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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

This document is approved for public release per review by:

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UCOR Classification & Information Control Office	Date

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Prepared for the
U.S. Department of Energy
Oak Ridge Office of Environmental Management

United Cleanup Oak Ridge LLC
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PREFACE

This *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* has been prepared in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the 1986 Superfund Amendments and Reauthorization Act, to present the public with the selected remedy for the disposal of waste expected to be generated by cleanup of the Oak Ridge Reservation (USDOE) National Priorities List Site. This Record of Decision documents the selected remedy agreed on by the U.S. Department of Energy (DOE), the Tennessee Department of Environment and Conservation, and the U.S. Environmental Protection Agency. This document summarizes and relies on information from the D5 Remedial Investigation/Feasibility Study (DOE 2017a), the Proposed Plan (DOE 2018a), and *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation*, *Oak Ridge, Tennessee* (DOE 2022).

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CONTENTS

PREFACE iii

FIGURES vii

TABLES vii

ACRONYMS ix

1. PART 1. DECLARATION 1
   - 1.1 SITE NAME AND LOCATION 1-3
   - 1.2 STATEMENT OF BASIS AND PURPOSE 1-3
   - 1.3 ASSESSMENT OF THE SITE 1-6
   - 1.4 DESCRIPTION OF THE SELECTED REMEDY 1-6
   - 1.5 STATUTORY DETERMINATIONS 1-8
   - 1.6 ROD CERTIFICATION CHECKLIST 1-9
   - APPROVALS 1-11

2. PART 2. DECISION SUMMARY 1
   - 2.1 SITE NAME, LOCATION, AND DESCRIPTION 2-3
   - 2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES 2-3
     - 2.2.1 Previous Investigations and Data Sources 2-3
     - 2.2.2 Previous Cleanup Decisions 2-10
   - 2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION 2-11
   - 2.4 SCOPE AND ROLE OF THE ACTION 2-14
   - 2.5 SITE CHARACTERISTICS 2-15
     - 2.5.1 Geology 2-16
     - 2.5.2 Groundwater 2-16
     - 2.5.3 Surface Water 2-17
     - 2.5.4 Ecological Resources 2-17
     - 2.5.5 Cultural Resources 2-18
     - 2.5.6 Contamination 2-19
   - 2.6 CURRENT AND ANTICIPATED LAND USES 2-20
     - 2.6.1 Current Land Use 2-20
     - 2.6.2 Anticipated Land Use 2-20
   - 2.7 SUMMARY OF SITE RISKS 2-22
   - 2.8 REMEDIAL ACTION OBJECTIVES 2-23
   - 2.9 SUMMARY OF REMEDIAL ALTERNATIVES 2-24
     - 2.9.1 Alternative 1 – No Action 2-24
     - 2.9.2 Alternative 2 – Onsite Disposal Alternative 2-24
     - 2.9.3 Alternative 3 – Hybrid Disposal Alternative 2-25
     - 2.9.4 Alternative 4 – Offsite Disposal Alternative 2-26
   - 2.10 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES 2-27
     - 2.10.1 Overall Protection of Human Health and the Environment 2-27
     - 2.10.2 Compliance with ARARs 2-27
     - 2.10.3 Long-term Effectiveness and Permanence 2-28
     - 2.10.4 Reduction of Toxicity, Mobility, or Volume Through Treatment 2-33
     - 2.10.5 Short-term Effectiveness 2-33
     - 2.10.6 Implementability 2-34

2.10.7 Cost 2-35
2.10.8 State Acceptance 2-36
2.10.9 Community Acceptance 2-36
2.10.9.1 Proposed Plan public review and comment 2-36
2.10.9.2 Additional public engagement 2-37
2.10.10 NEPA Values 2-38
2.10.11 Environmental Justice 2-40
2.11 PRINCIPAL THREAT WASTES 2-42
2.12 SUMMARY OF PREFERRED REMEDY 2-42
2.12.1 Summary of the Rationale for the Selected Remedy 2-45
2.12.2 Description of the Selected Remedy 2-45
2.12.2.1 Conceptual design of EMDF and infrastructure 2-48
2.12.2.2 Construction activities 2-49
2.12.2.3 Waste characteristics, remedy performance, and waste acceptance criteria 2-50
2.12.2.4 Basis for discharge limits 2-65
2.12.2.5 Description of EMDF operations 2-69
2.12.2.6 Capping and support facility dismantlement 2-70
2.12.2.7 Maintenance activities and environmental monitoring 2-70
2.12.2.8 Land use controls 2-71
2.12.3 Cost Estimate for the Selected Remedy 2-73
2.12.4 Expected Outcomes of the Selected Remedy 2-74
2.13 STATUTORY DETERMINATIONS 2-74
2.13.1 Overall Protection of Human Health and the Environment 2-74
2.13.2 Compliance with ARARs 2-74
2.13.2.1 Waiver to TSCA 40 *CFR* 761.75(b)(3) 2-76
2.13.2.2 Waiver to TSCA 40 *CFR* 761.75(b)(5) 2-79
2.13.2.3 Exemption to TDEC 0400-20-11-.17(1)(h) 2-81
2.13.2.4 NEPA 2-83
2.13.3 Cost Effectiveness 2-83
2.13.4 Use of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable 2-83
2.13.5 Preference for Treatment as a Principal Element 2-84
2.13.6 CERCLA 5-Year Reviews 2-84
2.14 DOCUMENTATION OF SIGNIFICANT CHANGES 2-84
2.14.1 Offsite Costs 2-85
2.14.2 Impacts to Reindustrialization 2-85
2.14.3 Greenhouse Gases 2-87
2.14.4 Groundwater Field Demonstration 2-88
2.14.5 Summary 2-90
2.15 REFERENCES 2-91

3. PART 3. RESPONSIVENESS SUMMARY 3-1
3.1 SUMMARY OF PROPOSED PLAN COMMENTS AND RESPONSES 3-4
3.2 SUMMARY OF ADDITIONAL PUBLIC ENGAGEMENT COMMENTS AND RESPONSES 3-264
3.3 RESPONSIVENESS SUMMARY REFERENCES 3-475

APPENDIX A. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS A-1

FIGURES

Fig. 2.1. Oak Ridge Reservation....2-5
Fig. 2.2. ORR end-use map....2-6
Fig. 2.3. Land use (proposed) and disposal sites evaluated in Bear Creek Valley....2-7
Fig. 2.4. Phase I characterization and site characteristics of the EMDF site....2-9
Fig. 2.5. Revised Bear Creek Valley land use designations, defined for purposes of setting cleanup goals....2-44
Fig. 2.6. EMDF conceptual site layout.....2-46
Fig. 2.7. Risk results for the Inadvertent Human Intrusion exposure scenario, based on EMDF performance modeling....2-53
Fig. 2.8. Risk results for the Release To Groundwater (resident farmer) exposure scenario, based on EMDF performance modeling....2-54
Fig. 2.9. Conceptual rail route at ETTP for offsite disposal alternative....2-86

TABLES

Table 2.1. Groundwater and surface water goals, BCV Y-12 site, Oak Ridge, Tennessee....2-21
Table 2.2. Summary of CERCLA evaluation criteria for disposal alternatives....2-29
Table 2.3. Estimated costs for disposal alternatives....2-35
Table 2.4. Land use considerations for Onsite Alternatives....2-39
Table 2.5. EMDF estimated radionuclide inventory (at closure)....2-51
Table 2.6. EMDF administrative WAC....2-56
Table 2.7. Summary of EMDF radiological WAC....2-58
Table 2.8. Numeric AWQC that are chemical-specific ARARs for key COCs in EMDF Landfill Wastewater....2-66
Table 2.9. Instream surface water and fish tissue PRG/cleanup levels for EMDF....2-67
Table 2.10. Land use controls for the selected remedy....2-72
Table 2.11. Total estimated project costs....2-73
Table 2.12. Greenhouse gas emission factors....2-88
Table 2.13. Greenhouse gas global warming potential....2-88
Table 2.14. Greenhouse gas emissions for offsite disposal....2-88

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ACRONYMS

ARAR	applicable or relevant and appropriate requirement
AWQC	ambient water quality criteria
BCV	Bear Creek Valley
CA	Composite Analysis
CBCV	Central Bear Creek Valley
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	*Code of Federal Regulations*
CMP	Comprehensive Monitoring Plan
CO_2e	carbon dioxide equivalent
COC	contaminant of concern
CROET	Community Reuse Organization of East Tennessee
CWA	Clean Water Act of 1972
D	drainage
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
EBCV	East Bear Creek Valley
ELCR	excess lifetime cancer risk
EMDF	Environmental Management Disposal Facility
EMWMF	Environmental Management Waste Management Facility
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
ETTP	East Tennessee Technology Park
EUWG	End Use Working Group
FFA	Federal Facility Agreement
FS	Feasibility Study
GWFD	groundwater field demonstration
GWP	global warming potential
HI	hazard index
IHI	Inadvertent Human Intrusion
IPCC	Intergovernmental Panel on Climate Change
LDR	land disposal restriction
LEFPC	Lower East Fork Poplar Creek
LLW	low-level (radioactive) waste
LUC	land use control
LUCIP	LUC Implementation Plan
LWTS	landfill wastewater treatment system
MCL	maximum contaminant level
ML	minimum level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act of 1969
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	U.S. Nuclear Regulatory Commission
NT	North Tributary
OMB	Office of Management and Budget

OREIS	Oak Ridge Environmental Information System
OREM	Oak Ridge Office of Environmental Management
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
Oak Ridge NPL Site	Oak Ridge Reservation (USDOE) NPL Site
OSHA	Occupational Safety and Health Administration
PA	Performance Assessment
PCB	polychlorinated biphenyl
PCCR	Phased Construction Completion Report
PRG	preliminary remediation goal
RAO	remedial action objective
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act of 1976
RDR	Remedial Design Report
RDWP	Remedial Design Work Plan
RER	Remediation Effectiveness Report
RGW	Release To Groundwater
RI	Remedial Investigation
ROD	Record of Decision
RSE	Remedial Site Evaluation
S&M	surveillance and maintenance
SARA	Superfund Amendments and Reauthorization Act of 1986
SSAB	Site Specific Advisory Board
TDEC	Tennessee Department of Environment and Conservation
TSCA	Toxic Substances Control Act of 1976
UCOR	United Cleanup Oak Ridge LLC
VOC	volatile organic compound
W	west
WAC	waste acceptance criteria
WBCV	West Bear Creek Valley
Y-12	Y-12 National Security Complex

PART 1. DECLARATION

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1.1 SITE NAME AND LOCATION

Environmental Management Disposal Facility (EMDF)
Oak Ridge Reservation (USDOE) National Priorities List (NPL) Site
Oak Ridge, Tennessee
Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Information System Identification TN#1890090003

1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the selected remedy for the disposal of CERCLA waste at the U.S. Department of Energy (DOE) Oak Ridge Reservation (USDOE) NPL Site (hereafter referred to as the Oak Ridge NPL Site) located in Oak Ridge, Tennessee. The scope of the Oak Ridge NPL Site CERCLA cleanup program has significantly increased since the original waste estimates for the site were developed. Additional capacity is needed for the disposal of CERCLA waste beyond the currently approved CERCLA disposal facility known as the Environmental Management Waste Management Facility (EMWMF). Since EMWMF began operations in 2002, over 200,000 waste shipments have been made to the facility (as of June 2022), and approximately 80 percent of the EMWMF volume capacity has been used for safe and protective disposal of CERCLA waste. Completion of the Oak Ridge NPL Site cleanup project is estimated to require an additional 2.2 million cy of disposal capacity. Current waste projections for the future cleanup projects include soil and soil-like material (approximately one third the planned volume) and demolition/ remediation debris (approximately two thirds the planned volume).

The remedial action selected in this ROD addresses the construction of a disposal facility, the EMDF, in Central Bear Creek Valley (CBCV) Site 7c for CERCLA waste generated from other environmental restoration projects. CERCLA requires the evaluation of all phases of response actions, including the evaluation of disposal options for generated waste. In order to evaluate and select a comprehensive, all-inclusive remedy for disposal of CERCLA waste from multiple waste-generating cleanup actions on the Oak Ridge NPL Site, a waste disposal decision separate from the decisions generating waste was determined necessary by the Federal Facility Agreement (FFA) parties.

The selection of the CBCV Site 7c requires modifying the end use goals for the areas in Bear Creek Valley (BCV) referred to as Zones 1 and 2 in the *Record of Decision for the Phase I Activities in Bear Creek Valley at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee* (DOE 2000, Table 2). In the BCV Phase I ROD, the remediation goals for Zone 2 were based on a potential future land use of recreational use in the near term and unrestricted use in the long term, consistent with the End Use Working Group (EUWG) recommendations and final report (DOE 1998a). This Zone 2 land use basis for remediation goals is being changed by this ROD to DOE-controlled industrial to be consistent with the presence of the EMDF as a long-term disposal facility. This now makes the land use remediation basis of Zone 2 consistent with that of Zone 3, the area closest to the Y-12 National Security Complex (Y-12). This modification to the land use in BCV is consistent with the *Oak Ridge Reservation Planning: Integrating Multiple Land Use Needs* (DOE 2021a) and the *U.S. Department of Energy Oak Ridge Reservation End State Vision* (DOE's End State Vision) (DOE 2004), which specified the future land uses of the Oak Ridge Reservation (ORR). This modification to land use in BCV does not affect the cleanup goals set for remedies selected in the BCV Phase I ROD.

