater using technologies agreed by the FFA Parties.

121. **Page 3-147, 1st bullet, Response**

The response states, “DOE will take all practical measures to remove mercury before waste generation and send that mercury offsite to treatment/storage/disposal facilities.” How will DOE remove mercury from debris *after* generation?

122. **Page 3-151, 3rd paragraph**

The commenter asks whether EMDF would have capacity for unplanned and emergency cleanups of waste not currently projected for disposal, including unlined burial grounds needing remediation in the future. DOE’s response indicates there is a volume contingency and “there would be space for some.” The ROD should clarify whether EMDF includes adequate capacity to remediate existing disposal trenches or whether additional landfill space might be required in the future.

²⁸ Thomason, C., 2019, *Mercury in Fish Tissue Throughout the State*, internal TDEC correspondence, September 18.

123. **Page 3-153, 1st bullet**

The commenter states a primary goal should be reducing the volume of waste. The response indicates other projects *can consider* implementing such technologies before disposing of waste in the EMDF. It also states the ROD *does include a commitment* to waste minimization.

As noted in a previous comment, the text of Section 2.12.2.4 (p. 2-46) falls short of a strong commitment to volume reduction and other forms of waste minimization. The ROD should clarify how a goal in the EMDF ROD meets the promised commitment when waste-generating projects are not within the scope of the EMDF ROD, as stated in Section 2.4 (p. 2-11).

124. **Page 3-174, Comment 168.26**

The comment cites a statement in the Proposed Plan that “some residual levels of mercury associated with building rubble, soils and drained equipment are proposed for onsite disposal.” The response states, “plans for segregating mercury prior to and during demolition are the responsibility of the generating project and are not addressed in this disposal decision.”

a. The ROD, including this response, should commit to the development and implementation of clear, documented requirements for waste generators to assure ARARs are met.

b. Will EMDF accept waste with visible beads of mercury?

125. **Page 3-195, Response to Comment 8**

The commenter states, “more explanation is needed how segregation will be performed to prevent ‘clean’ waste from being disposed at the EMDF and using up available space.” The response states waste segregation and volume reduction are very high priorities for DOE on the ORR and “DOE is committed to the reduction of waste volumes going to EMDF through waste segregation and maximizing recycling.”

As noted in a previous comment, the text of Section 2.12.2.4 (p. 2-46) falls short of a strong commitment to volume reduction and other forms of waste minimization. The ROD should clarify how a goal in the EMDF ROD meets the commitment when waste-generating projects are not within the scope of the EMDF ROD, as stated in Section 2.4 (p. 2-11).

Appendix A: Applicable or Relevant and Appropriate Requirements

126. **Removal of ARARs Presented in Seven Tables**

Appendix A omits requirements the FFA Parties agreed upon and documented in Appendix G when their Senior Executive Committee representatives signed the RI/FS

DRA dated December 7, 2017. Many of the comments related to Appendix A seek justification for removal of those ARARs and TBCs.

Appendix G was based on several months of effort by attorneys for the FFA Parties, directed by the FFA Parties' leadership teams. The intent was to resolve the content of ARARs tables, a part of the dispute for which resolution could be achieved without delay, unlike other parts of the dispute for which resolution was deferred—i.e., site characterization to determine groundwater levels, independent verification of the PA/CA process leading to the PDAS.

In April 2021, DOE and contractor personnel initiated a series of meetings among the FFA Parties. DOE presented seven tables of legal requirements from the preliminary 2017 DRA that would be omitted from the D1 ROD. Although discussions among the FFA Parties led to a few ARARs being restored, many of the issues remain unresolved in the D1 ROD issued on June 17, 2021.

The D1 ROD has text in Section 2.14, Documentation of Significant Changes, p. 2-56, stating that ARARs from the Appendix G prepared as part of the DRA signed on December 7, 2017 had been removed without explanation, other than a determination these were no longer relevant and appropriate:

The list of ARARs has changed since the RI/FS was developed (which served as the foundation for the Proposed Plan). Several ARARs that were determined to not be relevant and appropriate were removed. Removal of these ARARs from consideration did not change the siting, conceptual design, or protectiveness of the landfill and infrastructure.

Changes to reduce the number of ARARs may not be "significant" changes to the remedy under 40 CFR 300.430(g)(3)(ii), which covers changes after the Proposed Plan:

(ii) After publication of the proposed plan and prior to adoption of the selected remedy in the record of decision, if new information is made available that significantly changes the basic features of the remedy with respect to scope, performance, or cost, such that the remedy significantly differs from the original proposal in the proposed plan and the supporting analysis and information, the lead agency shall:

A) Include a discussion in the record of decision of the significant changes and reasons for such changes, if the lead agency determines such changes could be reasonably anticipated by the public based on the alternatives and other information available in the proposed plan or the supporting analysis and information in the administrative record; or

(B) Seek additional public comment on a revised proposed plan, when the lead agency determines the change could not have been reasonably anticipated by the public based on the information available in the proposed plan or the supporting analysis and information in the administrative record. The lead agency shall, prior to adoption of the selected remedy in the ROD, issue a revised proposed plan, which shall include a discussion of the significant changes and the reasons for such changes, in accordance with the public participation requirements described in paragraph (f)(3)(i) of this section.

The ROD should provide more explanation in Section 2.14 or in Appendix A tables about the extensive jettisoning of ARARs previously agreed by the FFA Parties in the 2017 DRA. Meanwhile, modified versions of six of the tables are included in comments below to show some issues being resolved by restoring ARARs and a larger number of issues left unresolved because of the removals with very little convincing explanation.

127. **Omission of ARARs Identified in the EPA Administrator's DRD**

The FFA Parties also discussed ARARs that require inclusion in the landfill wastewater management FFS and, ultimately in the EMDF ROD, as a result of the EPA Administrator's DRD. Footnote 24 in the DRD states:

...certain requirements were inadvertently omitted from the FFS that may also be applicable to setting PRGs for the discharge of pollutants, and the FFS must be revised to include these omitted regulations. My staff will provide you shortly with a table that identifies the EPA and Tennessee CWA NPDES [National Pollution Discharge Elimination System] regulations applicable to CWA pollutants to be added to the existing ARARs/TBC tables in the Wastewater FFS.

EPA provided the requirements in a follow-up letter dated January 19, 2021.²⁹

DOE is required to add the additional ARARs in accordance with FFA Section XXVI:

J. Within thirty-five (35) days of resolution of a dispute pursuant to the procedures specified in this Section, the DOE shall incorporate the resolution and final determination into the appropriate plan, schedule or procedures and proceed to implement this Agreement according to the amended plan, schedule or procedures.

K. Resolution of a dispute pursuant to this Section of this Agreement constitutes a final resolution of any dispute arising under this Agreement. All Parties shall abide by all terms and conditions of any final resolution of dispute obtained pursuant to this Section of this Agreement. Any resolution of a dispute pursuant

²⁹ Available at <https://doeic.science.energy.gov/uploads/F.0600.029.0849.pdf>.

to this Agreement shall be incorporated into this Agreement and shall become a term and condition of this Agreement.

This requirement is also summarized on p. 2 of the EPA Administrator's DRD:

As the final decision-maker for a disputed remedy at a federal facility on the NPL, the EPA has the authority to interpret ARARs, including the applicability of any flexibility provided under an ARAR.

While TDEC recognizes some citations may be corrected to their current versions, the addition of these ARARs required by the EPA Administrator is not negotiable. The elimination of any of these ARARs is impermissible. The table must be restored to the version provided in EPA's January 19, 2021 letter.

128. **Landfill Wastewater Management Requirements in 40 CFR 445 & Related Provisions**

An egregious example of not following the EPA Administrator's DRD as required by the FFA is the omission of requirements based on 40 CFR 445. In addition to removing the three specific citations of 40 CFR 445.11, 445.13, and 445.14 as ARARs, other changes were made which DOE argued flowed from the attempted elimination of the Part 445 requirements. In part, the argument seems to be based on a mercury waste and wastewater strategy being contemplated and negotiated by the FFA Parties for incorporation in the D2 ROD.

Coupled with the decision not to accept any listed hazardous wastes, there is now much less significant challenge for treatment of characteristic hazardous waste not containing mercury. However, the Administrative WAC in the D1 ROD do not prohibit disposal of other kinds of characteristic hazardous waste.

DOE carries the burden to demonstrate that its waste, mostly in the form of hazardous debris, would no longer be considered hazardous waste. It remains possible that the EMDF will still operate as a Subtitle C facility for characteristic hazardous wastes other than D009 mercury that are treated to meet LDR requirements. As a result, the EMDF would remain subject to Subpart A of 40 CFR Part 445. Even if DOE were to exclude all characteristically hazardous wastes, then it would fall into similar requirements of 40 CFR 445, Subpart B for Subtitle D RCRA landfills.

DOE previously argued 40 CFR 445 does not apply because EMDF would be a captive landfill, as exempted by 40 CFR 445.1(f). If EMDF were a captive landfill, then the landfill wastewater would be more like process wastewater generated by the industrial process to which the landfill is "captive." The intent of the provision is not to eliminate a requirement for landfill wastewater treatment but to align the treatment standards to the CWA Effluent Limitations Guidelines (ELG) for the industrial process.

It is a separate issue that DOE’s landfill wastewater may not contain all or even most of the constituents identified for treatment. DOE argues the burden for monitoring constituents the wastewater would not contain. In rejecting the substantive treatment requirements in 40 CFR 445, DOE also rejected the requirements provided by 40 CFR 122.44(a)(2)(i)-(iv), which would alleviate any burden of continued monitoring for any of the pollutants covered in 445.13, provided DOE can demonstrate they are not present in its wastes.

While most of the EPA Administrator’s DRD deals with radionuclides and use of state water quality standards as relevant and appropriate for addressing discharges of landfill wastewater contaminated with radionuclides, 40 CFR 445 was included in the ARARs table accompanying the DRD without discussion as applicable requirements. This regulatory part contains CWA ELGs which establish technology-based treatment standards for constituents in leachate from soils and hazardous waste landfills.

The D2 ROD must restore all the 40 CFR 445 and related requirements. Terms used in the definitions provided in 40 CFR 445.2 must be used to interpret the applicable requirements; the term “landfill wastewater” includes contaminated storm water, a defined term also known as “contact water,” and leachate among other types of wastewater. Based on historical data from EMWMF, levels of some contaminants in “contact water” may exceed level measured in leachate. Landfill wastewater is to be managed separately from uncontaminated storm water, ensuring treatment is applied to landfill wastewater without dilution by uncontaminated storm water, as has been the practice with EMWMF.

129. **Table 1 Removed TBC Guidance**

In the D1 ROD, Tables A.1 (Chemical-specific ARARs), A.2 (Location-specific ARARs), and A.3 (Action-specific ARARs) do not contain certain TBC requirements previously included in the agreed upon 2017 DRA Appendix G. The explanation provided for omitting these TBCs is inadequate. As mentioned above, this and subsequent comments include modified versions of tables DOE provided.

Table 1 Removed TBC Guidance

Location Resource	Requirements	Prerequisite	Citation
<i>Location-specific</i>			
Presence of migratory birds as defined in 50 CFR 10.13, and their habitats	Requirements are as follows: <ul style="list-style-type: none"> • avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency action; • restore and enhance the habitats of migratory birds, as practicable; and • prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable. 	Federal agency action that is likely to impact migratory birds— TBC	Executive Order 13186

<i>Action-specific</i>			
Characterization of LLW (e.g., wastewater, contaminated PPE)	Shall be characterized using direct or indirect methods and the characterization documented in sufficient detail to ensure safe management and compliance with the WAC of the receiving facility.	Generation of LLW for storage and disposal at a DOE facility— TBC	DOE M 435.1-1(IV)(I)
Characterization of LLW (e.g., wastewater, contaminated PPE)	Characterization data shall, at a minimum, include the following information relevant to the management of the waste: <ul style="list-style-type: none"> • physical and chemical characteristics; • volume, including the waste and any stabilization or absorbent media; • weight of the container and contents; • identities, activities, and concentrations of major radionuclides; • characterization date; • generating source. 	Generation of LLW for storage and disposal at a DOE facility— TBC	DOE M 435.1-1(IV)(I)(2)
Temporary storage of LLW	Shall not be readily capable of detonation, explosive decomposition, reaction at anticipated pressures and temperatures, or explosive reaction with water.	Management of LLW at a DOE facility— TBC	DOE M 435.1-1(IV)(N)(1)
Temporary storage of LLW	Shall be stored in a location and manner that protects the integrity of waste for the expected time of storage and minimizes worker exposure.	Management of LLW at a DOE facility— TBC	DOE M 435.1-1(IV)(N)(3)
Temporary storage of LLW	Shall be managed to identify and segregate LLW from mixed waste.	Management of LLW at a DOE facility— TBC	DOE M 435.1-1(IV)(N)(6)
Temporary storage of LLW	Shall be packaged in a manner that provides containment and protection for the duration of the anticipated storage period and until disposal is achieved or until the waste has been removed from the container.	Storage of LLW in containers at a DOE facility— TBC	DOE M 435.1-1(IV)(L)(1)(a)
Temporary storage of LLW	Vents or other measures shall be provided if the potential exists for pressurizing or generating flammable or explosive concentrations of gases within the waste container.	Storage of LLW in containers at a DOE facility— TBC	DOE M 435.1-1(IV)(L)(1)(b)
Temporary storage of LLW	Containers shall be marked such that their contents can be identified.	Storage of LLW in containers at a DOE facility— TBC	DOE M 435.1-1(IV)(L)(1)(c)
Treatment of LLW	Treatment to provide more stable waste forms and to improve the long-term performance of a LLW disposal facility shall be implemented as necessary.	Generation for disposal of LLW at a DOE facility— TBC	DOE M 435.1-1(IV)(O)
# Disposal of LLW at an off-site disposal facility or in the EMWMF	LLW shall be certified as meeting waste acceptance requirements before it is transferred to the receiving facility.	Generation for disposal of LLW at a DOE facility— TBC	DOE M 435.1-1(IV)(J)(2) #
Transportation of LLW off-site	LLW waste shall be packaged and transported in accordance with DOE O 460.1A and DOE O 460.2.	Preparation of off-site shipment of LLW— TBC	DOE M 435.1-1(D)(1)(E)(11) #
Transportation of LLW off-site	To the extent practicable, the volume of waste and number of shipments shall be minimized.	Preparation of off-site shipment of LLW— TBC	DOE M 435.1-1(IV)(L)(2) #

#See comment below.

130. **Removed TBCs include DOE Orders**

While DOE correctly argues inclusion of TBC requirements is not mandatory, the burden is on DOE to explain the omission of TBCs the FFA Parties agreed to include in signing the 2017 DRA. The D1 ROD does not explain why these requirements would no longer be useful for the selected remedy. The use of TBCs is consistent with and complements statutory requirements to protect human health and the environment and to comply with ARARs.³⁰ In 2017, the FFA Parties did not agree on the enforceability of TBCs based on DOE Order 435.1-1 if included in the ROD, but the FFA dispute did not address the contribution of the TBCs to remedy protectiveness.

As noted in TDEC comments on the third draft (D3) and other drafts of the RI/FS, DOE Orders represent DOE's regulatory responsibilities under the AEA, as well as its obligation to maintain EMDF in perpetuity. Consequently, the ROD should list DOE Orders as TBC requirements because they provide a basis for more stringent requirements than the TDEC rules. The expectation is the more restrictive requirement will apply, as is typical of the CERCLA process.

During Appendix G revision in the fall of 2017, DOE proposed to identify the requirements based on DOE 435.1-1 with an asterisk to indicate the TBCs would not be enforceable by EPA. As part of a CERCLA ROD, DOE Orders listed as TBC would need to be independently enforceable through CERCLA. As such, the TBCs would lose their nature as self-regulated requirements of the Atomic Energy Act (AEA) and be subject to external enforcement.

EPA should recognize DOE's consistent interpretation and application of DOE Order 435.1 requirements as a consideration in any potential enforcement of requirements placed in the ROD. Moreover, under the FFA, DOE is amply protected from EPA making an arbitrary interpretation. DOE has exaggerated the risk to its AEA authority that might be posed by listing DOE Order requirements as TBCs and has a long history of including DOE Order requirements as TBCs without raising this issue. TDEC would also agree to examine how DOE has interpreted and applied DOE Order requirements in considering any action it might take to enforce the ROD.

Many DOE Order requirements relate to the matters of characterization, temporary storage, and treatment of LLW. Table A-3 in the D1 ROD includes ARARs derived from NRC regulations and compatible TDEC DRH rules that are identified as "relevant and appropriate." However, it is not clear the DOE Order requirements are matched by corresponding ARARs performing the same functions.

Omission of any TBCs the FFA Parties agreed to in 2017 should be selective and justified. The ROD should show why individual TBCs are unnecessary—e.g., they relate

³⁰ 40 CFR 300.430(g)(3) and the 1990 NCP preamble, 55 FR 8666 at 8745.

to aspects of LLW management that will not occur at EMDF or they duplicate ARARs in the ROD. As an example, three of the requirements, DOE M 435.1-1(IV)(J)(2), DOE M 435.1-1(I)(1)(E)(11), and DOE M 435.1-1(IV)(L)(2), indicated by pound/hashtag symbols (#) in Table 1 above, appear related only to offsite disposal and may not be within the scope of this ROD. The explanation for removing these requirements might be that offsite shipment is covered by RODs for actions that will generate the LLW, but DOE should confirm these requirements are covered in such CERCLA decision documents or there is an intent to add these requirements.