Zone 1, per the BCV Phase I ROD, was assigned a near-term and future (long-term) land use of unrestricted as the basis of remediation goals. Through this ROD, Zone 1 is modified to a restricted recreational land use for near-term and long-term consideration as the basis of remediation goals, based on serving as a buffer zone due to its proximity to the EMDF. This land use term, restricted recreational, is established to define

recreational land use that is limited in some way. BCV from Highway 95 east to Y-12 (areas including most of Zone 1 and all of Zones 2 and 3) is within DOE-posted *No Trespassing* property limits; therefore, although portions of this property are open for recreational hunting (turkey and deer) at limited times, fishing is never allowed, and may be deterred corresponding to the *No Trespassing* postings. These limitations do not, however, impact the Tennessee State classifications for surface water, including Recreation, Fish and Aquatic Life, Livestock Watering and Wildlife, and Irrigation, that apply to Bear Creek and its tributaries, which are used in setting water quality criteria for the surface water resource affected by the remedy (see Sect. 2.6). Bear Creek is also on the Clean Water Act of 1972 (CWA) Section 303(d) list of impaired waters due to the levels of mercury and polychlorinated biphenyls (PCBs) in fish, and the state has issued a "fish advisory" against eating the fish from Bear Creek due to "increasing public access to a lower stretch of the creek."[1] Groundwater in BCV is not currently used for drinking water; however, all groundwater in the state of Tennessee is considered "general use groundwater" (Tennessee Department of Environment and Conservation [TDEC] 0400-40-03-.07 and 0400-40-03-.08) if it has not been designated as Special Source Water, Site Specific Impaired Ground Water, or meets the definition of Unusable Ground Water (TDEC 0400-40-03-.07[4][b]). In general, maximum contaminant levels (MCLs) under the Safe Drinking Water Act are used as protection levels for groundwater that is currently or potentially used for drinking.

These land use modifications from what was previously included in the BCV Phase I ROD and EUWG report, are necessary based on this new CERCLA decision and are consistent with the BCV Phase I ROD language that states, "These initial goals will remain in effect unless new technologies, land use requirements, regulatory requirements, or subsequent CERCLA decisions for BCV establish a basis for revision." As noted in the *Bear Creek Valley Watershed Remedial Action Report Comprehensive Monitoring Plan* (BCV RAR CMP) (DOE 2019a), "As new CERCLA decision and post-RA documents for the BCV watershed are approved, the monitoring and verification requirements will be addressed in this BCV RAR CMP." These land use modifications are consistent with the *Oak Ridge Reservation Planning: Integrating Multiple Land Use Needs* (DOE 2021a) and DOE's End State Vision (DOE 2004).

The land use controls (LUCs) and LUC Implementation Plan (LUCIP) for BCV are also contained in this document; thus, the BCV RAR CMP will be updated to adopt these revised designations and accompanying watershed LUCs for the EMDF remedy prior to startup of operations. In addition to this plan containing LUCs, the EMWMF has an operations LUCIP, *Land Use Control Implementation Plan for Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act of 1980 Waste, Oak Ridge, Tennessee* (DOE 2006). The EMWMF LUCIP will be updated to include EMDF (or a new, separate LUCIP will be created), and as a secondary document will be incorporated into the EMDF Remedial Design Report (RDR) primary document for approval per a schedule established under the FFA Appendix E. The land use changes do not affect the surface water use classification.

The selected remedy was chosen in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) (42 *United States Code* Sect. 9601 et seq.), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 *Code of Federal Regulations* [*CFR*] 300). The *Federal Facility Agreement for the Oak Ridge Reservation* (DOE 1992) was agreed upon in accordance with CERCLA Section 120, and provides a framework for remediation activities on the Oak Ridge NPL Site. Use of the CERCLA process for the evaluation and selection of this remedial action is consistent with the requirements of the FFA. As the lead agency for Oak Ridge NPL Site cleanup, DOE is working with the other FFA parties, the U.S. Environmental Protection Agency (EPA) and TDEC, to

[1] *State posts fish advisory on Bear Creek,* Frank Munger, Knoxville News Sentinel, May 25, 2016.

coordinate response activities and ensure all environmental restoration activities on the Oak Ridge NPL Site are performed in accordance with CERCLA and the NCP.

The decision presented in this ROD was based on the information in the Administrative Record file for the evaluation of additional CERCLA waste disposal at the Oak Ridge NPL Site. DOE prepared a Remedial Investigation/Feasibility Study (RI/FS) (DOE 2017a) that evaluated alternatives for the disposal of additional CERCLA waste that will be generated. The RI/FS provided considerable information, including the analysis of a number of alternatives: (1) no action, (2) various locations for newly constructed onsite disposal on the ORR, (3) the combination of both onsite and offsite disposal, and (4) only offsite disposal at authorized facilities.

Several possible onsite disposal locations were evaluated in the RI/FS for various siting options in BCV. All alternatives for waste disposal at the Oak Ridge NPL Site were evaluated against the nine CERCLA remedy selection criteria. Throughout this CERCLA process, National Environmental Policy Act of 1969 (NEPA) values are incorporated in accordance with the Secretarial Policy Statement on NEPA (DOE 1994).

Although the RI/FS (D5 version) was not formally approved by EPA or TDEC, the three agencies agreed to move forward with the Proposed Plan. On December 7, 2017, a formal dispute agreement was entered into by the three parties, which addressed the issues of siting, applicable or relevant and appropriate requirements (ARARs), and waste acceptance criteria (WAC), and concurred on submitting a Proposed Plan that would identify the CBCV as the preferred location for an onsite disposal facility.

On September 10, 2018, DOE issued an approved Proposed Plan for a 45-day public review outlining the alternatives evaluated and the preferred alternative. Several requests were received and two extensions were granted to the public comment period for a total duration of 120 days. DOE received public input on the alternatives' evaluation and the preferred alternative from September 10, 2018–January 9, 2019. Public input was considered prior to the selection of the remedy and issuance of this ROD. Part 3 of this ROD includes comments received on the Proposed Plan and the DOE response to the comments (Sect. 3.1).

Following development of the D1 ROD, the FFA parties recommended additional public engagement to provide additional information related to WAC, discharge limits, and siting of the EMDF (specifically related to groundwater levels and the Groundwater Field Demonstration [GWFD]), developed since the Proposed Plan. Three fact sheets were developed and presented for public review and comment from May 9 to June 7, 2022, and a formal public meeting was held on May 17, 2022 to present the information and solicit public input (see Sect. 2.3). Part 3 of this ROD includes the comments received from the additional public engagement and the DOE response to the comments (Sect. 3.2).

Based on the evaluation of alternatives, the Proposed Plan, and the input received from the public, the Onsite Disposal Alternative, specifically the design, construction, operation, and closure of the EMDF in CBCV, has been selected for the disposal of future CERCLA-generated waste on the Oak Ridge NPL Site. The selected alternative meets the CERCLA threshold criteria and provides the best balance of the remaining CERCLA evaluation criteria. DOE has determined that the selected alternative satisfies the requirements of 40 *CFR* 300.430(f)(1)(ii) to (1) be protective of human health and the environment, (2) attain those ARARs that are identified at the time of ROD signature or provide grounds for invoking a waiver under 40 *CFR* 300.430(f)(1)(ii)(C), (3) be cost effective, and (4) use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. CERCLA's preference for treatment will be addressed through individual waste lot treatment decisions in other CERCLA decision documents, as needed, to meet the EMDF WAC, for example the land disposal restrictions (LDRs), before onsite disposal. CERCLA's preference for treatment is also addressed by active treatment of landfill wastewater generated at the site to minimize contaminant transport to downstream receptors.

1.3 ASSESSMENT OF THE SITE

The remedy selected in this ROD protects public health and the environment from actual or threatened releases of hazardous substances through disposal of CERCLA waste generated during the cleanup of the Oak Ridge NPL Site. The Oak Ridge NPL Site cleanup removes actual or threatened releases of contamination, protecting human health and the environment. 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. The selected remedy will meet the remedial action objectives (RAOs) during operation, as well as following closure, as described below:

- Prevent exposure of people to CERCLA waste (or contaminants released from the waste into the environment) through meeting chemical-, location-, and action-specific ARARs, and by preventing exposure that exceeds a human health risk of 10^{-4} to 10^{-6} excess lifetime cancer risk (ELCR) or hazard index (HI) of 1
- Prevent adverse impacts to water resources (surface water and groundwater) from CERCLA waste or contaminants released from the waste through meeting chemical-, location-, and action-specific ARARs, and by preventing exposure that exceeds a human health risk of 10^{-4} to 10^{-6} ELCR or HI of 1
- Prevent unacceptable exposure to ecological receptors from CERCLA waste contaminants through meeting chemical-, location-, and action-specific ARARs
- Maintain a 15-ft separation between the bottom of emplaced waste and the seasonal high water table[2] of the uppermost unconfined aquifer, which includes 5 ft of liner system and 10 ft of geologic buffer consistent with TDEC 0400-11-01-.04(4)(a)(2).

The CBCV Site 7c is in the same valley as the existing EMWMF, along with several other historical waste disposal areas in BCV. When compared to the rest of the Oak Ridge NPL Site, CBCV offers distinct advantages for long-term management of radioactive and hazardous waste disposal, including addressing technical challenges related to protection of surface water and groundwater resources and construction and operation of a CERCLA landfill. As further described in Sect. 2.5, the CBCV Site 7c is underlain primarily by shales, siltstones, and mudstones, with little limestone and no karst features present. The planned waste disposal area is located between, not over, tributaries to Bear Creek.

1.4 DESCRIPTION OF THE SELECTED REMEDY

This ROD presents the selected remedy for the permanent disposal of CERCLA waste at the Oak Ridge NPL Site. The selected remedy presented in this ROD is the Onsite Disposal Alternative presented in the Proposed Plan, including the selection of the CBCV Site 7c for construction of EMDF. The components of the selected remedy include the following:

- Maintain a 15-ft separation between the base of emplaced wastes and seasonal high water table of the uppermost unconfined aquifer, consistent with TDEC 0400-11-01-.04(4)(a)(2). This requirement has been added as an RAO in order to assure protectiveness during operation and post-closure. Included within the 15 ft would be the facility's 10-ft geologic buffer and the 5-ft liner system. Site-specific groundwater investigations indicate that parts of the site footprint can clearly meet this requirement;

[2] In this document, unless specified otherwise, the seasonal high water table refers to the post-construction groundwater table elevation that will serve as the basis of the design. This post-construction groundwater table elevation will be established before design based on review of available water level measurements, both historical and post-ROD field demonstration data (see Sect. 2.14.3), across the EMDF footprint, and agreed upon by the FFA parties (DOE, EPA, and TDEC).

however, for higher elevations in the site – particularly in the area of the knoll feature in the CBCV Site 7c footprint – TDEC and EPA have expressed concern that predicted post-construction groundwater conditions used for preliminary design may not be achievable. Therefore, a post-ROD field demonstration (see Sect. 2.14.4) will be performed in coordination with TDEC and EPA to obtain additional groundwater data that will be reviewed and evaluated in order to support a final design.

- Final WAC for EMDF that include administrative and analytical waste limitations to only accept waste for disposal that can be compliantly managed within the facility to ensure protection of human health and the environment. There are numerous ARARs within the EMDF WAC, including controls on the disposal of Resource Conservation and Recovery Act of 1976 (RCRA)-regulated hazardous waste and Toxic Substances Control Act of 1976 (TSCA)-regulated waste. The remedy requires that wastes not meeting the EMDF WAC either be treated to meet the WAC or sent offsite for disposal. Additional operational-based constraints on the size, weight, dimensions, and similar physical characteristics, as well as radionuclide inventory, will be established and proceduralized to ensure waste can be safely received and disposed using available equipment and provide daily protection to workers, the public, and the environment. (Note: operational-based constraints are not relied upon to demonstrate CERCLA protectiveness. Section 2.12.2.3 provides details concerning EMDF WAC).
- The design, construction, and operation of EMDF at the CBCV Site 7c to satisfy design-based and performance-based requirements of DOE and ARARs. The final design will also satisfy considerations of the impacts of climate change.
- The construction of EMDF with up to 2.2 million cy of disposal capacity, with multiple waste cells to accept CERCLA waste. Final capacity will be determined during the facility design process. Construction of EMDF will be completed in phases as remediation progresses.
- Engineered features such as a clean-fill dike to meet stability and seismic requirements, a multi-layer base liner system with a double leachate collection/detection system to isolate waste from groundwater, and a multi-layer cover to reduce infiltration and isolate the waste from human and environmental receptors over the long term. The EMDF liner system and cover system will be consistent with RCRA and TSCA substantive requirements as defined by this ROD's ARARs.
- Inclusion of a low-hydraulic conductivity geologic buffer layer (either native or engineered) between the landfill liner and the seasonal high water table.
- Construction of groundwater and surface water drainage features to divert water around the facility, as needed, to ensure long-term protection of human health and the environment and to achieve ARARs.
- Construction of support facilities adjacent to the footprint of the landfill. Support facilities and infrastructure may include operations/support trailers; staging/laydown areas; borrow areas; stockpile areas; parking areas; wastewater storage tanks or basins; truck loading stations; electrical, water, and communication utilities; truck weigh scale; guard stations; wastewater and stormwater management systems; storage/staging areas; material stockpile areas; and spoil areas.
- Construction and operation of a landfill wastewater treatment system (LWTS) consistent with ARARs to minimize the release of contaminants into adjacent and downstream surface water bodies for uptake by potential receptors. The specific remediation goals for landfill wastewater are presented in Sect. 2.12.2.4.
- Use of fill material during operation of EMDF, including, but not limited to, crushed concrete, block and brick masonry, waste soil, clean soil, and other soil-like material consistent with ARARs.

- Engineered perimeter structures, such as mechanically stabilized earth[3] walls or similar structures, if needed. These structures may be necessary and will be allowed to meet the required separation between waste and groundwater specified by the RAO.
- Closure of EMDF, consistent with ARARs, after operations are complete.
- Performance monitoring during the operation and post-closure periods of EMDF, consistent with ARARs and to inform the need for corrective actions, if necessary.
- Long-term maintenance, surveillance, and monitoring of EMDF, consistent with ARARs, to ensure the integrity of the engineered facility for as long as the waste remains a threat to human health or the environment.
- Institutional controls at EMDF implemented and monitored to prevent access to the waste in the future for as long as the waste remains a threat to human health or the environment, consistent with ARARs.
- Change of the initial land use designations (from the BCV Phase I ROD) used to set remediation goals in BCV Zones 1 and 2. Zone 1 is modified to restricted recreational, and Zone 2 is modified to DOE-controlled industrial land use for purposes of setting remediation goals for near-term and long-term consideration, as introduced in Sect. 1.2 and further discussed in Sect. 2.6. Note: The land use changes do not affect the surface water use classification.