At the bottom of the original Table 1, there were several omitted TBCs for TDEC general ARAPs. It is appropriate to remove these requirements because they are superseded by general permits issued later which are cited in Appendix A. This example highlights the flaw in the wholesale removal of other TBCs, because these requirements are not defined as ARARs, but they serve important functions not provided by other requirements for protectiveness of the selected remedy.

131. **Table 2 Removed Administrative Requirements**

During meetings of the FFA Parties, DOE cited and quoted a long excerpt from the *CERCLA Compliance with Other Laws Manuals: Part I* (EPA-540/G-89/006)³¹ to justify removing a set of requirements identified in Table 2 below as administrative. While the definitions have been stated, no individual justification is provided to explain why the requirements serve no substantive purpose, rather than merely concluding that each requirement should be removed. Each requirement should be restored, or specific justification should be provided for its removal. Some of the requirements were restored during the FFA Party discussions mentioned above. TDEC added a comment column to the table below to indicate which requirements were kept and cited the relevant table and page in the D1 ROD.

Table 2 Removed Administrative Requirements

Applica-tion	Requirements	Prerequisite	Citation	TDEC comment
<i>Location-specific [note: these specific "section" descriptions are not in EMWMF ARARs]</i>				
Presence of wetlands as defined in 10 CFR 1022.4	Project Description. This section shall describe the proposed action and shall include a map showing its location with respect to the floodplain and/or wetland. For actions located in a floodplain, the nature and extent of the flood hazard shall be described, including the nature and extent of hazards associated with any high-hazard areas.	DOE actions that involve potential impacts to, or take place within wetlands— applicable	10 CFR 1022.13(a)(1)	Substantive provisions are included in Table A.2. p. A-6 thru A-9 Deletion accepted

³¹ Available at <https://semspub.epa.gov/work/HQ/174076.pdf>.

Presence of wetlands as defined in 10 CFR 1022.4	Floodplain or Wetland Impacts. This section shall discuss the positive and negative, direct and indirect, and long- and short-term effects of the proposed action on the floodplain and/or wetland. This section shall include impacts on the natural and beneficial floodplain and wetland values (§) appropriate to the location under evaluation. In addition, the effects of a proposed floodplain action on lives and property shall be evaluated. For an action proposed in a wetland, the effects on the survival, quality, and function of the wetland shall be evaluated.	DOE actions that involve potential impacts to, or take place within wetlands— applicable	10 CFR 1022.13(a)(2)	Deletion accepted. See immediately above.
Action-specific				
Temporary storage of hazardous waste in containers on-site – “90-Day Storage Area”	<ul style="list-style-type: none"> container is marked with the date upon which each period of accumulation begins and is visible for inspection; and 	Accumulation of RCRA hazardous waste on-site as defined in 40 CFR 260.10— applicable	40 CFR 262.34(a)(2) TDEC 0400-12-01-.03(4)(e)(2)(ii)	As a disposal facility how would generator requirements apply to EMDF as opposed to the activities that generate the hazardous waste prior to shipment to the EMDF?
Temporary storage of hazardous waste in containers on-site – “90-Day Storage Area”	<ul style="list-style-type: none"> container is marked with the words “Hazardous Waste” 	Accumulation of RCRA hazardous waste on-site as defined in 40 CFR 260.10— applicable	40 CFR 262.34(a)(3) TDEC 0400-12-01-.03(4)(e)(2)(iii)	As a disposal facility how would generator requirements apply to EMDF as opposed to the activities that generate the hazardous waste prior to shipment to the EMDF? Does marking have a safety rationale?

Charac- terization and man- agement of univer- sal waste	Must label or mark the universal waste to identify the type of universal waste.	Generation of universal waste [as defined in 40 CFR 273] for disposal— applicable	40 CFR 273.34 TDEC 0400-12- 01-12(3)(e)	Included now Table A.3., page A-29
Tempo- rary stor- age of PCB waste (e.g., PPE, rags) in a contain- er(s)	Storage area must be clearly marked as required by 40 CFR 761.40(a)(10)	Storage of PCBs and PCB items at concentration ≥ 50 ppm for disposal— applicable	40 CFR 761.65(c)(3)	Included now Table A.3., page A-30
Disposal of contain- ers of TSCA PCB wastes	Container(s) shall be marked as illustrated in 40 CFR 761.45(a). <i>a version of this is in EMWWMF, says they must be marked but no specific details.</i>	Disposal of PCBs or PCB items in chemical waste landfill— applicable	40 CFR 761.40(a)(1)	Included now Table A.3., page A-30
Inventory require- ments	The owner or operator of a landfill must maintain the following items in the operating record required under §264.73: (a) On a map, the exact location and dimensions, including depth, of each cell with respect to permanently surveyed benchmarks; and (b) The contents of each cell and the approximate location of each hazardous waste type within each cell.	Operation of a RCRA hazardous waste landfill— applicable	40 CFR 264.309 TDEC 0400-12- 01-06(14)(j)	Included now Table A.3., page A-37
Inventory require- ments	Maintain, until closure, records of the location, depth and area, and quantity in cubic yards of asbestos containing material within the disposal site on a map or diagram.	Operation of an active waste disposal site that receives ACM from a source covered under 40 CFR 61.145— applicable	40 CFR 61.154(f)	Now appears on Table A.3, p. A-45

Inventory require-ments	Disposal records shall include information on the PCB concentration in the liquid wastes and the three-dimensional burial coordinates for PCBs and PCB items.	Operation of a TSCA chemical waste landfill— applicable	40 CFR 761.75(b)(8)(iv)	Now appears on Table A.3, p. A-38
Survey plat	Must submit to the local zoning authority or the authority with jurisdiction over local land use, a survey plat indicating the location and dimensions of landfill cells, with respect to permanently surveyed benchmarks. The plat must contain a note, prominently displayed which states the owner/operator obligation to restrict disturbance of the landfill.	Closure of a RCRA landfill— applicable	40 CFR 264.116 TDEC 0400-12-01-.06(7)(g)	Now appears on Table A.3, p. A-45
Survey plat	Within 60 days of a site becoming inactive and after the effective date of this subpart, record, in accordance with State law, a notation on the deed to the facility property and on any other instrument that would normally be examined during a title search; this notation will in perpetuity notify any potential purchaser of the property that: (1) The land has been used for the disposal of asbestos-containing waste material; (2) The survey plot and record of the location and quantity of asbestos-containing waste disposed of within the disposal site required in §61.154(f) have been filed with the Administrator; and (3) The site is subject to 40 CFR part 61, subpart M.	Closure of an asbestos-containing waste disposal site— applicable	40 CFR 61.151(e)	Now appears on Table A.3, p. A-45
Post-closure notices	Must submit to the local zoning authority a record of the type, location, and quantity of hazardous wastes disposed of within each cell of the unit.	Closure of a RCRA landfill— applicable	40 CFR 264.119(a) TDEC 0400-12-01-.06(7)(j)(1)	Now appears on Table A.3, p. A-46

Survey plat	Must record, in accordance with State law, a notation on the deed to the facility property - or on some other instrument which is normally examined during a title search - that will in perpetuity notify any potential purchaser of the property that the land has been used to manage hazardous wastes, and its use is restricted.	Closure of a RCRA landfill— applicable	40 CFR 264.119(b) TDEC 0400-12-01-.06(7)(j)(2)	Now appears on Table A.3, p. A-46
Closure of ground-water monitoring well(s)	Shall be accomplished by a licensed driller.	Permanent plugging and abandonment of a well relevant and appropriate	TDEC 0400-45-09-.16(2)	Deletion accepted: Substantive closure criteria are listed in Table A.3, P. a-47

132. **Table 3 Removed Volume Reduction Requirements**

Table 3 was titled *Volume Reduction Requirements Removed*. Their removal was based on the point these requirements were not associated with the selected remedy. TDEC has offered comments and continues to believe volume reduction would be beneficial to preserve landfill capacity. However, TDEC also acknowledges these requirements were not associated with the larger onsite disposal sites evaluated in the RI/FS that TDEC never officially approved.

133. **Table 4 Removed RCRA Tank System Requirements**

Has DOE determined EMDF will not generate hazardous landfill waste water in accordance with 40 CFR 262.11(a)-(b) and Tenn. Comp. R. & Regs. § 0400-12-01-.03(1)(b)? As mentioned in an earlier comment, the possibility remains that the EMDF will accept hazardous wastes. While WAC would prohibit the disposal of listed wastes, negating applicability of the RCRA “derived from” rule or the “pass-through” principle [see 40 CFR 261.3(a)(2)(iii)-(iv) and 261.3(c)(2)(i)], TDEC asks for a quantitative demonstration, or at least a clear explanation supporting DOE’s assertion, that no characteristically hazardous landfill wastewater will be generated.

Given the anticipated need to treat high concentrations of mercury and other pollutants, including radionuclides, in landfill wastewater, storage tanks should be designed with secondary, lined containment to protect against spillage. These requirements are commonly applied to leachate storage systems at permitted solid waste “Subtitle D” disposal facilities, even though they are not required to comply with provisions for double-walled tanks, double-walled piping, and other requirements for

facilities intended to hold hazardous wastes. TDEC highlights these requirements in the table below.

Table 4 Removed RCRA Tank System Requirements
No RCRA Tank Systems Needed Because No Listed Waste Allowed
and Landfill Wastewater Will Not Be Hazardous

Applica- tion	Requirements	Prerequisite	Citation	
<i>Action-specific</i>				
Pre- opera- tion/oper- ation of a RCRA tank sys- tem (tanks and pip- ing)	Prior to use, must ensure that proper handling procedures are adhered to in order to prevent damage to the system during installation.	Construction of RCRA tank system — applicable	40 CFR 264.192(b) TDEC 0400-12-01-.06(10)(c)(2)	
Pre- opera- tion/oper- ation of a RCRA tank sys- tem (tanks and pip- ing)	Prior to use, must inspect the system for the presence of weld breaks, punctures, scrapes of protective coatings, cracks, corrosion, other structural damage, or inadequate construction/installation. All discrepancies must be remedied before the system is covered, enclosed or placed in use.	Construction of RCRA tank system — applicable	40 CFR 264.192(b)(1)-(6) TDEC 0400-12-01-.06(10)(c)(2)(i)-(vi)	
Pre- opera- tion/oper- ation of a RCRA tank sys- tem (tanks and pip- ing)	Prior to use, tanks and ancillary equipment must be tested for tightness. If a tank system is found not to be tight, all repairs necessary to remedy the leak(s) must be performed prior to the system being placed into use.	Construction of RCRA tank system — applicable	40 CFR 264.192(d) TDEC 0400-12-01-.06(10)(c)(4)	

Design of a RCRA Tank System	Must prepare an assessment attesting that the tank system design has sufficient structural integrity and is acceptable for the storing/treating of hazardous waste. The assessment must include the information specified in 40 CFR 264.192(a)(1)-(5) [TDEC 0400-12-01-.06(10)(c)(1)-(5)].	Storage of RCRA hazardous waste in a new tank system— relevant and appropriate	40 CFR 264.192(a) TDEC 0400-12-01-.06(10)(c)(1)	
Design of a RCRA Tank System	Ancillary equipment (i.e., piping) must be supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction.	Storage of RCRA hazardous waste in a new tank system— relevant and appropriate	40 CFR 264.192(e) TDEC 0400-12-01-.06(10)(c)(5)	
Design of a RCRA Tank System	Must provide the degree of corrosion protection based upon the information in 40 CFR 264.192(a)(3) (TDEC 0400-12-01-.06[10][c][1][iii]) to ensure the integrity of the tank system during use. Installation of field fabricated corrosion protection system must be supervised by an independent corrosion expert.	Storage of RCRA hazardous waste in a new tank system— relevant and appropriate	40 CFR 264.192(f) TDEC 0400-12-01-.06(10)(c)(6)	
Design of a RCRA Tank System	Must provide secondary containment in order to prevent release of hazardous waste or constituents into the environment.	Storage of RCRA hazardous waste in a new tank system— relevant and appropriate	40 CFR 264.193(a)(1) TDEC 0400-12-01-.06(10)(d)(1)	TDEC
Design of a RCRA Tank System	Secondary containment systems must be: <ul style="list-style-type: none"> • Designed, installed, and operated to prevent any migration of wastes or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during the use of the tank system; and • Capable of detecting and collecting releases and accumulated liquids until the collected material is removed. 	Storage of RCRA hazardous waste in a new tank system— relevant and appropriate	40 CFR 264.193(b) TDEC 0400-12-01-.06(10)(d)(2)	TDEC
Design of a RCRA Tank System	Secondary containment systems must be at a minimum: <ul style="list-style-type: none"> • Constructed of or lined with materials that are compatible with the wastes(s) to be placed in the tank system and must have sufficient strength and thickness to prevent failure owing to pressure gradients (including static head and external hydrological forces), physical 	Storage of RCRA hazardous waste in a new tank system— relevant and appropriate	40 CFR 264.193(c) TDEC 0400-12-01-.06(10)(d)(3)	TDEC

	<p>contact with the waste to which it is exposed, climatic conditions, and the stress of daily operation (including stresses from nearby vehicular traffic).</p> <ul style="list-style-type: none"> Placed on a foundation or base capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift; Provided with a leak-detection system that is designed and operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours, or at the earliest practicable time if the owner or operator can demonstrate to the Regional Administrator that existing detection technologies or site conditions will not allow detection of a release within 24 hours; and Sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills, or precipitation. Spilled or leaked waste and accumulated precipitation must be removed from the secondary containment system within 24 hours, or in as timely a manner as is possible to prevent harm to human health and environment, if the owner or operator can demonstrate to the Regional Administrator that removal of released waste or accumulated precipitation cannot be accomplished within 24 hours. 			
Design of a RCRA Tank System	<p>Secondary containment for tanks must include one or more of the following devices:</p> <ul style="list-style-type: none"> a liner (external to the tank); a vault; a double-walled tank; or an equivalent device as approved by the EPA. 	Storage of RCRA hazardous waste in a new tank system— relevant and appropriate	40 CFR 264.193(d) TDEC 0400-12-01-.06(10)(d)(4)	
Design of a RCRA Tank System	<p>External liner systems must be:</p> <ul style="list-style-type: none"> designed and operated to contain 100 percent of the capacity of the largest tank within its boundary; designed or operated to prevent run-on or infiltration of precipitation into the 	Storage of RCRA hazardous waste in a new tank system—	40 CFR 264.193(e)(1) TDEC 0400-12-01-.06(10)(d)(5)(i)	

	<p>secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. (Such additional capacity must be sufficient to contain precipitation from a 25 year, 24-hour rainfall event);</p> <ul style="list-style-type: none"> • free of cracks or gaps; and • designed and installed to surround the tank completely and to cover all surrounding earth likely to come into contact with the waste if the waste is released from the tank(s) (i.e., capable of preventing lateral as well as vertical migration of the waste). 	relevant and appropriate		
Design of a RCRA Tank System	<p>Vault system must be:</p> <ul style="list-style-type: none"> • designed or operated to contain 100 percent of the capacity of the largest tank within its boundary; • designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. (Such additional capacity must be sufficient to contain precipitation from a 25 year, 24-hour rainfall event); • constructed of chemical-resistant water stops in all joints (if any); • provided with an impermeable interior coating or lining that is compatible with the stored waste and that will prevent migration of the waste into the concrete; • provided with a means to protect against formation of and ignition of vapors within the vault if the waste being stored or treated meets the definition of ignitable or reactive waste under 40 CFR 261.21 or 261.23; and • provided with an exterior moisture barrier or otherwise designed or operated to prevent migration of moisture into the vault if the vault is subject to hydraulic pressure. 	<p>Storage of RCRA hazardous waste in a new tank system— relevant and appropriate</p>	<p>40 CFR 264.193(e)(2) TDEC 0400-12-01-.06(10)(d)(5)(ii)</p>	
Design of a RCRA Tank System	<p>Double-walled tanks must be:</p> <ul style="list-style-type: none"> • designed as an integral structure (i.e., an inner tank completely enveloped within and outer shell) so that any release from the inner tank is contained by the outer shell; 	<p>Storage of RCRA hazardous waste in a new tank system—</p>	<p>40 CFR 264.193(e)(3) TDEC 0400-12-01-.06(10)(d)(5)(iii)</p>	

	<ul style="list-style-type: none"> protected, if constructed of metal, from both corrosion of the primary tank interior and of the external surface of the outer shell; and provided with a built-in continuous leak detection system capable of detecting a release within 24 hours, or at the earliest practicable time. 	relevant and appropriate		
Design of a RCRA Tank System	<p>Ancillary equipment must be provided with secondary containment (e.g., trench, jacketing, double-walled piping) that meets the requirements of 40 CFR 264.193(b) and (c) (TDEC 0400-12-01-.06[10][d][2] and [3]) except for:</p> <ul style="list-style-type: none"> aboveground piping (exclusive of flanges, joints, valves, and other connections) that are visually inspected for leaks on a daily basis; welded flanges, welded joints and welded connections, that are visually inspected for leaks on a daily basis; seamless or magnetic coupling pumps and seal-less valves, that are visually inspected for leaks on a daily basis; and pressurized aboveground piping systems with automatic shut-off devices (e.g., excess flow check valves, flow metering shutdown devices, loss of pressure actuated shut-off devices) that are visually inspected for leaks on a daily basis. 	Storage of RCRA hazardous waste in a new tank system— relevant and appropriate	40 CFR 264.193(f) TDEC 0400-12-01-.06(10)(d)(6)	
Design and installation of a RCRA surface impoundment	Must install a liner system consisting of two or more liners and a leachate collection and removal system, constructed in accordance with 40 CFR 264.221(c)(1)-(4) (TDEC 0400-12-01-.06[11][b][3][i]-[iv]).	Storage of RCRA hazardous waste in a new surface impoundment— relevant and appropriate	40 CFR 264.221(c) TDEC 0400-12-01-.06(11)(b)(3)	
Design and installation of a RCRA surface impoundment	Must implement a leak detection system capable of detecting, collecting and removing leaks of hazardous constituents from all areas of the top liner during the active life and post-closure care period.	Storage of RCRA hazardous waste in a new surface impoundment— relevant and appropriate	40 CFR 264.221(c)(2) TDEC 0400-12-01-.06(11)(b)(3)(ii)	