1.5 STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, is cost effective, and uses permanent solutions and alternative treatment technologies to the maximum extent practicable. The selected remedy provides the best balance of tradeoffs among the alternatives with respect to the balancing criteria considered. There is no principal threat waste to be addressed as part of this action. The selected remedy complies with federal and state ARARs as identified in this ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A TSCA waiver for siting requirements in TSCA 40 *CFR* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to TDEC 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Because this selected remedy will result in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years after initiation and at least every 5 years to ensure the remedy will be protective of human health and the environment, as long as hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure remain. DOE will submit the results of these 5-year reviews for EPA and TDEC approval in accordance with the requirements of the CERCLA/NCP and FFA for the Oak Ridge NPL Site.

[3] A mechanically stabilized earth structure employs elements of reinforcement along with compacted soil backfill interlayered together to form a reinforced-soil mass that relies on self-weight to resist lateral pressures from earth, seismic events, and water.

1.6 ROD CERTIFICATION CHECKLIST

The following information is included in Part 2, Decision Summary, of this ROD.

- Contaminants of concern (COCs) and their respective concentrations (Sects. 2.7 and 2.12.2.3); reference is made to waste generation project COCs.
- Baseline risk represented by the COCs (Sect. 2.7). Because the EMDF will be constructed in an area not influenced by past operations or disposal practices, the existing risk represents background conditions; therefore, a baseline risk assessment is not required.
- Remediation levels established for the COCs and the basis for the levels (Sect. 2.12); WAC are established for CERCLA waste.
- The remedy is demonstrated to meet the CERCLA risk range (Sect. 2.12.2.3).
- Decisive factor(s) that led to selection of the remedy (Sect. 2.12).
- Land use that will be available at the site as a result of the selected remedy (Sect. 2.6).
- Estimated capital and operation and maintenance costs (Sect. 2.12).
- Manner in which any source material constituting principal threats is addressed (Sect. 2.11).

Additional information regarding EMDF can be found in the Administrative Record, which was generated and approved by the three FFA parties for this ROD.

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APPROVALS

Record of Decision for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee

DOE/OR/01-2794&D2/R2

September 2022

Laura O. Wilkerson Digitally signed by Laura O. Wilkerson Date: 2022.09.14 15:46:08 -04'00' — 9/14/2022

Laura O. Wilkerson, Acting Manager
Oak Ridge Office of Environmental Management
U.S. Department of Energy

Date

Gregory T. Young Digitally signed by Gregory T. Young DN: cn=Gregory T. Young, o=TDEC, ou=Deputy Commissioner, email=greg.young@tn.gov, c=US Date: 2022.09.15 10:56:40 -05'00' — 9/15/22

Gregory T. Young
Deputy Commissioner
Tennessee Department of Environment and Conservation

Date

Michael S. Regan — SEP 30 2022

Michael S. Regan
Administrator
U.S. Environmental Protection Agency

Date

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PART 2. DECISION SUMMARY

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2.1 SITE NAME, LOCATION, AND DESCRIPTION

EMDF
Oak Ridge Reservation (USDOE) NPL Site
Oak Ridge, Tennessee
CERCLA Information System Identification TN#1890090003

The 32,465-acre DOE-owned ORR is located within the city limits of Oak Ridge, Tennessee, which is approximately 12.5 miles west-northwest of Knoxville, Tennessee, in Roane and Anderson counties (Fig. 2.1). There are three major federal research and production installations at ORR that are managed by DOE. The three installations were originally constructed on the ORR as part of the World War II-era Manhattan Project and include the Heritage Center, formerly known as the East Tennessee Technology Park (ETTP)[4], the Oak Ridge National Laboratory (ORNL), and Y-12.

DOE is responsible for waste management on the ORR and the environmental restoration activities on the Oak Ridge NPL Site under its Office of Environmental Management Program at the national level, and locally under the Oak Ridge Office of Environmental Management (OREM) Program. The OREM Program is responsible for eliminating any significant hazards to human health and the environment associated with contamination. Environmental restoration activities on the Oak Ridge NPL Site are performed in accordance with CERCLA and the NCP.

The recent focus of the OREM Program has been CERCLA demolition and soil remediation at facilities that have been contaminated by historical Manhattan Project and Cold War activities, have been determined to no longer be necessary to support the ORR mission, are costly to maintain, and are in differing stages of deterioration causing safety and environmental concerns. This cleanup mission is projected to take at least the next 3 decades to complete and will result in large volumes of radioactive, hazardous, and mixed waste that will require disposal.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.2.1 Previous Investigations and Data Sources

A considerable amount of information is available that documents the environmental conditions of BCV. Much of the available information is based on surface and subsurface investigations and reports of contaminant source areas and groundwater plumes, including drilling and installing hundreds of monitoring wells and sampling and analysis of soils, sediment, groundwater, and surface water. CERCLA documents, technical reports, and applied research papers have also been prepared to supplement the findings based upon this available data. Relevant information has been included in the Administrative Record.

The *Record of Decision for the Phase I Activities in Bear Creek Valley at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee* (BCV Phase I ROD) (DOE 2000) divided the area into three zones for setting remediation goals, as recommended by an EUWG of public stakeholders (DOE 1998a). Subsequent documents were developed with consideration of input from a citizen's focus group in partnership with DOE, including the *Oak Ridge Reservation Planning: Integrating Multiple Land Use Needs* (DOE 2021a) and DOE's End State Vision (DOE 2004), which specified the future land uses of the ORR. The land usage

[4] Throughout this document, the Heritage Center continues to be referred to as ETTP.

for BCV, per the End State Vision, is to remain under DOE/National Nuclear Security Administration (NNSA) control for industrial use, including some restricted waste management areas (Fig. 2.2).

With regard to the EUWG/BCV Phase I ROD zones defined for setting cleanup goals, Zone 1 is the uncontaminated western portion of BCV. It has some ongoing groundwater monitoring activities and has been identified for all media to remain uncontaminated. Zone 2 also has no known contaminated sites and is the proposed location of EMDF. The land uses supporting site-specific remediation goals for Zone 2 as recommended by the EUWG were established in the BCV Phase I ROD as supporting recreational use in the near-term and unrestricted use in the long term. Zone 3 is the eastern portion of BCV and has historical and active waste sites, some of which may require future remediation. Zone 3 is the location of EMWMF and other site facilities. Remediation goals set for Zone 3 are based on DOE-controlled industrial use of the area. The BCV Phase I ROD indicates that these land uses can be changed in the future if there are new technologies, new land use requirements, new regulatory requirements, or subsequent CERCLA decisions. Construction and operation of the EMDF in Zone 2 requires a modification to the future land use basis for remediation goals in that zone, as well as the adjacent Zone 1 (see Sects. 2.4, 2.6, and 2.12 for detailed information). Figure 2.3 shows the three land use zones with the proposed land use designation changes. Technical information and data from more than 3 decades of investigations, reports, and remedial actions in Zone 3, and ongoing monitoring of surface water and groundwater, are all available to support development and planning of EMDF.

BCV is the most appropriate area on the ORR for locating an onsite disposal facility due to its current and planned end use (mission support), geology, and groundwater flow conditions. Multiple sites for EMDF were evaluated in BCV (Fig. 2.3).

BCV trends northeast to southwest and is bounded by Pine Ridge on the northwest and Chestnut Ridge on the southeast. Several smaller tributaries, designated as the North Tributaries (NTs) (numbered sequentially as NT-1, NT-2, etc. from Y-12) drain off Pine Ridge to Bear Creek. Elevations range from highs near 1260 ft along the crest of Pine Ridge to lows around 800 ft at Bear Creek near State Route 95. Bear Creek drains the entire BCV watershed. Groundwater migrates from the upland areas and discharges along valley floors supporting base flow along the NT stream channels and Bear Creek. Although there is contaminated groundwater in BCV, the RI/FS shows that none of the sites considered for EMDF are located over known groundwater contamination plumes.

Available information indicates that the subsurface of BCV is stable. Available satellite images and field reconnaissance in the valley suggest there is no visible evidence of large-scale natural mass movement in BCV. The existing natural slopes of Pine Ridge along BCV have not shown any indication of recent large-scale landslides or slumping. Characterization efforts (i.e., test pits, boreholes, well drilling logs, and corresponding laboratory testing) that have occurred at various locations within the valley demonstrate the stability of the existing terrain. The conceptual design for EMDF avoids undercutting along Pine Ridge to avoid creating potentially unstable slopes above excavated areas.

The EMDF site will not lie directly on the Maynardville Limestone where groundwater flow through karst conduits is well documented. The Maynardville geologic formation is not suitable for constructing a landfill. The location of the Maynardville/Nolichucky contact was verified during surface water walkdowns conducted in the Bear Creek tributaries as part of the EMDF Phase 1 characterization. A team of personnel from OREM and TDEC examined the streambed to identify the presence of decreasing shale (indicative of the Nolichucky) and increasing carbonate rock (indicative of the Maynardville). At the location where shale no longer was noted in the streambed, the team marked the Maynardville Limestone contact location using the Global Positioning System.

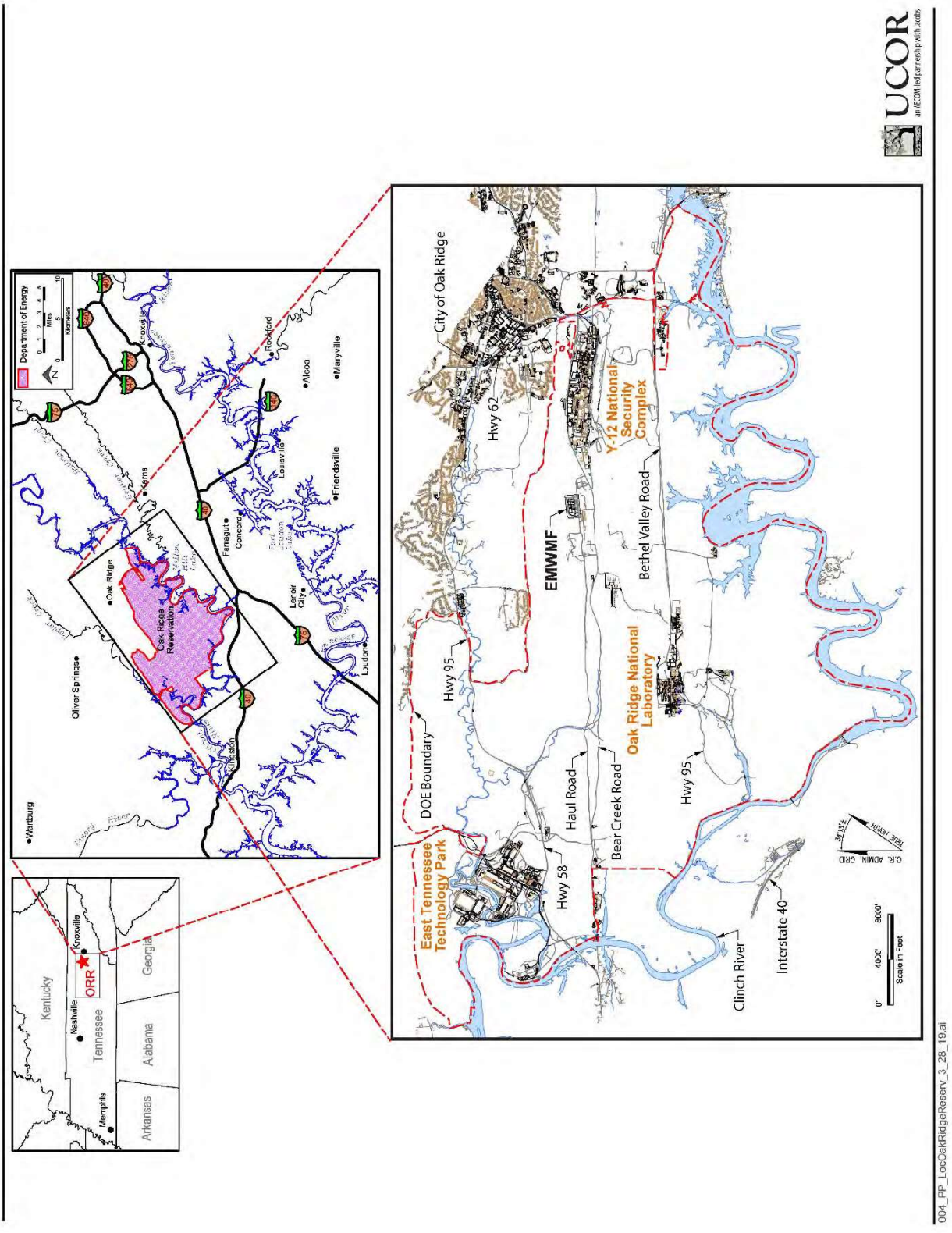
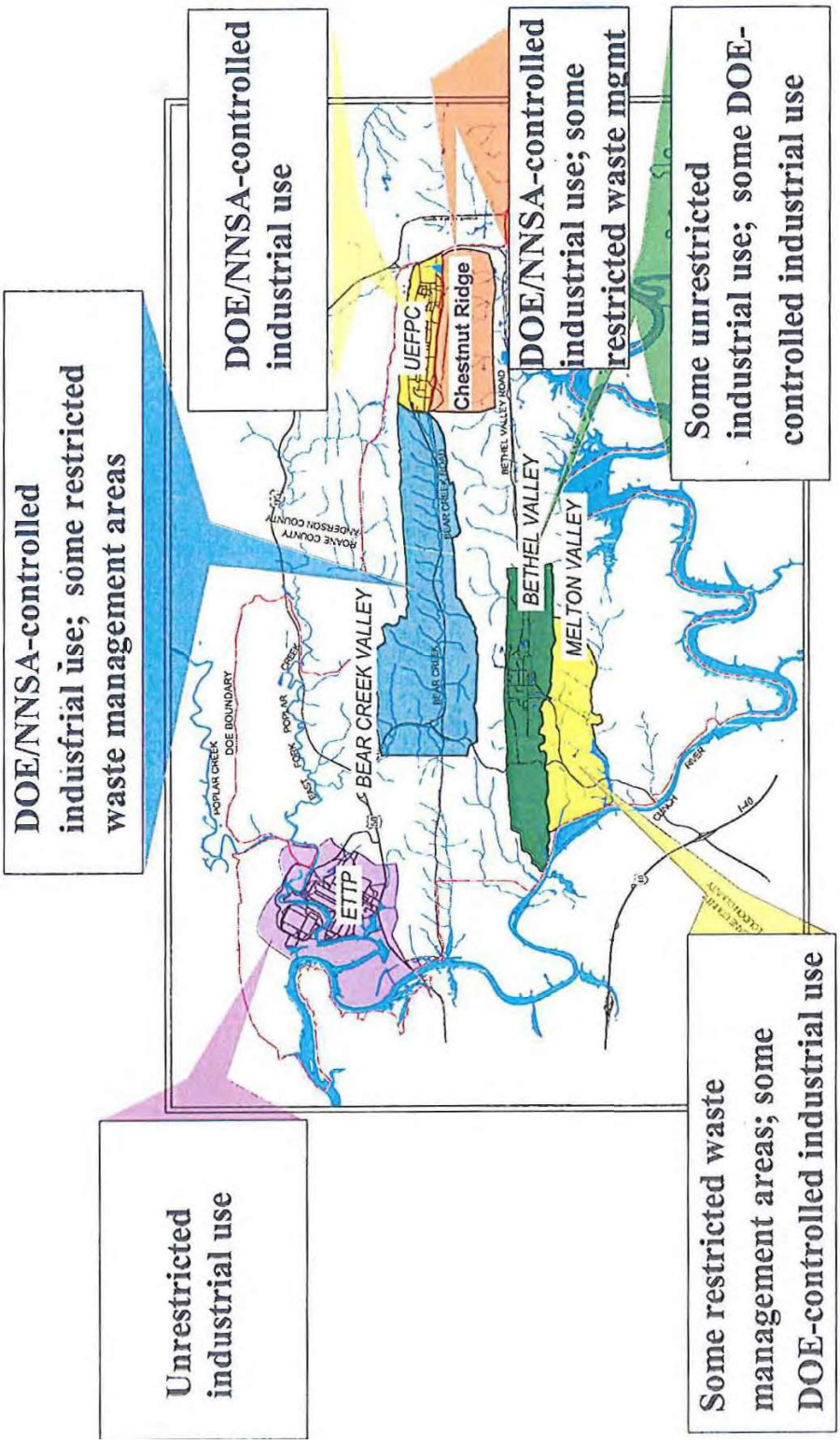


Fig. 2.1. Oak Ridge Reservation



Note: Fig. 1.2 from DOE 2004.

Fig. 2.2. ORR end-use map

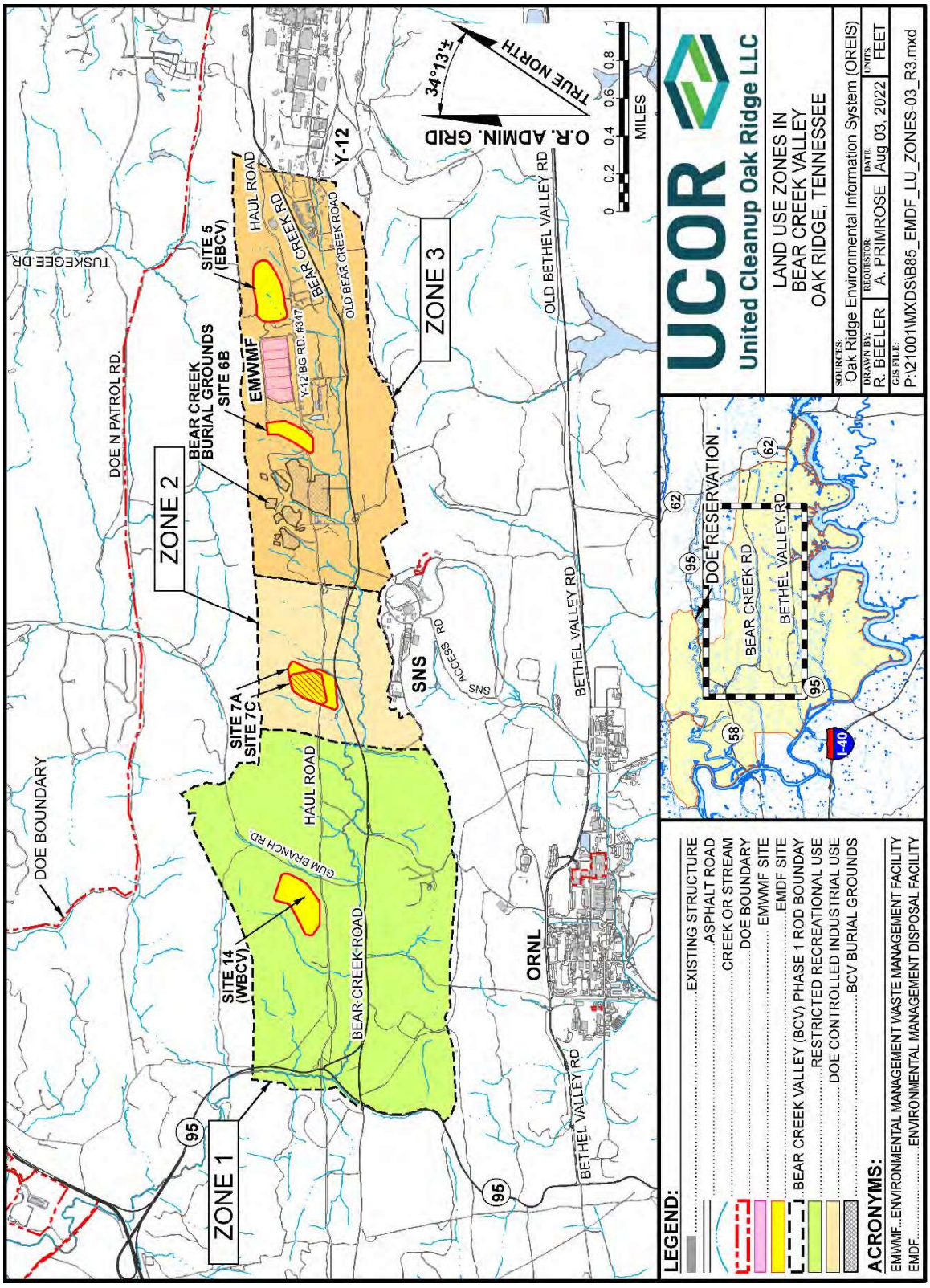


Fig. 2.3. Land use (proposed) and disposal sites evaluated in Bear Creek Valley

The results of over 3 decades of investigations, information from the remediation of some sites near Y-12, and ongoing monitoring of surface water and groundwater are available to support development and planning for EMDF in BCV. Findings from available reports have been incorporated into Appendix E of the RI/FS (DOE 2017a). The reports referenced in the RI/FS are also available in the Administrative Record.

In addition to reviewing BCV historic data, DOE developed a Phase 1 investigation in conjunction with EPA and TDEC to provide site-specific information for the proposed EMDF site. This approved sampling approach was documented in the *Phase 1 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee* (DOE 2018b).

The approved sampling approach included several detailed tasks to obtain additional geologic and hydrogeologic data to determine whether the site is acceptable for siting a CERCLA landfill, as well as continued monitoring of groundwater levels beyond the initial year required by the Phase 1 Field Sampling Plan. In addition, data were obtained for comparison to the original assumptions in the RI/FS. This comparison helps refine the approach for landfill construction and provides information for the upcoming engineering design.

The characterization tasks were completed primarily in February through April 2018, although surface water and groundwater elevation monitoring continued for more than 1 full year to develop a complete picture of groundwater elevation changes. The completed tasks provided detailed information that increased the understanding of the proposed site in CBCV and included the following:

- Surface water walkovers to assess streams, seeps, springs, and other expressions of shallow groundwater to gain a better understanding of surface water and groundwater at this location.
- Locating the contact of the Nolichucky Shale with the Maynardville Limestone (the type of bedrock locally most prone to contain karst features) to ensure waste placement does not occur over this type of bedrock.
- Surface water flow via flumes installed in NT-10, Drainage (D)-10W, and NT-11 to better understand the engineering controls that may be needed to manage surface water.
- Installation of the initial eight pairs of shallow and deep piezometers to measure groundwater surfaces and obtain detailed subsurface information on bedrock and groundwater and five flumes to obtain surface water data. Installation of continuous downhole monitors to better predict responses to rainfall, determine high and low groundwater levels, and provide input for design calculations. Additional piezometers were installed at a later date and are monitored to provide design data (Fig. 2.4).
- Subsurface material tests to obtain design data for selecting the appropriate materials to develop the engineering design for the landfill.

Fig. 2.4. Phase I characterization and site characteristics of the EMDF site

Results of the Phase 1 site characterization support final site selection. The results also confirm the CBCV Site 7c is suitable for a new, low-level (radioactive) waste (LLW)[5] 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). Surface water walkovers determined the Nolichucky Shale contact with the Maynardville Limestone. Results of the Phase 1 characterization are provided in the following secondary documents that are in the Administrative Record:

- *Technical Memorandum #1, Environmental Management Disposal Facility Phase 1 Field Sampling Results, Oak Ridge, Tennessee* (DOE 2018c)
- *Technical Memorandum #2, Environmental Management Disposal Facility Phase 1 Monitoring, Oak Ridge, Tennessee* (DOE 2019b). (Note that the data supporting this document are available as text files on the DOE Oak Ridge Environmental Information System [OREIS] [https://ucor.com/oak-ridge-environmental-information-system-oreis/]).

Precipitation in the valley primarily runs off as surface water and shallow groundwater in the stormflow zone. Site walkovers found numerous cases where surface water enters and exits the soil through decayed trees and other types of features. Flumes record higher stream flows following precipitation, indicating that precipitation is running off as stormwater. Flow rates rapidly decrease when precipitation is over, but there continues to be flow, indicating a smaller influence from groundwater. Surface water flow rates adjacent to the landfill were between 0 and 7000 gpm at NT-11, 0 and 3000 gpm at D-10W, and 0 and 4000 gpm at NT-10.

Core drilling for the EMDF piezometers confirmed the presence of typical BCV geologic structures in the subsurface, including steeply dipping beds; interbedded shales, siltstones, and some limestone; and the presence of joints and fractures in bedrock.

Groundwater elevations were similar to the groundwater elevations predicted in the RI/FS (DOE 2017a), with the exception of higher elevations within the knoll. Groundwater levels measured in both deep and shallow piezometers during Phase 1 characterization confirmed that groundwater discharges as seeps in the valleys and drainages. As expected, groundwater occurs at higher elevations beneath the central knoll. Groundwater levels respond to rainfall events, indicating recharge is occurring on the site. Higher than normal rainfall occurred during the monitoring period, contributing to the higher than anticipated groundwater elevations seen at a few of the piezometers. This also means that the pre-construction seasonal high water table levels were captured by the Phase 1 effort.

Per a formal Dispute Resolution Agreement among DOE, EPA, and TDEC in December 2017, the results and analysis of the field investigation, including the first 2 months of monitoring, were placed in the Administrative Record and were available during the Proposed Plan public comment period (DOE 2018c). The entire year-long monitoring results are documented in a second Technical Memorandum (DOE 2019b), also included in the Administrative Record.

2.2.2 Previous Cleanup Decisions

A 1999 ROD (DOE 1999) authorized construction of a facility located on the ORR to provide permanent disposal for radioactive, hazardous, and mixed wastes that present unacceptable risks to human health and the environment in their current setting at ORR. This facility, the EMWMF, has been accepting CERCLA

[5] LLW is defined by what it is not, per TDEC 0400-20-11-.03(21); LLW is radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel or byproduct material as defined in Sect. 11e.(2) of the Atomic Energy Act (uranium or thorium tailings and waste).

cleanup wastes since 2002. The capacity of EMWMF is 2.33 million cy as authorized by the ROD, a subsequent Explanation of Significant Difference (DOE 2010), and a subsequent RDR addendum (DOE 2017b).

An increase of the scope of the OREM cleanup program has occurred since the original waste estimates were made in the 1998 RI/FS that led to the construction of EMWMF (referred to herein as the EMWMF RI/FS) (DOE 1998b). New excess facility cleanup scope at ORNL and Y-12, identified by the Integrated Facility Disposition Program, was added in 2009 by a major modification to the FFA (DOE 2009). Some of the actions progressed into projects that were performed under the American Recovery and Reinvestment Act of 2009 (referred to as ARRA), with CERCLA waste disposed at the EMWMF. The added cleanup scope forecasted to occur over the next 3 decades significantly increased the volume of CERCLA waste projected to be generated, and requiring disposal, from the volume previously estimated.

The *Report on the Remedial Investigation of Bear Creek Valley at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee* (DOE 1996a) was completed for BCV, and the BCV Phase I ROD (DOE 2000) was issued in 2000. The ROD led to projects at the BCV S-3 Ponds and the BCV Boneyard/Burnyard. A second ROD on the BCV Burial Grounds is expected to be prepared in the future. None of those remediation project sites are located in the footprint of the CBCV Site 7c selected for EMDF.

The 2021 Remediation Effectiveness Report (RER) for the ORR (DOE 2021b) illustrates the contaminant source areas, extent of groundwater contamination, and current monitoring locations within the BCV watershed. The existing groundwater plumes include radionuclides, volatile organic compounds (VOCs), and nitrates that commingle from the various sources located within the eastern half (Zone 3) of BCV. Although BCV Phase I ROD goals have not yet been attained, the preponderance of data presented in the 2021 RER chapter for the BCV (Chap. 4) show decreasing concentrations for primary COCs (nitrates and uranium) in surface water and stable trends, no trends, or decreasing trends for groundwater contaminants.

The CBCV Site 7c is located well outside those groundwater plumes and in a topographically higher area that is outside of the downgradient flow paths of those plumes (DOE 2021b). The RER includes detailed contaminant plume maps and cross sections that provide detailed information on groundwater conditions in BCV.