Design and installation of a RCRA surface impoundment	Must design, construct and maintain dikes with sufficient structural integrity to prevent massive failure.	Storage of RCRA hazardous waste in a new surface impoundment — relevant and appropriate	40 CFR 264.221(h) TDEC 0400-12-01-.06(11)(b)(8)	
Design and installation of a RCRA surface impoundment	Alternative design practices to those in 40 CFR 264.221(c) (TDEC 0400-12-01-.06[11][b][3]) may be approved by the Regional Administrator.	Storage of RCRA hazardous waste in a new surface impoundment — relevant and appropriate	40 CFR 264.221(d) TDEC 0400-12-01-.06(11)(b)(4)	
Control of air emissions from an above-grade RCRA tank system	The requirements of 40 CFR 264 Subpart CC do not apply to a waste management unit that is used solely for on-site treatment or storage of hazardous waste that is generated as a result of implementing remedial activities required under CERCLA authorities.	Storage of RCRA hazardous waste in a new tank system— relevant and appropriate	40 CFR 264.1080(b)(5) TDEC 0400-12-01-.32(a)(2)(v)	
Operation of a RCRA tank system	Hazardous wastes or treatment reagents must not be placed in the tank system if they could cause the tank, its ancillary equipment or the containment system to rupture, leak, corrode, or otherwise fail.	Storage of RCRA hazardous waste in a new tank system— relevant and appropriate	40 CFR 264.194(a) TDEC 0400-12-01-.06(10)(e)(1)	
Operation of a RCRA tank system	Must use appropriate controls and practices to prevent spills and overflows from the tank or containment system. These include at a minimum: <ul style="list-style-type: none"> • spill prevention controls (e.g., check valves, dry disconnect couplings); • overfill prevention controls (e.g., level sensing devices, high level alarms, automatic feed cutoff, or bypass to a standby tank; and • maintenance of sufficient freeboard in uncovered tanks to prevent overtopping by wave or wind action or by precipitation. 	Storage of RCRA hazardous waste in a new tank system— relevant and appropriate	40 CFR 264.194(b) TDEC 0400-12-01-.06(10)(e)(2)	

Operation of a RCRA tank system	Must comply with the requirements of 40 CFR 264.196 (TDEC 0400-12-01-.06[10][g]) if a leak or a spill occurs in the tank system.	Storage of RCRA hazardous waste in a new tank system— relevant and appropriate	40 CFR 264.194(c) TDEC 0400-12-01-.06(10)(e)(3)	
Operation of a RCRA surface impoundment	Design and operate facility to prevent overtopping resulting from normal or abnormal operations; overfilling; wind and wave action; rainfall; run-on; malfunctions of level controllers, alarms and other equipment; and human error.	Storage of RCRA hazardous waste in a surface impoundment — relevant and appropriate	40 CFR 264.221(g) TDEC 0400-12-01-.06(11)(b)(7)	
Operation of a RCRA surface impoundment	Remove surface impoundment from operation if the dike leaks or if there is a sudden drop in liquid level.	Storage of RCRA hazardous waste in a surface impoundment — relevant and appropriate	40 CFR 264.227 TDEC 0400-12-01-.06(11)(h)	
Closure of a RCRA tank system	Must remove or decontaminate all waste residues, contaminated containment system components (liners, etc.) contaminated soils, and structures and equipment contaminated with waste, and manage them as hazardous waste, unless 40 CFR 261.3(d) (TDEC 0400-12-01-.02[1][c][4]) applies. If all contents cannot be practicably removed or decontaminated, consider the tank system a landfill and close in accordance with the landfill closure requirements of 40 CFR 264.310 (TDEC 0400-12-01-.06[14][k]).	Closure of a RCRA hazardous tank system— relevant and appropriate if wastewater is determined to be hazardous	40 CFR 264.197(a) and (b) TDEC 0400-12-01-.06(10)(h)(1) and (2)	
Closure and post-closure care of a surface impoundment	Must remove or decontaminate all waste residues and contaminated materials; otherwise free liquids must be removed, the remaining wastes stabilized to a bearing capacity sufficient to support final cover, and the facility closed and covered with a final cover designed in accordance with 40 CFR 264.228(a)(2)(iii)(A)-(E) (TDEC 0400-12-01-.06[11][i][1][ii][III]).	Closure of a hazardous waste surface impoundment — relevant and appropriate if wastewater is determined to be hazardous	40 CFR 264.228(a) and (b) TDEC 0400-12-01-.06(11)(i)(1) and (2)	

	<p>If some waste residues or contaminated materials are left in place at final closure, must comply with all postclosure requirements contained in §§264.117 through 264.120 (TDEC 0400-12-01-.06[7][h] through [k]), including maintenance and monitoring throughout the postclosure period. Must also:</p> <ul style="list-style-type: none"> • maintain integrity and effectiveness of final cover, making repairs to the cap as necessary; • maintain and monitor leak detection system; • maintain and monitor groundwater monitoring system; • prevent run-on and runoff from eroding or otherwise damaging final cover. 			
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DOE could also argue for a wastewater treatment unit exemption under 40 CFR 260.10 definitions:

Wastewater treatment unit means a device which:

- (1) Is part of a wastewater treatment facility that is subject to regulation under either section 402 or 307(b) of the Clean Water Act; and
- (2) Receives and treats or stores an influent wastewater that is a hazardous waste as defined in § 261.3 of this chapter, or that generates and accumulates a wastewater treatment sludge that is a hazardous waste as defined in § 261.3 of this chapter, or treats or stores a wastewater treatment sludge which is a hazardous waste as defined in § 261.3 of this Chapter; and
- (3) Meets the definition of tank or tank system in § 260.10 of this chapter.

On November 17, 1980 (45 Federal Register 76074), the EPA promulgated the wastewater treatment unit (WWTU) exemption from RCRA requirements under 40 CFR 260.10. The exemption was designed specifically to avoid duplicative requirements under RCRA and the CWA for the management of certain hazardous wastes. The exemption excludes equipment used to treat hazardous wastewater and wastewater treatment sludge from: (1) the RCRA permitting requirements of 40 CFR Part 270, (2) general facility standards in 40 CFR 264 and 265, and (3) specific tank design and operating requirements in 40 CFR 264 and 265, Subpart J, 40 CFR 264.1(g)(6):

- (6) The owner or operator of an elementary neutralization unit or a wastewater treatment unit as defined in § 260.10 of this chapter, provided that if the owner or operator is diluting hazardous ignitable (D001) wastes (other than the D001 High TOC Subcategory defined in § 268.40 of this chapter, Table Treatment Standards for Hazardous Wastes), or reactive (D003) waste, to remove the

characteristic before land disposal, the owner/operator must comply with the requirements set out in § 264.17(b).

The exemption would apply regardless of whether the wastewater was itself hazardous waste or not. However, TDEC reiterates the need for lined secondary containment, as stated above.

134. **RCRA Wastewater Management System Requirements**

The ROD should clarify how landfill wastewater will be managed. In addition to the information requested in Comment 68a, the ROD should explain the following.

- a. Will landfill wastewater be managed in ponds, tanks, or both?

At EMWMF, "contact water" is stored in ponds and open tanks, while leachate is stored in a separate set of tanks. Figure 2.5 (p. 2-36) shows six "Leachate/Contact Water Storage" tanks, and text in Section 2.12.2.1 (p. 2-38) describes "the landfill wastewater storage system," with no discussion of ponds or tanks.

If ponds or basins are used, they would be regulated as surface impoundments under RCRA. If only tanks are used, the surface impoundment regulations would not be ARARs for the design.

- b. Explain how DOE will avoid operating landfill cells as wastewater impoundments.
- c. Explain how DOE will ensure landfill wastewater on the liner does not exceed 30 centimeters (cm), as required by 40 CFR 264.301(c)(2) and Tenn. Comp. R. & Regs. § 0400-12-01-.06(14) (b)(1)(ii).

135. **Table 5 Removed Asbestos Closure Requirements**

While certain aspects of the RCRA Subtitle C regulatory scheme provide more stringent requirements such as depth of final cover, it is not clear whether all the National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements have counterparts in the RCRA Subtitle C regulations. Specificity can constitute stringency, and ARARs are parsed into specific requirements; generalizations are not useful. Also, EPA has indicated that redundancy in a ROD provides flexibility in the RD phase, but there is an opportunity to eliminate ARARs related to features not needed for design. For example, a contentious issue among the FFA Parties is whether to include RCRA Subtitle C tank and surface impoundment requirements as ARARs. DOE asserts such prescriptive storage tank specifications should not be required for EMDF landfill wastewater because of DOE's decision to prohibit listed hazardous waste and characteristic mercury D009 wastes. Leaving aside the issue that EMDF could accept other characteristic hazardous wastes, EPA has stated there is no obligation to comply with ARARs for which there are no applicable or relevant and appropriate features in the design.

For example, EMWMF uses tanks and surface impoundments for managing landfill wastewater—i.e., leachate and contaminated storm water, also known as “contact water.” Preliminary drawings for EMDF indicate only tanks are being considered. In the event the decision is made to use only tanks, then the requirements for surface impoundments will not be ARAR. The design must meet ARARs, but the ARARs do not dictate the design. Based on extensive experience, an EPA attorney emphasized that ARARs can be eliminated during design but adding ARARs during that phase can cause delay because of the requirement to prepare, review, and approve an Explanation of Significant Differences. One example cited involved a project where the responsible party emphatically refused to consider staging remediation waste in a pile and then decided to use a staging pile, resulting in delays because the corresponding ARARs were not included in the ROD.

Similarly, the analysis of stringency for NESHAP requirements and RCRA Subtitle C requirements can be made as part of the RD/RA. The RD/RA process uses documents like the Remedial Design Work Plan (RDWP) which provides opportunities to determine the necessity of various ARARs and compare and evaluate specificity and stringency of similar requirements. ROD language can be agreed that will recognize the ability to remove ARARs not needed for final design.

Table 5 Removed Asbestos Closure Requirements
RCRA Closure Requirements are Applicable and More Stringent

Applica- tion	Requirements	Prerequisite	Citation
<i>Action-specific</i>			
Closure of an asbestos-containing waste disposal area	Upon closure, comply with the provisions of 40 CFR 61.151(a) – (c)[TDEC 1200-3-11-.02(2)(l)(1) – (3)]:	Closure/capping of a permitted asbestos disposal site— relevant and appropriate	40 CFR 61.154(g) TDEC1200-3-11-.02(5)(g)
Closure of an asbestos-containing waste disposal area	Must either discharge no visible emissions to the outside air; <u>or</u>	Closure/capping of a permitted asbestos disposal site— relevant and appropriate	40 CFR 61.151(a)(1) TDEC 1200-3-11-.02(2)(l)(1)(i)
Closure of an asbestos-	Cover the ACM with at least 6 in. of compacted non-asbestos-containing material and grow and maintain a	Closure/capping of a permitted asbestos disposal	40 CFR 61.151(a)(2)

containing waste disposal area	cover of vegetation on the area adequate to prevent exposure of the asbestos-containing waste; <u>or</u>	site— relevant and appropriate	TDEC 1200-3-11-.02(2)(l)(1)(ii)
Closure of an asbestos-containing waste disposal area	Cover the asbestos-containing waste with at least 2 ft of compacted non-asbestos-containing material and maintain it to prevent exposure of the waste.	Closure/capping of a permitted asbestos disposal site— relevant and appropriate	40 CFR 61.151(a)(3) TDEC 1200-3-11-.02(2)(l)(1)(iii)
Closure of an asbestos-containing waste disposal area	Unless a natural barrier adequately deters access by the general public, install and maintain warning signs and fencing as detailed in 40 CFR 61.151(b)(1) – (3) <u>or</u> comply with 40 CFR 61.151(a)(2) or (a)(3).	Closure/capping of a permitted asbestos disposal site— relevant and appropriate	40 CFR 61.151(b) TDEC 1200-3-11-.02(2)(l)(2)
Closure of an asbestos-containing waste disposal area	Owner may use an alternative control method that has received prior approval of the Administrator rather than comply with the requirements of 40 CFR 61.151(a) or (b).	Closure/capping of a permitted asbestos disposal site— relevant and appropriate	40 CFR 61.151(c) TDEC 1200-3-11-.02(2)(l)(3)

136. **Table 6 Removed Solid Waste Requirements**

Like the previous comment, the comparison of stringency should proceed from requirement to requirement and not on a general impression of the stringency of the overall regulatory scheme. Rather than engaging in lengthy analysis at this juncture, the approach described in the previous comment can be taken to allow DOE to select the more stringent ARARs when needed for design. One example that should be convincing is reliance on the geologic buffer requirements from Tenn. Comp. R. & Regs. § 0400-20-11-.04(4)(a) with Subtitle C liner requirements as the basis for ARAR waivers. The solid waste scheme overall requires less stringent liner and final cover systems, but the geologic buffer requirements is a very useful specific requirement. The same utility could apply to one of the solid waste requirements DOE seeks to eliminate after identifying them as ARARs earlier in the CERCLA process.

Table 6 Removed Solid Waste Requirements
RCRA Hazardous Waste Requirements are Applicable and More Stringent

Application	Requirements	Prerequisite	Citation
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Action-specific			
Facility design, construction	<p>Underlying the liners shall be a geologic buffer which shall have:</p> <ul style="list-style-type: none"> (i) A maximum hydraulic conductivity of 1.0×10^{-5} cm/s and measures at least ten (10) feet from the bottom of the liner to the seasonal high-water table of the uppermost unconfined aquifer or top of the formation of a confined aquifer, or (ii) Have a maximum hydraulic conductivity of 1.0×10^{-6} cm/s and measure not less than five (5) feet from the bottom of liner to the seasonal high-water table of the uppermost unconfined aquifer or the top of the formation of a confined aquifer, or (iii) Other equivalent or superior protection as defined in subpart (ii) of this part. 	Design and construction of a solid waste landfill— relevant and appropriate	TDEC 0400-11-01-.04(4)(a)(2)
Pre-construction activities	Prior to excavation, all bore holes drilled or dug during subsurface investigation of the site, piezometers, and abandoned wells which are either in or within 100 feet of the areas to be filled must be backfilled with a bentonite slurry or other sealant approved by the Commissioner to an elevation at least ten feet greater than the elevation of the lowest point of the landfill base (including any liner), or to the ground surface if the site will be excavated less than ten feet below grade.	Construction of a solid waste disposal facility— relevant and appropriate	TDEC 0400-11-01-.04(2)(l)
Operation of a Subtitle D solid waste landfill	A facility must be operated and maintained in a manner to minimize litter. Fencing, diking and/or other practices shall be provided as necessary to confine solid wastes subject to dispersal. All litter must be collected for disposal in a timely manner.	Operation of a Subtitle D solid waste landfill— relevant and appropriate	TDEC 0400-11-01-.04(2)(d)
Operation of a Subtitle D solid waste landfill	There must be maintained on-site operating equipment capable of spreading and properly compacting the volume of solid wastes received, and capable of handling the earthwork required. Back-up equipment must be available within 24 hours of primary equipment breakdown.	Operation of a Subtitle D solid waste landfill— relevant and appropriate	TDEC 0400-11-01-.04(2)(g)
Operation of a Subtitle D solid waste landfill	<p>Cover material sufficient to meet the initial and intermediate cover requirements of this rule must be available at the facility. If such material must be hauled in from off-site [i.e., off of ORR], at least a 30-day supply must be maintained on site at all times.</p> <p><i>[Note: Off-site, as referred to here, is assumed to mean off of the ORR.]</i></p>	Operation of a Subtitle D solid waste landfill— relevant and appropriate	TDEC 0400-11-01-.04(2)(h)
Operation of a Subtitle D	Collection and holding facilities associated with run-on and run-off control systems must be emptied or otherwise	Operation of a Subtitle D solid waste	TDEC 0400-11-01.04(2)(i)

solid waste landfill	<p>managed expeditiously after storms to maintain design capacity of the system.</p> <p>Run-on and run-off must be managed separately from leachate.</p> <p>Other control measures (e.g., temporary mulching or seeding, silt barriers) must be taken as necessary to control erosion of the site.</p>	landfill— relevant and appropriate	
Operation of a Subtitle D solid waste landfill	The operator must take dust control measures as necessary to prevent dust from creating a nuisance or safety hazard to adjacent landowners or to persons engaged in supervising, operating, and using the site. The use of any dust suppressants (other than water) must be approved prior to use.	Operation of a Subtitle D solid waste landfill— relevant and appropriate	TDEC 0400-11-01.04(2)(j)
Operation of a Subtitle D solid waste landfill	There must be installed on-site a permanent benchmark (e.g., concrete marker) of known elevation.	Operation of a Subtitle D solid waste landfill— relevant and appropriate	TDEC 0400-11-01.04(2)(o)
Waste handling activities at a solid waste landfill	Solid waste disposal activities shall be confined to the smallest practicable area. Compaction will be performed as necessary to ensure a stable fill.	Land disposal of solid waste— relevant and appropriate	TDEC 0400-11-01-.04(6)(b)(1)
Waste handling activities at a solid waste landfill	Emplaced solid wastes shall be covered with soil or other material of such depths and at such intervals as is necessary to prevent fire hazards, promote a stable fill, minimize potential harmful releases of solid wastes or solid waste constituents.	Land disposal of solid waste— relevant and appropriate	TDEC 0400-11-01-.04(6)(b)(2)

137. **Table 7 Removed Miscellaneous Requirements**

Based on the DOE's commitment to onsite treatment of landfill wastewater, this ARAR may be removed without objection from TDEC.