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

DOE has participated in extensive public engagement activities during the selection of this disposal approach. For this disposal decision, DOE has met CERCLA requirements to encourage early and frequent involvement by members of the public. DOE has worked extensively with the Oak Ridge Site Specific Advisory Board (SSAB), a community-based advisory organization established to provide recommendations to DOE on remediation decisions on the Oak Ridge NPL Site. Additionally, DOE has presented the status of the alternatives under development to other community organizations, including the Roane County Environmental Review Board (November 5 and December 8, 2015), Energy Technology and Environmental Business Association (March 24, 2015), Friends of ORNL (February 19, 2016), League of Women Voters (November 17, 2015), Oak Ridge Rotary Clubs (October 7 and November 5, 2015), Oak Ridge Community School (September 22 and 29, 2015), and the East Tennessee Economic Council (August 7, 2015). Interviews or opinion editorials also have been conducted with or submitted to local newspapers (*Knoxville News Sentinel* Editorial Board [July 15, 2015] and to the *Oakridger* [June 17 and July 9, 2015]). The Oak Ridge City Council members, Tennessee State Senators, city of Oak Ridge Mayor, Anderson County Mayor, City Manager for Oak Ridge, and Roane County Mayor have been provided tours of the area on numerous occasions from 2015 through 2018.

DOE representatives attended a public meeting with the city of Oak Ridge (March 22, 2016), as well as had discussions with concerned residents in the Scarboro community (June 24, July 21, September 24, and December 16, 2015) at various locations, including a community church, the New Hope Center, and local businesses. Additionally, tours of the existing landfill and the proposed site were given. No specific meetings or discussions were held with residents of the Country Club Estates (community that is closest to the proposed location) as they did not request one nor express a concern.

DOE published a public notice of availability for the *Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste* (DOE 2018a) in the *Oakridger*, the *Knoxville News-Sentinel*, the *Loudon County News-Harriman Record*, the *Rockwood Times*, and other local newspapers within the region. Additionally, DOE placed notices of dates and times of planned interactions through social media accounts, and sent mailers to all 15,000 households in Oak Ridge. DOE also discussed the EMDF project and comment period at the SSAB monthly board meeting – which airs on the public access channel (Channel 12 – Community Television of Knoxville). The public notice established a public comment period from September 10 to October 26, 2018. Two requests to extend the public comment period were granted and the end date was revised to January 9, 2019. Two informational poster sessions were held on September 13 and October 2, 2018, and a formal public meeting was held on November 7, 2018 to present the preferred alternative described in the Proposed Plan and solicit public input. All comments on the Proposed Plan are presented as received; the comments and their responses are included in Part 3, "Responsiveness Summary," of this ROD.

Following development of the D1 ROD, the FFA parties recommended additional public engagement to provide additional information and an opportunity for public review and comments related to WAC, ensuring water quality protection for Bear Creek, and site groundwater characterization (specifically related to groundwater levels and the GWFD). As part of the education and outreach efforts for this additional comment period, OREM created three new fact sheets related to those topics that were reviewed and approved by EPA and TDEC (summarized below), produced a new video, and launched a website focused on EMDF educational materials. OREM also provided Spanish versions of the fact sheets that were available to the public.

- *Site Groundwater Characterization fact sheet*
  - Engineers and scientists from DOE, EPA, and TDEC collected and analyzed extensive data to make informed decisions for the EMDF location to ensure it is safe and protective.
  - The design features of the EMDF isolate and protect the waste from the surrounding environment.
  - DOE will conduct a field demonstration to verify the expected groundwater conditions following landfill construction.
- *Waste Acceptance Criteria fact sheet*
  - General definition of WAC
  - Summary of type of waste that will be disposed in the EMDF and summary of items prohibited from disposal in EMDF
  - Overview of Analytic WAC, including waste lot concentration limits and landfill inventory limits
  - Overview of WAC Compliance Plan.
- *Water Quality Protection for Bear Creek fact sheet*
  - Summary of fish tissue sampling activities, including results that indicate current discharges to Bear Creek do not pose a risk to the environment or recreational activities near the ORR

- Overview of preliminary remediation goals (PRGs) established for protectiveness to public health
- Description of Bear Creek fish community survey
- Agreement by FFA parties to treat landfill wastewater prior to discharge
- Summary of mercury management approach for Bear Creek and EMDF discharge limit for mercury.

Email invites were sent to all known stakeholders, advertisements and invites were posted on social media accounts, and advertisements were posted in the *Oakridger* and the *Roane County News* about the public meeting and comment period. The public notice established a public comment period from May 9 to June 7, 2022, and a formal public meeting was held on May 17, 2022 to present the information and solicit public input. Part 3 of this ROD includes the comments received from the additional public engagement and the DOE response to the comments (Sect. 3.2).

EPA conducted three community engagement/listening sessions on February 11, 2022. The purpose of these listening sessions was to hear concerns and thoughts about the proposed EMDF in an informal setting to encourage open communication. These sessions were not recorded and there were no formal minutes. Attendance at the listening sessions was by invitation, with a conscious effort made to include all points of view at each session. Each invitee was also reminded of the upcoming May 17, 2022 public meeting and additional public comment period.

Sessions were set up to collect the thoughts and concerns from the following groups:

- Session 1 with local elected officials
- Session 2 with broad group representatives: Southern Environmental Law Center, Tennessee Chapter of Sierra Club, Tennessee Citizens for Wilderness Planning, and Labor Union representatives
- Session 3 with invited community members, including individuals that live close to the ORR, community leaders, church leaders, Scarboro Community Alumni Association leaders, Scarboro Neighborhood Improvement Association, Order of Elks, School Board member, National Association for the Advancement of Colored People representatives, Small Business owner, ORR retirees, Board Chair of the Oak Ridge SSAB, and various community historians.

In addition to the additional public meeting and public comment period, DOE has also presented information on the EMDF at the Oak Ridge SSAB's Board meeting (May 11, 2022), at the TDEC-sponsored Show of the South conference (May 12, 2022), and to the Oak Ridge Chamber of Commerce (June 21, 2022). The Knoxville News Sentinel ran an article highlighting the Southern Environmental Law Center's perception of the EMDF project (May 16, 2022). On June 1, 2022, the *Oakridger* (with support from the *Knoxville News Sentinel*) ran an article covering the May 17th public meeting; the article quoted many of the comments that were given at the meeting and highlighted both those in support and opposed to the project. In addition, OREM launched a new monthly news program called Energycast Oak Ridge on May 22, 2022, which airs on community television in Knox, Anderson, Roane, and Morgan counties. The comment period was highlighted in the first newscast on May 22nd, and the project was covered in depth in the second episode on June 19, 2022. By the second episode, the show began airing in 23 counties across middle and east Tennessee.

This remedy was chosen in accordance with CERCLA, as amended by SARA, and the NCP. This decision was based on the Administrative Record prepared for this project. The principal documents supporting this ROD include the following:

- *Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee* (DOE 2017a)
- *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee* (DOE 2022)
- *Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste* (DOE 2018a)
- Characterization data for the CBCV Site 7c as outlined in the Field Sampling Plan that was included in the Proposed Plan (including hydrology and geological information) are found in:
  - *Technical Memorandum #1, Environmental Management Disposal Facility, Phase 1 Field Sampling Results, Oak Ridge, Tennessee, Oak Ridge, TN,* (DOE 2018c)
  - *Technical Memorandum #2, Environmental Management Disposal Facility, Phase 1 Monitoring, Oak Ridge, Tennessee*, (DOE 2019b). (Note that the data supporting this document are available as text files on the DOE OREIS [https://ucor.com/oak-ridge-environmental-information-system-oreis/]).

These documents and other information supporting the selection of this remedy can be found at the Information Center, Building 1916-T1, 1 Science.gov Way, Oak Ridge, Tennessee, 37830, (865) 241-4780.

2.4 SCOPE AND ROLE OF THE ACTION

The scope of the Oak Ridge NPL Site CERCLA cleanup program has significantly increased since the original waste estimates were developed (DOE 1999). As stated earlier, it is projected that an additional 2.2 million cy of disposal capacity will be required for the Oak Ridge NPL Site CERCLA cleanup program after full capacity of EMWMF is reached. The RI/FS (DOE 2017a) was prepared to evaluate several possible alternatives for disposal of CERCLA waste generated during ongoing and future cleanup of the Oak Ridge NPL Site.

The RI/FS analyzed the following primary alternatives: (1) no action, (2) onsite disposal in a newly constructed facility on the ORR, (3) a combination of onsite and offsite disposal (i.e., hybrid alternative), and (4) offsite disposal at authorized facilities. Several possible onsite disposal locations in BCV were evaluated in the RI/FS.

This ROD documents the decision to construct EMDF at the CBCV Site 7c to provide onsite disposal capacity for CERCLA waste being generated during cleanup of the Oak Ridge NPL Site. The scope of this remedial action includes construction, operation, and closure of EMDF; management of associated non-contaminated storm water and landfill wastewater; and post-closure monitoring and maintenance of the facility.

The scope of this action does not include the removal and remedial actions at Oak Ridge NPL Site that will generate CERCLA waste. The scope of this action does not include the handling, packaging, and transportation of waste to either EMDF or an offsite disposal facility. The remediation projects generating CERCLA waste (referred to as the "generator") will be responsible for the disposition of any waste resulting from cleanup activities at the Oak Ridge NPL Site. The generator projects will be responsible for the disposition of any material that is eligible for recycling. The generator projects will be responsible for meeting the WAC specified for the EMDF and for coordinating with the WAC Attainment Team for acceptance of the waste profile at EMDF (to be documented in waste handling plans).

CERCLA decisions for removal or remedial actions that generate waste may include actions such as treatment to ensure that CERCLA waste targeted for onsite disposal meets the EMDF WAC. Any treatment of CERCLA waste necessary to meet the EMDF WAC (e.g., LDRs) or offsite disposal requirements is outside the scope of this action.

The scope of this action is to provide for disposal of CERCLA waste that is generated from cleanup activities at the Oak Ridge NPL Site. If Oak Ridge NPL Site-related CERCLA waste is identified in the future at off-ORR locations, but within the state, the FFA parties will follow the CERCLA process to determine the waste disposition. For CERCLA waste, where it is determined by the FFA parties that EMDF is the appropriate place for disposal of such waste, the FFA parties will agree that those waste streams may be disposed of within EMDF consistent with a project-specific waste handling plan.

In 1997, based on a State of Tennessee recommendation to expand community involvement, DOE sponsored the establishment of the EUWG, a group composed of citizens from diverse stakeholder organizations. The EUWG was asked to develop recommendations for end use of contaminated areas on the ORR and community values that could be used to guide the cleanup decision-making process. As documented in the EUWG *Oak Ridge Reservation Stakeholder Report on Stewardship* (DOE 1998a), recommendations were made on the goals for cleanup in three zones of BCV and for siting an onsite CERCLA waste disposal facility. The recommendation for BCV included the establishment of a restricted waste disposal zone in the area of existing long-term waste disposal areas (Zone 3). The EUWG recommendation stated that any CERCLA waste facility should be located on or adjacent to an area that is already contaminated and used for long-term waste disposal. Notwithstanding the EUWG recommendation favoring placement of long-term waste disposal facilities in areas already contaminated or near areas of contamination, for a variety of reasons discussed in Sect. 2.12.1, the FFA parties believe that CBCV (Zone 2) is the preferred location for the landfill. Siting the landfill in BCV is consistent with the *Oak Ridge Reservation Planning: Integrating Multiple Land Use Needs* (DOE 2021a) and DOE's End State Vision (DOE 2004), to maintain the area for DOE/NNSA-controlled industrial use, including waste management areas.

This ROD is based on data and information presented in the RI/FS and the Administrative Record. DOE has completed the required public review and comment on all information associated with the evaluation of the alternatives contained in the Proposed Plan (Sect. 2.10.9.1). In addition, the FFA parties recommended and completed additional public engagement, including additional public review and comments, to provide additional information related to WAC, discharge limits, and siting of the EMDF (specifically related to groundwater levels and the GWFD) (Sect. 2.10.9.2).

2.5 SITE CHARACTERISTICS

The site selected for EMDF is located in CBCV and is situated within an upland area located between north-south trending valleys of NT-10 and NT-11. The site and surrounding areas are forested, except for areas along the south side between Haul Road and Bear Creek Road, where the area has been cleared. The cleared area includes a recent soil staging area along the southern margin and two wetland basins completed in 2015 for Y-12 compensatory wetland mitigation. The Haul Road and Bear Creek Road are located in the southern part of the site and will need to be relocated to the south prior to EMDF construction.

BCV is considered the most appropriate area on the ORR for locating an onsite disposal facility due to its current and planned land use, geology, and groundwater flow conditions. A considerable amount of information is available documenting the environmental conditions of BCV. Much of the available information is based on surface and subsurface investigations and reports of contaminant source areas and groundwater plumes, including the drilling and installation of hundreds of monitoring wells and sampling

and analysis of soils, sediment, groundwater, and surface water. Findings from available reports have been incorporated into Appendix E of the RI/FS (DOE 2017a). The reports referenced in the RI/FS are available in the Administrative Record.

2.5.1 Geology

The anticipated waste footprint at the EMDF site predominantly overlies bedrock of the Conasauga Group, including the Maryville Formation and Nolichucky Shale (Fig. 2.4). These formations are predominantly shales, siltstones, and mudstones. There is little limestone present in the bedrock underlying the proposed disposal cells. The crest of the knoll below the north center of the footprint is underlain by the erosion-resistant Maryville Formation. The typical weathering profile of topsoil, silty/clayey soil residuum, saprolite, and fractured bedrock occupy the undisturbed site areas**.** Recent stream deposits are present along the streams and tributaries throughout EMDF.

Karst features such as sinkholes, sinking streams, and resurgent springs have not been documented within the formations underlying the proposed footprint of EMDF, but are documented within the Maynardville outcrop belt south of EMDF.