Table 7 Removed Miscellaneous Requirements

Removed as Noted

Application	Requirements	Prerequisite	Citation
<i>Action-specific</i>			

Wastewater transferred by truck or pipeline to on-site on-ORR CWA-authorized WWTU	<p>A user may not introduce into a wastewater facility any pollutant(s) which causes pass through or interference, and wastewater must meet the pretreatment standards and prohibitions [waste acceptance criteria and limits] set by the wastewater facility prior to transfer.</p> <p>THIS ARAR REMOVED SINCE IT APPLIES TO WASTEWATER TRANSFER TO PWTC OR OTHER ONSITE TREATMENT FACILITY, NOT PART OF REMEDY</p>	Transfer of contaminated wastewater to a CWA-authorized wastewater facility for treatment— applicable	TDEC 0400-40-14-.05(1) – (2) and (4)
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138. **Table A.1, p. 5, last row**

Tennessee’s antidegradation rule is correctly listed as an ARAR. The table should note the remedy does not involve water withdrawal, only discharge. It should also note Tennessee determines whether a parameter is “unavailable” by referencing its CWA 303(d) list, available online at the following addresses:

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html>

https://www.tn.gov/content/dam/tn/environment/water/planning-and-standards/wr_wq_303d-2020-final.xlsx

Based on the most recent (2020) report, Bear Creek is not meeting its designated recreational use for mercury, PCBs, nitrites/nitrates, and cadmium. Mercury (in the form of methylmercury) and PCBs bioaccumulate in fish, and the rule allows “no additional loading.” For nitrites/nitrates and cadmium, the requirement is to allow no measurable degradation. The table should differentiate these two requirements, and it should note the current status of Bear Creek on the 303(d) list. The table should also note this rule subparagraph will no longer be an ARAR if conditions improve, such that Bear Creek attains its designated use before EMDF begins discharging wastewater.

Based on the separate agreement related to the discharge of mercury in landfill wastewater, mentioned above, the ROD should include ARARs based on substantive portions of the following regulatory language and citations:

40 CFR 122.4:

(i) To a new source or a new discharger, if the discharge from its construction or operation will cause or contribute to the violation of water quality standards. The owner or operator of a new source or new discharger proposing to discharge into a water segment which does not meet applicable water quality standards or is not expected to meet those standards even after the application of the effluent limitations required by sections 301(b)(1)(A) and 301(b)(1)(B) of CWA, and for which the State or interstate agency has performed a pollutants load allocation for the pollutant to be discharged, must demonstrate, before the close of the public comment period, that:

(1) There are sufficient remaining pollutant load allocations to allow for the discharge; and

(2) The existing dischargers into that segment are subject to compliance schedules designed to bring the segment into compliance with applicable water quality standards. The Director may waive the submission of information by the new source or new discharger required by paragraph (i) of this section if the Director determines that the Director already has adequate information to evaluate the request. An explanation of the development of limitations to meet the criteria of this paragraph (i)(2) is to be included in the fact sheet to the permit under § 124.56(b)(1) of this chapter.

The state counterpart is found at Tenn. Comp. R. & Regs. § 0400-40-05-.04(1)(g) but without the language limiting the use of an offset as a basis to find a new discharge does not “cause or contribute” to a violation. Primarily, state rule citations are used, and there is generally no substantive difference. Under 42 USC §9621(2)(d)(2)(ii) in the strictest sense, a state regulation is only ARAR if it is more stringent than its federal counterpart or it has no federal counterpart. For this context any discharge must be consistent with the terms of the Total Maximum Daily Load (TMDL)-equivalent approach developed under CERCLA.

While the obligation to establish a TMDL is a duty of the state, one of the acceptable reasons why a state may avoid establishing a TMDL is because the water quality is being addressed under “alternate authority,” which is CERCLA in this situation. Hence, through CERCLA the functional equivalent of a TMDL can be put in place, and the compliance schedule can be established, as mentioned in 40 CFR 122.4(i).

40 CFR§ 130.7:

(c)For pollutants other than heat, TMDLs shall be established at levels necessary to attain and maintain the applicable narrative and numerical WQS with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. Determinations of TMDLs shall take into account critical conditions for stream flow, loading, and water quality parameters.

(i) TMDLs may be established using a pollutant-by-pollutant or biomonitoring approach. In many cases both techniques may be needed. Site-specific information should be used wherever possible.

(ii) TMDLs shall be established for all pollutants preventing or expected to prevent attainment of water quality standards as identified pursuant to paragraph (b)(1) of this section. Calculations to establish TMDLs shall be subject to public review as defined in the State CPP.

Under Tenn. Comp. R. & Regs. § 0400-40-05, no direct counterpart exists for 40 CFR 122.44(d)(1)(vi), which states:

(vii) When developing water quality-based effluent limits under this paragraph the permitting authority shall ensure that:

(A) The level of water quality to be achieved by limits on point sources established under this paragraph is derived from, and complies with all applicable water quality standards; and

(B) Effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, are consistent with the assumptions and requirements of any available wasteload allocation for the discharge prepared by the State and approved by EPA pursuant to 40 CFR 130.7.

Consequently, an ARAR based on this regulatory subsection should be added to the ROD in case the equivalent of a TMDL is developed to restore the Bear Creek watershed for methylmercury or PCBs.

While definitions are not ARARs, the terms used in the TMDL regulations are defined at 40 CFR 130.2:

(e) Load or loading. An amount of matter or thermal energy that is introduced into a receiving water; to introduce matter or thermal energy into a receiving water. Loading may be either man-caused (pollutant loading) or natural (natural background loading).

(f) Loading capacity. The greatest amount of loading that a water can receive without violating water quality standards.

(g) Load allocation (LA). The portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources. Load allocations are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. Wherever possible, natural and nonpoint source loads should be distinguished.

(h) Wasteload allocation (WLA). The portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality-based effluent limitation.

(i) Total maximum daily load (TMDL). The sum of the individual WLAs for point sources and LAs for nonpoint sources and natural background. If a receiving water has only one point source discharger, the TMDL is the sum of that point source WLA plus the LAs for any nonpoint sources of pollution and natural background sources, tributaries, or adjacent segments. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure. If Best Management Practices (BMPs) or other nonpoint source pollution controls make more stringent load allocations practicable, then wasteload allocations can be made less stringent. Thus, the TMDL process provides for nonpoint source control tradeoffs.

(j) Water quality limited segment. Any segment where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after the application of the technology-based effluent limitations required by sections 301(b) and 306 of the Act.

Also, the following EPA guidance should be listed as TBCs. These links provide information about using offsets as allowed by 40 CFR 122.4(i) based on non-point sources planned as part of the TMDL. Specifically, note the recognition in 40 CFR 130.2(i) of the ability to use nonpoint reductions to allow a higher Waste Load Allocation (WLA) to a point source like the EMDF.

<https://www.epa.gov/npdes/water-quality-trading-basics-and-policy-resources>

https://www.epa.gov/sites/default/files/2015-10/documents/2006_08_08_tmdl_tmdl_clarification_letter.pdf

The third type of TMDL, described in the Great Lakes Initiative, is different from the two preceding types. While not a "phased TMDL," it is a TMDL that anticipates implementation in several distinct stages. It is also different from the adaptive implementation scenario because it anticipates the load and wasteload allocations will not require any significant adjustments. Instead, implementation actions will be staged over a period of time. For example, EPA has approved mercury TMDLs where the wasteload allocation to point sources, which would be implemented within five years through the NPDES process, was predicated on long-term reductions in atmospheric mercury deposition. TDEC believes the appropriate terminology for such a TMDL, if a label needs to be applied, would be "staged implementation."

The second link provided above leads to information that discusses EPA's 1991 guidance regarding the use of "phased TMDLs" in two situations.³² In the first situation, the guidance addresses waters impaired by both point and nonpoint sources, where wasteload allocations to point sources are predicated on nonpoint source loading reductions—i.e., where point sources receive higher wasteload allocations because the TMDL assumes nonpoint sources will generate reduced loads. In such cases, the guidance recommends that some additional provision in the TMDL, such as a schedule and description of the implementation mechanisms for nonpoint source control measures, be included to provide reasonable assurance that the nonpoint source measures will achieve the expected load reductions.

139. **EPA Comments**

TDEC appreciates the opportunity to review an earlier set of EPA comments on ARARs and general concurs with those comments, unless the issue has been specifically addressed earlier in these comments. TDEC does not understand the EPA comment that hazardous waste tank requirements are applicable, unless the WWTU exemption is eliminated. However, TDEC would join in most of the EPA comments and specifically applauds comments calling for restoration of ARARs required by Administrator Wheeler's DRD resolving the landfill wastewater FFS dispute and the supplemental ARARs table provided in a follow-up letter dated January 19, 2021.²⁹ Also, TDEC was specifically asked to check with the DWR about the applicability of a set of requirements EPA provided from 40 CFR 230. TDEC confirms these requirements can be applied consistent with the practices used by the DWR in its water pollution control program and supports the addition of these ARARs.

140. **TDEC Guidance**

TDEC requests DOE consider the workbook for the Stream Quantitative Tool (SQT) and the 2019 Stream Mitigation Guidelines.³³ These guidance documents show how to determine the loss of resource value, which is the basis for the substantive standard of "no net loss".

141. **Long-term Stability**

Should Tenn. Comp. R. & Regs. § 0400-20-11-.08(3)(b)(4) be included as an ARAR? This rule states:

³² EPA, 1991, *Guidance for Water-Quality-based Decisions: The TMDL Process*, EPA 440/4-91-001, April; available at <https://www.epa.gov/sites/default/files/2018-10/documents/guidance-water-tmdl-process.pdf>.

³³ Available at https://www.tn.gov/content/dam/tn/environment/water/natural-resources-unit/wr_nru-comp-mit-tn-sqt-workbook-2020-01.xlsx and <https://www.tn.gov/content/dam/tn/environment/water/policy-and-guidance/dwr-nr-g-01-stream-mitigation-guidelines-052019.pdf>, respectively.

Analyses of the long-term stability of the disposal site and the need for ongoing active maintenance after closure must be based upon analyses of active natural processes such as erosion, mass wasting, slope failure, settlement of wastes and backfill, infiltration through covers over disposal areas and adjacent soils, and surface drainage of the disposal site. The analyses must provide assurance there will not be a need for ongoing active maintenance of the disposal site following closure.

142. **Drinking Water Protection**

Appendix A omits Safe Drinking Water Act (SDWA) standards. Preliminary EMDF ARAR text documented in DRA Appendix G states this remedial action is not being conducted in or on surface or groundwater; therefore, the MCLs are not ARARs. Yet, the basis of the inventory-limit analytic WAC proposed in the D1 ROD is use of groundwater from a nearby well. If the PA analytic WAC applied in the ROD to satisfy the CERCLA protectiveness criterion are based on use of groundwater as tap water, how could MCLs not be ARARs?

As explained in the D1 ROD, an RAO is necessary to ensure 15 ft of separation between EMDF waste and the seasonal high-water table because of shallow natural groundwater levels documented in TM-1 and TM-2. The D1 ROD also describes plans to build the landfill immediately adjacent to several streams.

SDWA standards (e.g., MCLs) must be ARARs to ensure the remedy protects water resources—one of the most important substantive requirements of any landfill permit. Arguably, most of the state's seven key concerns documented in the Proposed Plan relate to ensuring remedy protectiveness for exposure to groundwater. The fourth (D4) and fifth (D5) drafts of the RI/FS include an RAO to prevent adverse impacts to water through meeting SDWA MCLs in waters that are current or potential sources of drinking water.

143. **Corrective Action Practicability**

- a. Tenn. Comp. R. & Regs. § 0400-12-02-.03(2)(e)(1)(i)(III) is cited on p. A-19, but the D1 ROD needs to provide information documenting the required demonstration of the technical practicability of a corrective action program at the site.
- b. Consider including other parts of Tenn. Comp. R. & Regs. § 0400-12-02-.03 as ARARs because they address floodplains, wetlands, seismic considerations, areas of complex hydrogeology, corrective action buffer zones, and surface waters.
- c. Tenn. Comp. R. & Regs. § 0400-40-03-.06(2)(a), (b), (c) are cited. Should Tenn. Comp. R. & Regs. § 0400-40-03-.06(2) also be included as an ARAR?

144. **Groundwater Classification and Criteria**

Consider including portions of Tenn. Comp. R. & Regs. §§ 0400-40-03-.07 and 0400-40-03-.08 as ARARs.

145. **Post-closure Stability**

Based on the D1 ROD, EMDF WAC relies in part on NRC Class C limits. Therefore, the ROD should include as ARARs key requirements from NRC-compatible rule Tenn. Comp. R. & Regs. § 0400-20-11-.17, Technical Requirements for Land Disposal Facilities, on which disposal of such wastes is premised. Specifically, disposal of Class C waste is premised on compliance with 10 CFR 61.55(a)(2)(iii) and 10 CFR 61.56, which highlights the need to include the TDEC-compatible rules as ARARs in the ROD. Those rules are Tenn. Comp. R. & Regs. §§ 0400-20-11-.17(6)(b)(3) and 0400-20-11-.17(7), respectively.

ROD (Appendix A & Table 2.4) should list all waste characteristics requirements in Tenn. Comp. R. & Regs. § 0400-20-11-.17(7) as ARARs and cite them verbatim. The first six paragraphs of Tenn. Comp. R. & Regs. § 0400-20-11-.17(7) are included, but the seventh paragraph (gas pressures and activities) and eighth paragraph (hazardous, biological, pathogenic or infectious material) are not. The site stability rule at Tenn. Comp. R. & Regs. § 0400-20-11-.16(5) should be an ARAR, particularly with the acceptance of Class C waste.

146. **Page A-27, Table A-3, last entry on page**

The citation is for Tenn. Comp. R. & Regs. § 0400-12-01-.03(1)(a)(2)(i)(II), Independent Requirements of a Small Quantity Generator. Based on Tenn. Comp. R. & Regs. § 0400-12-01-.03(1)(d), Generator Category Determination, would not the applicable requirement be Tenn. Comp. R. & Regs. § 0400-12-01-.03(1)(a)(2)(i)(III), Independent Requirements of a Large Quantity Generator?

Editorial Comments

147. **Section 1.5, Page 1-7, 1st paragraph in section**

For consistency with the rest of the document, *Principal Threat Waste* should be lowercase.

148. **Section 2.1, Pages 2-1 and 2-2**

Consider numbering these pages, consistent with p. 3-1 and 3-2.

149. **Section 2.2.1, Page 2-6, 5th paragraph**

In the third sentence, correct "EDMF" to "EMDF."

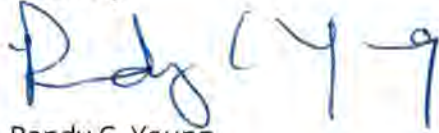
150. **Section 2.2.1, Page 2-6, 5th paragraph**

In the third sentence, correct "EDMF" to "EMDF."

151. **Section 2.2.1, Page 2-9, 1st line**
Change “between” to “among.”
152. **Section 2.5.2, Page 2-13, 1st partial paragraph, next-to-last sentence**
Change *confirms* to *confirm* in the sentence beginning, “The gradients and piezometric surface.”
153. **Section 2.9.2, Page 2-18, 3rd paragraph below bullets**
Underdrains is plural, so change *an engineered feature* to *as engineered features*, and change *controls* to *control*.
154. **Section 2.10.7, Page 2-28, 2nd line of section**
Change “between” to “among.”
155. **Section 2.12.2.3, Page 2-40, Administrative WAC, 3rd line**
Change “between” to “among.”
156. **Table 2.4, Page 2-41, 7th row**
Change “it” to “they.”
157. **Table 2.4, Page 2-41, Footnote a**
Change “between” to “among.”
158. **For consistency with other CFR citations in the ROD, consider deleting both instances of Section 2.12.2.4, Page 2-46, 4th paragraph**
For consistency with other CFR citations in the ROD, consider deleting both instances of “equivalent to.” Alternatively, consider replacing the phrase with “compatible with,” which is the terminology used by the U.S. Nuclear Regulatory Commission (NRC) [<https://www.nrc.gov/docs/ML1808/ML18081A070.pdf>].
159. **Section 2.12.2.4, Page 2-46, Footnote 6**
Change “between” to “among.”
160. **Section 2.13.2, Page 2-50, last paragraph**
For consistency with other CFR citations in the ROD, consider deleting both instances of “equivalent to.” Alternatively, consider replacing the phrase with “compatible with,” which is the terminology used by the U.S. Nuclear Regulatory Commission (NRC) [<https://www.nrc.gov/docs/ML1808/ML18081A070.pdf>].
161. **Section 2.13.2.3, Page 2-54, 1st paragraph in section**
The “-5” in the last line should be superscript.
162. **Page 3-5, Summary of Comments and Responses: Need for waivers**
Italicize the title of the guidance document cited in the first sentence.

Questions or comments concerning the contents of this letter should be directed to Brad Stephenson at the above address, by phone at (865) 220-6587 or by email at brad.stephenson@tn.gov.

Sincerely



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