2.5.2 Groundwater

Groundwater migrates from the upland areas along Pine Ridge and discharges to stream channels, supporting base flow within the NT streams and Bear Creek. Although there is contaminated groundwater in BCV, the extensive dataset from sampling efforts in BCV used in the RI/FS indicates that the site selected for EMDF is not located over existing groundwater contamination plumes.

A primary objective of the Phase 1 site characterization activities initiated in January 2018 was to understand groundwater elevations at the CBCV Site 7c selected for EMDF. Representative lithologic and groundwater data from across the site and in representative formations were also obtained.

Groundwater elevation, conductivity, pH, and temperature data were collected by using downhole monitors placed in each piezometer. Because these piezometers could be preferential pathways for vertical migration of groundwater, all piezometers within the footprint of the disposal cells will be plugged and abandoned prior to construction of EMDF.

The water-level data collected to date at EMDF show that, in general, the vertical hydraulic gradients between the shallow and deeper bedrock zones are mostly flat (less than 0.03 ft/ft vertical gradient). Three well pairs consistently have a slight downward gradient (GW-978/GW-979, GW-980R/GW-981, and GW-988/GW-989). They are located at the northern saddle area, on the knoll to the northwest, and on the knoll to the southwest, respectively. Slight upward vertical hydraulic gradients have only been observed at well pairs GW-992R/GW-993 and GW-994/GW-995, with a maximum upward gradient of 0.07 ft/ft. Both of these well pairs are located in the southern part of the proposed EMDF footprint near Haul Road (Fig. 2.4). All other wells pairs have gradients of less than 0.03 ft/ft at all times. Monitoring of EMDF water levels continued for over a year to ensure seasonal high groundwater measurements were captured (DOE 2018a). Piezometric surface elevations are similar to the piezometric surface elevations predicted in the RI/FS, with the exception of higher elevations within the knoll. Piezometric surface elevations measured in both deep and shallow piezometers during the Phase 1 characterization confirmed that the piezometric surface generally mirrors topography (i.e., is higher topographically beneath knolls/ridges and lower near the tributaries). The piezometric surface responds to rainfall events, indicating recharge is occurring on the site. Seasonal variation is also observed, with higher piezometric surfaces observed during the winter/spring wet season (typically November to March) than in the summer/fall dry season. A GWFD will be conducted to resolve TDEC concerns on the piezometric surface within the knoll area (Sect. 2.14.4). The gradients

and piezometric surface confirm that localized groundwater at the site in general results from recharge occurring on the higher elevations of the site. The tributaries have some influence on the groundwater flow in their immediate areas acting as a localized discharge location.

The configuration of the groundwater VOC plume emanating from the Bear Creek Burial Grounds is notable because parts of its footprint occur along the geologic strike of parts of the EMDF site footprint in CBCV (within the outcrop belts of the Maryville Formation and Nolichucky Shale). The VOC plume commingles with plumes emanating from source areas further upstream, which follow strike-dominant flow in the Maynardville Limestone and surface water flow along Bear Creek toward the southwest.

The areas immediately surrounding the site selected for EMDF are currently unpopulated DOE-controlled property. The nearest residential area (Country Club Estates) is more than 0.8 miles from the CBCV Site 7c. The Scarboro Community is located approximately 3.9 miles northeast of the selected site. All nearby communities are separated by a large ridge (Pine Ridge) from the proposed EMDF sites. Groundwater originating in the selected area for EMDF moves away from these residential areas.

2.5.3 Surface Water

Surface water drainages near the site include NT-10, NT-11, D-10 West (W), and D-11 East, an east–west trending feature that drains westward into NT-11 near the center of the site (Fig. 2.4). Surface water flow in these drainage channels flows down Pine Ridge, away from residential areas, to Bear Creek located on the valley floor. The CBCV Site 7c surface water systems are fed by precipitation, surface runoff and shallow stormflow, and both shallow and deeper groundwater that discharges via springs and seeps.

Stream flow is primarily a result of precipitation events and from subsequent shallow seeps with limited flow or dry stream conditions during the summer months. Shallow soil can act as a stormflow layer when flow is present, with surface water transport through macropores that emerge as visible flow further downstream (DOE 2019b). Meandering stream channels filled with sediments are present upstream of the Haul Road culverts, and are not typical of other higher gradient streams found across the ORR.

Continuous flow monitoring data for NT-10, NT-11, and D-10W were collected as part of Phase 1 site characterization. The available U.S. Geological Survey base flow data indicate that base flow is continuous along the D-10W, NT-10 and NT-11 stream channels during the winter/spring non-growing wet season During the summer/fall growing season with warm and often dry conditions, base flow is negligible and limited to pulsed flow associated with significant storm rainfall events (Robinson and Johnson 1995). Flow monitoring for Bear Creek downstream of the CBCV Site 7c indicates continuous flow in Bear Creek (DOE 2018a).

Several seeps are located adjacent to the drainages and tributaries, indicating localized shallow groundwater discharge occurs there at least seasonally.

2.5.4 Ecological Resources

A detailed wetland delineation study was performed that confirmed the presence of wetland areas previously identified, delineated their boundaries, and expanded the study area to allow evaluation of impacts over a broader area than reported on in the RI/FS. The expanded study area included NT-9, NT-11, and Bear Creek (ORNL 2018). Potential wetlands were evaluated relative to the dominance of wetland vegetation, soils, and hydrological characteristics. Seventeen wetlands, including one created wetland, were identified within that expanded study area, covering a total of 11.8 acres.

Fish surveys conducted in 2018 in the study area tributary streams identified fish communities consistent with other areas of the Bear Creek watershed (ORNL 2018). The fish surveys indicated that green sunfish were common in NT-9, D-10W, and NT-11. The strong population in D-10W was clearly influenced by the abundance of this species in the created wetlands constructed for mitigation for the Uranium Processing Facility project. Two species of fish were observed in the lower reach of NT-10. Bear Creek contains a larger diversity of fish species than encountered within the tributaries. The Bear Creek watershed is home to a strong population of Tennessee dace, the only fish on the ORR listed as "in need of management" by the Tennessee Wildlife Resources Agency. However, no Tennessee dace were observed in the tributary streams at the CBCV Site 7c sampled during the fish surveys.

Previous investigations to identify threatened and endangered species on the ORR (ORNL 2015), in general, have confirmed the presence of Indiana and gray bats, both federally listed endangered species, and the northern long-eared bat, a federally listed endangered species. Detailed bat surveys were conducted by ORNL within the EMDF area in 2017 and 2018 (ORNL 2018). Passive acoustic surveys were performed for 7 successive nights in 2017 at four survey sites. Additional acoustic surveys were performed for 23 successive nights in 2018 at eight survey sites. The survey sites were selected based on the presence of potential roost trees and suitable foraging areas.

Results of the bat acoustic surveys indicated that open forested portions of the CBCV Site 7c are used as summer habitat by state- and federally listed bat species. Bat calls were recorded for six species. However, the small number of calls for most species would indicate minimal presence on the CBCV Site 7c. Larger numbers of calls were recorded from one federally listed endangered (gray bat) and two state-listed threatened species (little brown bat and tri-colored bat), indicating these species likely roost and forage within the site.

Other threatened and endangered species surveys were conducted in 2018 by ORNL (ORNL 2018), and no state- or federally listed small mammal, reptile, or amphibian species were identified. The tubercled rein orchid, listed as threatened on the Tennessee Rare Plant List, was found in wetlands within the study area, particularly in wetlands along the NT-9 and D-10W streams. Two other plant species of interest found were the American ginseng and pink lady's slipper, which are considered threatened because of commercial harvest.

2.5.5 Cultural Resources

Historical surveys to identify archaeological and historical home sites and cemeteries across the ORR identified a cemetery (Douglas Chapel Cemetery) and two historical home site/structures near the EMDF site (DOE 2017a). In 2018, Cultural Resource Analysts, Inc. conducted a detailed Phase 1 archeological survey (Cultural Resource Analysts, Inc. 2018). The survey methods used included intensive pedestrian survey with supplemental screened shovel testing to confirm the presence of historical artifacts. The results of that study confirmed the presence of the cemetery and five archaeological sites.

Douglas Chapel Cemetery is located on the knoll between NT-10 and D-10W. The cemetery consists of the graves of 15 individuals and likely served the community of Bear Creek in the late nineteenth century until the early twentieth century. Based on the survey, avoidance or relocation was recommended for this cemetery. DOE intends to avoid the Douglas Chapel Cemetery and preserve it in situ as well as maintain access to the cemetery for visitors.

Four historic farmsteads/residences were identified near the present alignment of Haul Road. The sites consisted of standing rock chimneys, possible well/cellar depressions, and/or occasional artifacts. The residences were likely part of the historic community of BCV. When the federal government purchased the land for the Manhattan Project, all standing structures were demolished. One site was a prehistoric

habitation located near Bear Creek where lithic flakes were found, an indication of prehistoric tool production. All the sites were highly disturbed and appeared to contain no buried cultural deposits. Because of their limited research potential, no further work was recommended at these five sites. The sites were recommended not eligible for inclusion in the National Register of Historic Places.

2.5.6 Contamination

This section describes the type of waste and associated contamination estimated to require disposal. Higher contaminated waste streams (e.g., those that are not able to meet onsite WAC) and uncontaminated waste streams already have disposal options (offsite or the permitted ORR Landfills on Chestnut Ridge, respectively). LLW disposed at EMDF will originate primarily from facility deactivation and decommissioning or environmental remediation projects at Y-12 and ORNL. The waste will include facility demolition debris (including structural steel and concrete), contaminated equipment and soil, and other soil-like wastes. EMDF will accept both containerized LLW and bulk (uncontainerized) waste for disposal. Waste quantities included in the RI/FS are based on the estimates provided in the OREM Waste Generation Forecast available at the time (circa 2014). No major changes in waste quantity estimates have occurred since that time frame, through the writing of this ROD.

Potential radiological and chemical contaminants were identified from existing characterization data and representative waste stream characterization data from similar waste disposed at EMWMF. Wastes derived from CERCLA cleanup at Y-12 and ORNL will contain a wide range of radionuclides. The primary radioactive contaminants in Y-12 waste streams are uranium isotopes, whereas ORNL waste streams will contain a greater variety of radionuclides, including fission products such as cesium-137 and strontium-90, and to a lesser extent fission products such as technetium-99 and iodine-129. Trace quantities of some transuranic radionuclides (e.g., plutonium and americium) are also predicted in ORNL waste. This difference is important for estimating the EMDF radiological inventory because Y-12 waste accounts for approximately 70 percent of the forecasted waste volume and ORNL waste accounts for the remaining 30 percent. Due to these differences in waste volume and radiological characteristics, Y-12 waste accounts for the majority of uranium activity in the expected EMDF inventory, whereas ORNL waste accounts for the majority of the total radionuclide curie inventory.

The chemical contaminant inventory was derived from the forecasted waste volumes, average bulk densities, and contaminant profiles for each anticipated EMDF waste stream. The estimated EMDF chemical contaminant inventory is dominated by metals, including common soil constituents such as iron, aluminum, calcium, magnesium, potassium, and sodium, as well as barium, chromium, lead, manganese, and uranium. Mercury also is present in a subset of the anticipated Y-12 waste streams; however, mercury hazardous waste (or mixed waste) will be disposed of offsite. There is anticipated to be similarity in chemical contaminants between Y-12 and ORNL waste streams because many of those contaminants are a result of standard industrial materials and operations. Minor amounts of organic contamination, including PCBs, are anticipated to be similar across waste lots. However, one notable difference is that some waste streams from Y-12 are anticipated to contain more mercury than ORNL waste streams, although that mercury will be *de minimis* amounts that would not be classified as characteristically hazardous.

2.6 CURRENT AND ANTICIPATED LAND USES

While the EUWG Stakeholder Report on Stewardship (DOE 1998a) included recommendations on the end use of BCV for the purposes of setting remediation goals and for siting an onsite CERCLA waste disposal facility, subsequent documents were developed with consideration of input from a citizen's focus group in partnership with DOE, including the *Oak Ridge Reservation Planning: Integrating Multiple Land Use Needs* (DOE 2021a) and DOE's End State Vision (DOE 2004), which specified the future land uses of the ORR. The land usage for BCV, per the End State Vision, is to remain under DOE/NNSA-control for industrial use, including some restricted waste management areas.

2.6.1 Current Land Use

DOE's End Use Vision defines BCV, as part of the larger ORR, as a future DOE/NNSA-controlled industrial area for restricted waste management areas (see Fig. 2.2). That BCV land use designation is still current.

The EMDF planned location in CBCV was designated as Zone 2 within the BCV Phase I ROD (DOE 2000). The BCV Phase I ROD designated the current land use for setting remediation goals in this area as recreational and the future land use goal as unrestricted use, consistent with the EUWG report. Since publication of the BCV Phase I ROD, development has occurred in this area (e.g., a clean soils storage area has been located within the proposed footprint, the DOE Roads and Grounds Facility is located in Zone 2, and the Spallation Neutron Source is located nearby). The selection of the EMDF site in Zone 2 requires DOE to modify land use designations for Zone 2 through this disposal decision to be consistent with the presence of a permanent waste disposal facility. The future land usage in Zone 1 of BCV, directly west of and adjacent to Zone 2 and thus serving as a buffer area, is modified as well. These modifications are consistent with the BCV Phase I ROD language, which clearly states that subsequent CERCLA decisions for BCV may establish a basis for revision to the land uses.

2.6.2 Anticipated Land Use

DOE indicated in the *Oak Ridge Reservation Planning: Integrating Multiple Land Use Needs* (DOE 2021a) and the End Use Vision (DOE 2004) its intent to maintain BCV, as part of the larger ORR, as a future mission area unavailable for consideration for other uses. DOE intends to retain ownership of the EMDF site in perpetuity. In the unlikely event that DOE transfers the EMDF site out of federal control, DOE would comply with the requirements of CERCLA Sect. 120(h)(3), as applicable. Deed restrictions will identify administrative controls necessary to protect the public and the integrity of EMDF.

Recategorizing Zones 1 and 2 to allow for construction of the EMDF will not result in significant changes to the surface water and groundwater goals provided in the BCV Phase 1 ROD. The change in land use designations do not affect the surface water use classification, per TDEC Use Classifications for Surface Waters at Chapter (0400-40-.04-09). Bear Creek (and its tributaries) is classified for Recreation, Fish and Aquatic Life, Livestock Watering and Wildlife, and Irrigation uses; the entire water body must still meet a risk level of 10^{-5}. The BCV Phase I ROD goals for surface water and groundwater are summarized in Table 2.1, as well as the revised goals per recategorizations presented in this ROD.

Table 2.1. Groundwater and surface water goals, BCV Y-12 site, Oak Ridge, Tennessee

Area of the valley[a]	Current situation and goals (per BCV Phase I ROD)[b]	Revised situation and future goals (per this CERCLA waste disposal ROD)
Zone 1 western half of BCV	No unacceptable risk posed to a resident or a recreational user. AWQC and groundwater MCLs are not exceeded.	Area becomes buffer zone for EMDF in Zone 2. No unacceptable risk posed to a hypothetical resident or a recreational user.
	GOAL: Maintain clean groundwater and surface water so that this area continues to be acceptable for unrestricted use.	GOAL: Surface water – AWQC (chemicals) and water quality-based values for surface water and fish tissue (radionuclides) consistent with Bear Creek state use classifications, including recreational use. Groundwater – MCLs are not exceeded.
	LAND USE: unrestricted	LAND USE: restricted recreational
Zone 2 a 1-mile-wide buffer zone between Zones 1 and 3	No unacceptable risk posed to a recreational user. Risk to a resident is within the acceptable risk range except for a small area of groundwater contamination. Groundwater MCLs are exceeded, but AWQC are not.	EMDF is constructed in this area. Risk from facility is controlled to within CERCLA risk range, see RAOs (Sect. 2.8).
	GOAL: Improve groundwater and surface water quality in this zone consistent with eventually achieving conditions compatible with unrestricted use.	GOAL: Surface water – remedy will be fully protective of AWQC and water quality-values for surface water and fish tissue (for radionuclides) consistent with relevant Bear Creek state use classifications, including recreational use. Groundwater – remedy will protect conditions in groundwater to allow Zone 2 to achieve or maintain MCLs. Reduce risk from direct contact to create conditions compatible with future industrial use.
	LAND USE: recreational (short term), unrestricted (long term)	LAND USE: controlled industrial
Zone 3 eastern half of BCV	Contains all the disposal areas that pose considerable risk. Groundwater MCLs and AWQC are exceeded.	No change
	GOAL: Conduct source control actions to: (1) achieve AWQC in all surface water (2) improve conditions in groundwater to allow Zones 1 and 2 to achieve the intended goals (3) reduce risk from direct contact to create conditions compatible with future industrial use.	GOAL: No change except to add water quality-based values for radionuclides in surface water and fish tissue.
	LAND USE: controlled industrial	LAND USE: controlled industrial

[a]See Fig. 2.3.
[b]Source: DOE 2000, Table 2.1.

AWQC = ambient water quality criteria
BCV = Bear Creek Valley
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980
DOE = U.S. Department of Energy
EMDF = Environmental Management Disposal Facility
MCL = maximum contaminant level
RAO = remedial action objective
ROD = Record of Decision
Y-12 = Y-12 National Security Complex

2.7 SUMMARY OF SITE RISKS

Unlike a RI/FS for a typical remediation project, the purpose of the EMDF RI/FS was not to evaluate alternatives for cleaning up a contaminated site, but to evaluate alternatives for disposal of CERCLA wastes generated from other remediation projects on the Oak Ridge NPL Site. RAOs, COCs, and associated risks posed by other operable units on the Oak Ridge NPL Site are identified in existing and forthcoming CERCLA decision documents.

Remediation of individual operable units on the Oak Ridge NPL Site will generate radiological and/or hazardous wastes that will be disposed at EMDF. The baseline risk evaluations for contaminated sites in existing and future CERCLA documents are conducted as part of those remediation projects.

Risks from not making a comprehensive waste disposal decision are identified in the EMDF RI/FS (as part of the No Action Alternative), but the baseline risk assessment for contaminated sites and operable units that eventually will generate the waste to be disposed in EMDF is conducted in association with the waste-generating CERCLA responses. The no action waste disposal alternative would implement no comprehensive sitewide strategy to address the disposal of waste resulting from any future CERCLA remediation project on the Oak Ridge NPL Site after EMWMF capacity is reached. Wastes that require disposal after EMWMF reaches maximum capacity would be addressed by each CERCLA cleanup project. Decisions on how or where to dispose of each CERCLA waste stream would be determined on a piecemeal basis (e.g., one building or group of buildings). This process would then be repeated by each cleanup project (over 100 demolition and remediation projects).

Consolidation of the waste at the EMDF from multiple cleanup projects across the ORR will result in a significant reduction in mobility of hazardous substances, pollutants, and contaminants by placement in a landfill with multi-layer liner and final cover systems. This consolidation will also result in minor risks to human health and the environment during the operational period through release of treated wastewater to surface water; however, the risk is controlled to within acceptable limits since the wastewater will be treated to remove the majority of contaminants per CWA ARARs. Releases to air are minor; no measurable risk has been recorded to date at the existing facility (EMWMF), as documented in the annual Phased Construction Completion Reports (PCCRs) for that facility (all reports may be found at the DOE Information Center: https://doeic.science.energy.gov/). Long-term risk from releases to groundwater and surface water as the facility ages are controlled to within the CERCLA risk range via defense in depth: facility design and features, WAC, monitoring, and institutional controls (see Sect. 2.12.2). Carcinogenic risk posed by estimated contaminants to be left in place at closure are shown to be protective to the CERCLA risk range for the exposures described above, thus meeting the RAOs.

Other site contaminants include PCBs, asbestos, beryllium, and limited amounts of RCRA metals. Acceptance of hazardous and toxic contaminants is limited by ARARs and consensus among FFA parties (e.g., mercury hazardous [D009] waste is prohibited from disposal in EMDF, as is RCRA listed waste); Sect. 2.12.2.3 discusses and lists those limitations. Asbestos and beryllium disposal, in particular, have disposal requirements in ARARs and operational procedures concerning packaging.

Other than mercury (which is managed through the prohibitions), no significant difference in volume/ mass/concentration of other hazardous/toxic contaminants from those disposed of in EMWMF is expected. EMWMF has demonstrated maintaining an HI below 1 for non-carcinogens and a risk level of 1×10^{-5} for carcinogens for all relevant exposure scenarios evaluated in the disposed waste inventory throughout its operation to date and projects no challenge to that statistic at closure (see the annual PCCRs referenced above). RCRA hazardous waste requiring treatment to meet LDR ARARs disposed to date accounts for

less than 0.05 percent of the EMWMF total capacity[6]. PCB limits are provided by TSCA ARARs, and additional evidence of protectiveness regarding PCB waste is provided in Sect. 2.13.2. A waste determination for landfill wastewater at EMWMF was made in Appendix F of the *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee* (DOE 2022); the wastewater was demonstrated to not be RCRA hazardous waste, with a significant margin of safety. Uranium as a metal is considered a toxic contaminant; more information addressing the protectiveness to be provided by EMDF WAC for uranium is given in Sect. 2.12.2.3. This information provides assurance that the EMDF remedy will meet the RAOs to maintain protectiveness under a cumulative HI of 1 for non-carcinogens and a risk level of 10^{-5} for all exposure scenarios identified for the disposed waste inventory.

2.8 REMEDIAL ACTION OBJECTIVES

CERCLA guidance defines RAOs as "medium-specific or operable-unit-specific goals for protecting human health and the environment" (EPA 1988). According to the NCP (40 *CFR* 300.430[e][2][i]), RAOs should specify the media involved, COCs, potential exposure pathways, and remediation goals. The scope of the selected waste disposal remedy is limited to the disposition of future-generated CERCLA waste resulting from CERCLA cleanup actions on the Oak Ridge NPL Site that meets WAC. Remediation goals for each CERCLA cleanup action generating waste streams are established in existing CERCLA decision documents or will be made in future CERCLA decision documents for specific projects.

Based on the projected radiological inventory (Sect. 2.12.2.3) for EMDF and the engineered features of the facility (including the 11-ft final cover over the waste), detailed performance analyses (United Cleanup Oak Ridge LLC [UCOR] 2020) indicate no unacceptable risk from radiological waste contaminants (direct or inhalation exposure) is expected. The pathways of concern are limited to those presented by way of water resources or through contact with waste, assuming some inadvertent intrusion into the waste. Therefore, the following RAOs were used in the development of this waste disposal remedy:

- Prevent exposure of people to CERCLA waste (or contaminants released from the waste into the environment) through meeting chemical-, location-, and action-specific ARARs, and by preventing exposure that exceeds a human health risk of 10^{-4} to 10^{-6} ELCR or HI of 1
- Prevent adverse impacts to water resources (surface water and groundwater) from CERCLA waste or contaminants released from the waste through meeting chemical-, location-, and action-specific ARARs, and by preventing exposure that exceeds a human health risk of 10^{-4} to 10^{-6} ELCR or HI of 1
- Prevent unacceptable exposure to ecological receptors from CERCLA waste contaminants through meeting chemical-, location-, and action-specific ARARs
- 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 ft of liner system and 10 ft of geologic buffer consistent with TDEC 0400-11-01-.04(4)(a)(2).

[6] Email from D. Hanahan, September 2, 2021 to TDEC.

2.9 SUMMARY OF REMEDIAL ALTERNATIVES

This section provides an overview of the remedial alternatives that were developed and evaluated in the RI/FS. The information here is a summary of the RI/FS and no modifications to the alternatives or the evaluation were made since the Proposed Plan was prepared. Any revisions to an alternative or additional evaluation conducted since the Proposed Plan was produced are presented later in the ROD.

2.9.1 Alternative 1 – No Action

The No Action Alternative is required under CERCLA and NEPA to establish and document baseline conditions and provide a basis for comparison with the action alternatives. The No Action Alternative has no comprehensive sitewide strategy to address the disposal of waste resulting from any future CERCLA response actions at the Oak Ridge NPL Site after EMWMF capacity is reached. All future waste streams from site cleanup that require disposal after EMWMF capacity is reached would be addressed at the project level, but would not have an onsite disposal facility available.

2.9.2 Alternative 2 – Onsite Disposal Alternative

The Onsite Disposal Alternative provides consolidated disposal for high volume, low-contaminated future-generated CERCLA waste exceeding the capacity of the existing EMWMF in a newly constructed, engineered facility(ies). Locations for onsite disposal were initially selected for further consideration using a screening evaluation that included many sites identified in a previous 1996 study (DOE 1996b) as well as other possible favorable locations/footprints. Secondary screening in Appendix D of the RI/FS narrowed consideration to four sites for detailed analysis in the EMDF RI/FS, with one of the four alternatives being a two-footprint (two-site) option. All site locations were located in BCV and are shown in Fig. 2.3. Sites were identified as follows:

- East Bear Creek Valley (EBCV) site, just east of the existing EMWMF (labeled Site 5 on Fig. 2.3)
- West Bear Creek Valley (WBCV) site, located approximately 2.5 miles west of the existing EMWMF (Site 14)
- Dual site, which includes a site beside and to the west of the existing EMWMF, and a second site in CBCV, located 1.5 miles west of the existing EMWMF (Sites 6b and 7a)
- CBCV, expansion of one of the dual sites (Site 7c).

The Onsite Disposal Alternatives include a requirement for a final WAC for EMDF that includes administrative and analytical waste limitations. The purpose of the WAC is to allow only the disposal of wastes that can be compliantly managed within the facility to ensure protection of human health and the environment.

The onsite alternatives evaluated in the RI/FS provide for construction in phases to include up to 2.8 million cy (depending on the site location) of disposal capacity with multiple waste cells, a RCRA-compliant multi-layer liner system with a leachate collection/detection system to isolate waste from the environment, and a RCRA-compliant multi-layer cover system to reduce infiltration and isolate the waste from human and environmental receptors. The onsite alternatives require a geologic buffer layer under the landfill liner and above the seasonal high water table of the uppermost unconfined aquifer or the top of the formation of a confined aquifer. The geologic buffer would consist of the geologic formation (i.e., in situ soil or rock) or an engineered structure (e.g., compacted fill).

The onsite alternatives include a drainage system to intercept and divert upgradient stormwater and shallow groundwater, resulting from stormflow, away from the landfill. Some of the alternatives include groundwater underdrains to remove groundwater from the area. Underdrains are engineered features for the intended purpose of suppression of the groundwater table. Some alternatives also contain temporary drainage features; these would be used to control surface water, perched groundwater, and infiltration, and would not be relied on for long-term suppression of groundwater. These are engineered features that control surface water or groundwater during construction and/or operation but for which long-term reliance in order to lower the groundwater surface is not required.

The Onsite Disposal Alternatives include support facilities adjacent to the footprint of the landfill, such as operations/support trailers; staging/laydown areas; stockpile areas; parking areas; landfill wastewater storage tanks; truck loading stations; electrical, water, and communication utilities; truck weigh scale; guard stations; landfill wastewater and non-contaminated stormwater management systems; material stockpile areas; and spoil areas. An ARAR-compliant LWTS is part of the Onsite Disposal Alternatives.

Landfill wastewater is defined in 40 *CFR* 445.2(f) as all wastewater associated with, or produced by, landfilling activities except for sanitary wastewater, non-contaminated stormwater, contaminated groundwater, 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 stormwater, and contact wash water from washing trucks, equipment, and railcar exteriors and surface areas that have come in direct contact with solid waste at the landfill facility.

These alternatives encompass the closure of EMDF after operations are complete pursuant to ARARs, including the demolition of any support facilities when no longer needed. Routine performance monitoring during operation; post-closure monitoring; access controls; institutional controls; and long-term maintenance, surveillance, and monitoring are part of the alternatives.

2.9.3 Alternative 3 – Hybrid Disposal Alternative

Hybrid disposal refers to significant disposal at both onsite and offsite disposal facilities using elements of both the Onsite Disposal Alternative and Offsite Disposal Alternative. As with the other alternatives, the starting waste volume for the Hybrid Disposal Alternative is the volume of waste created by CERCLA actions on the Oak Ridge NPL Site that could theoretically be disposed onsite. The Hybrid Disposal Alternative included the following:

- Consolidated disposal of CERCLA waste in a newly constructed and smaller landfill on ORR, still referred to as EMDF. A single onsite disposal option was analyzed (one of the two sites included in the Dual Site that was located immediately west of EMWMF) with components (e.g., buffer, liner, berms, cells, final cover) the same as that discussed under Alternative 2.
- Waste volumes that exceed the capacity of the facility, regardless of whether those wastes meet the onsite disposal WAC, would be disposed offsite.

The onsite portion of the Hybrid Disposal Alternative included designing and constructing the landfill, support facilities, and roadways; receiving waste that meets the WAC and placing that waste into the landfill; closing the landfill once the capacity is reached; and providing post-closure maintenance and land use controls for as long as the waste remains a threat to human health or the environment. Due to the limited capacity of the onsite disposal element of this alternative, a size-reduction facility to reduce disposal volumes was added to the onsite portion of the Hybrid Disposal Alternative.

The offsite portion of the Hybrid Disposal Alternative included shipping non-classified waste by rail and/or truck transport to the Nevada National Security Site (NNSS) or a commercial facility; shipping all classified

LLW to NNSS by truck transport; and shipping all LLW/RCRA waste to a commercial facility by rail as described for Alternative 4. The option included construction of a trans-load facility and a size-reduction facility.

2.9.4 Alternative 4 – Offsite Disposal Alternative

Under this alternative, contaminated waste resulting from CERCLA response actions at the Oak Ridge NPL Site and/or associated sites exceeding the capacity of the existing EMWMF would be transported off the reservation for disposal at approved disposal facilities, primarily by rail. (Waste that can meet the WAC of ORR Landfills for the disposal of construction debris or industrial waste can be disposed at these facilities.) Waste disposed under this alternative must meet the WAC of the offsite disposal facility.

This alternative considered the following options for offsite disposal:

- Non-classified LLW and LLW/TSCA waste would be shipped by rail, followed by truck transport to NNSS in Nye County, Nevada using a trans-load facility in Kingman, Arizona (Option 1).
- All classified LLW would be transported by truck to NNSS, and LLW/RCRA (mixed) waste would be shipped by rail for treatment and disposal at a commercial facility (Option 1 or 2).
- Non-classified LLW and LLW/TSCA waste would be shipped by rail to a commercial facility in Clive, Utah for disposal (Option 2).

For CERCLA actions that include offsite treatment, storage, or disposal of waste, appropriate licenses and/or permits are required by the receiving facility. In general, the following conditions must be met to use an offsite receiving facility in accordance with the Offsite Rule at 40 *CFR* 300.440 and CERCLA Sect. 121(d)(3):

- The proposed receiving facility must be operated in compliance with all applicable federal, state, and local regulations; there must be no relevant violations at or affecting the receiving facility.
- There must be no releases from the receiving unit and contamination from prior releases at the receiving facility must be addressed as appropriate.
- For mixed LLW/RCRA material, offsite commercial treatment, storage, or disposal facilities must have an approved U.S. Nuclear Regulatory Commission (NRC) license and a RCRA Part B permit.

These procedures require the regional EPA office with jurisdiction over the chosen disposal facility to issue an offsite acceptability determination that confirms the receiving facility is acceptable for CERCLA waste.

All waste would be transported from the generating project to a trans-loading facility. Transportation to the ETTP trans-loading facility would be the responsibility of the generating project and is not part of the Offsite Disposal Alternative.

Onsite facilities required to support the offsite disposal of waste included the following:

- Trans-load facility – Rail transportation of waste was assumed for all waste (except classified) being shipped for offsite disposal. The existing trans-load facility at ETTP would facilitate the transfer and staging of waste containers from trucks to railcars. Waste delivered by truck from generator sites would be staged at an existing docking area for rail shipment. Packages for waste such as intermodal containers would be loaded onto articulated bulk container railcars or the waste may be placed directly into super gondolas. When ready for shipment, one or more railcars would be transferred from the rail spur to the railroad system and from there would travel by rail to the disposal facility.

- Size-reduction facility – A size-reduction facility would be constructed and operated near the ETTP trans-load station. Waste targeted for size reduction would be transported by dump truck to ETTP and unloaded into the size-reduction unit feed system for processing. Processed material would be loaded by conveyor or excavator into intermodal containers that would be staged for loading onto railcars. Size reduction was found to be cost effective where packaging/transport methods are not weight limited and reductions in volume affect the number of transportation trips.

2.10 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

This comparative analysis summarized from the RI/FS evaluates the relative ability of the alternatives to meet the nine CERCLA evaluation criteria and summarizes the NEPA values evaluation. A summary of the comparative analysis is presented in Table 2.2.

2.10.1 Overall Protection of Human Health and the Environment

This evaluation criterion assesses the ability of each alternative to protect human health and the environment and comply with project-specific RAOs.

The No Action Alternative is the least protective as it is anticipated that the lack of a coordinated disposal program results in an increased reliance on management of waste in place at CERCLA remediation sites and a potential slowing of the pace of cleanup. Selection of any of the action alternatives would be protective of human health and the environment in the long term. The Onsite Disposal Alternatives would be protective primarily through the design and construction to required specifications and compliance with the WAC to be established for a new onsite CERCLA waste disposal facility. The Offsite Disposal Alternative also would be protective through the design and construction to required specifications and compliance with the WAC for each of the offsite existing authorized facilities. The Hybrid Disposal Alternative would be protective through the design, construction, and WAC of an onsite disposal facility and approved receiving offsite disposal facilities.

All action alternatives would be protective of human health and the environment in the short term. However, the Onsite Disposal Alternatives, regardless of the location of the landfill, would present the lowest short-term impact to the public primarily due to shipping waste shorter distances. Offsite disposal would require local and long-distance transportation of waste, treatment of some waste streams, and increased waste handling. Because of the greater volumes of wastes shipped over long distances, transportation risks are significantly higher for the Hybrid and Offsite Disposal Alternatives.

2.10.2 Compliance with ARARs

This criterion addressed compliance with federal and state environmental requirements that are either applicable or relevant and appropriate. Appendix A contains the ARARs for the selected remedy, such as those related to design, construction, operation, closure, and maintenance of EMDF. Additional details on how the ARARs are met for the selected remedy are provided in Sect. 2.13.2.

The No Action Alternative had no ARARs.

The Offsite Disposal Alternative and the offsite disposal element of the Hybrid Disposal Alternative met the required chemical-, location-, and action-specific ARARs related to the handling and packaging of waste for offsite shipment and no CERCLA statutory waivers needed to be requested. Disposal activities at the offsite disposal locations are not subject to ARARs, but compliance with facility licenses and/or permits would be determined prior to transport in accordance with the CERCLA offsite rule.

A TSCA waiver for all alternatives with an onsite disposal component would be requested for the Onsite Disposal Alternative and the onsite component of the Hybrid Disposal Alternative. This waiver would be issued under 40 *CFR* 761.75(c)(4) and address two components of the TSCA hydrologic condition requirement 40 *CFR* 761.75(b)(3) – the stipulations to maintain 50 ft between the base of the liner and the historical high groundwater table and to have no hydraulic connection between the site and standing or flowing surface water – as well as the TSCA siting requirement 40 *CFR* 761.75(b)(5) to locate the landfill site in an area of low to moderate relief.

An exemption of TDEC requirement 0400-20-11-.17(1)(h) concerning connection of surface water and groundwater within the site for all onsite alternatives would be requested. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

2.10.3 Long-term Effectiveness and Permanence

This criterion evaluated an alternative's ability to achieve overall reduction in risk to human health and the environment and to provide sufficient long-term controls and reliability. It considered the degree to which the alternative provides sufficient engineering, operational, and institutional controls; the reliability of those controls to maintain exposures to human and environmental receptors within protective levels; and the uncertainties associated with the alternative over the long term.

The effectiveness and permanence of the No Action Alternative depends on decisions made by multiple future individual CERCLA waste disposal projects. Because the decisions would be under CERCLA, they would be required to demonstrate long-term effectiveness and permanence of the proposed controls to be protective.

For the Hybrid and Onsite Disposal Alternatives, preventing exposure to contaminants placed in EMDF over the long term depends on the success of the waste containment features of the facility, characteristics of waste placed in EMDF, and land use controls. The multi-layer cover system would be designed to decrease migration of liquids, minimize erosion, accommodate settling and subsidence, and prevent burrowing animals and plant root systems from penetrating the cover system. The cover also would reduce the likelihood of inadvertent intrusion of humans by increasing the difficulty of digging or drilling into the landfill. With proper design and installation of the landfill liner and leachate systems, future unacceptable releases of contaminants to the environment would be limited and within protective levels. During operation when landfill wastewater is generated, that wastewater would be treated for removal of contaminants. Upon closure, when the landfill cover would be placed, landfill wastewater generation would gradually cease as the landfill waste is dewatered over an extended period of time.

The WAC (including ARARs) would restrict what waste could be placed in the landfill. These criteria would be set assuming some failure of the manmade components of the underlying liner system and would be determined to ensure that even under these conditions, landfill operation and its state after closure would not harm human health or the environment.

The major difference among the onsite locations would be the long-term land use changes. The sites in CBCV and WBCV are currently undisturbed forest and both are identified to remain uncontaminated under the BCV Phase I ROD (DOE 2000). Use of either of these sites would have the greatest land use change as the forest would be removed and the land use set in the earlier ROD would have to be changed to industrial use. The Dual Site Disposal Alternative also would have a notable land area (one of the two locations) that would be cleared of any forest and be reclassified to a future waste management area where none is currently planned.

Table 2.2. Summary of CERCLA evaluation criteria for disposal alternatives

Evaluation criterion	No Action Alternative	Onsite Alternatives				Offsite Alternative	Hybrid Disposal Alternative
		East Bear Creek Valley	Central Bear Creek Valley	West Bear Creek Valley	Dual Site		
Overall protection of human health and the environment	• May not be protective of human health and the environment if remediation is not accomplished due to extended time frames to complete remediation and increased funding required.	• Would meet all RAOs. • Protective because waste would be disposed in a landfill designed for long-term containment to be protective of human health and the environment through application of land use controls, application of WAC, and application of ARARs.				• Would meet all RAOs. • Protective because waste would be disposed in a landfill designed for long-term containment, application of WAC, and must meet CERCLA offsite rule. • Protective in preventing releases on the ORR because waste would be permanently removed and disposed in unpopulated regions with greater depths to groundwater.	• Would meet all RAOs. • Protective because waste would be disposed in a landfill (either onsite or offsite) designed for site-specific conditions to be protective of human health and the environment through application of land use controls, application of WAC, and application of ARARs or CERCLA offsite rule. • Site-specific conditions relevant to siting consideration and potentially affecting design at the onsite location include: – Hydrologic buffer (i.e., depth of waste to pre-construction groundwater levels) is estimated based on wells adjacent to the landfill footprint and within the same subsurface formations to range from ~ 0 ft (waste within pre-construction water levels) to ~ 30 ft bgs. – Groundwater flow direction is predominantly south to southwest; analysis is based on identified topography and multiple BCV well results. – Distance to 500-year floodplain is ~ 600 ft. – Distance to karst formation is ~ 600 ft. – Constructed with berm over seeps; would be addressed through engineered structure. • Shortest distance to DOE property line is ~ 4400 ft • Size of permanent commitment for landfill footprint is up to 50 acres.
		• Site-specific conditions relevant to siting consideration and potentially affecting design at this candidate site include: – Hydrologic buffer (i.e., depth of waste to pre-construction groundwater levels) within landfill footprint ranges from 0 ft (waste within pre-construction water levels) to ~ 80 ft bgs based on wells characterized within the footprint in 2015. – Distance to 500-year floodplain is ~ 1300 ft. – Distance to karst formation is ~1270 ft. – Constructed with waste over stream; would be addressed through engineered structure. • Shortest distance to DOE property line is ~ 1200 ft. • Size of permanent commitment for landfill footprint: up to 70 acres.	• Site-specific conditions relevant to siting consideration and potentially affecting design at this candidate site include: – Hydrologic buffer (i.e., depth of waste to pre-construction groundwater levels) is estimated to range from ~ 0 ft (waste within pre-construction water levels) to ~ 30 ft bgs based on wells characterized within the footprint in 2018. – Distance to 500-year floodplain is ~ 500 ft. – Distance to karst formation is ~ 350 ft. – Constructed with berm over stream; would be addressed through engineered structure. • Shortest distance to DOE property line is ~ 4200 ft. • Size of permanent commitment for landfill footprint: up to 67 acres.	• Site-specific conditions relevant to siting consideration and potentially affecting design at this candidate site include: – Hydrologic buffer (i.e., depth of waste to pre-construction groundwater levels) within landfill footprint ranges from 10–30 ft bgs based on wells characterized within the footprint in 1988. – Distance to 500-year floodplain is ~ 1000 ft. – Distance to karst formation is ~ 660 ft. – Constructed with waste over stream; would be addressed through engineered structure. • Shortest distance to the DOE property line is ~ 3900 ft. • Size of permanent commitment for landfill footprint: up to 71 acres.	• Site-specific conditions relevant to siting consideration and potentially affecting design at this candidate site include: – Hydrologic buffer (i.e., depth of waste to pre-construction groundwater levels) is estimated based on wells adjacent to the landfill footprint and within the same subsurface formations to range from ~ 0 ft (waste within pre-construction water levels) to ~ 60 ft bgs. – Distance to 500-year floodplain is ~ 600 ft (smaller site) and 500–800 ft (larger site). – Distance to karst formation is ~ 600 ft (smaller site) and 450–600 ft (larger site). – Constructed with berm over seeps; would be addressed through engineered structure. • Shortest distance to DOE property line is ~ 4000 ft. • Size of permanent commitment for landfill footprint: up to 109 acres (combined sites).		
Compliance with ARARs	• No action, therefore, no ARARs apply. ARARs for removal and remedial actions at individual sites are specified in separate CERCLA documents.	• Would comply with all ARARs. A waiver of TSCA 40 *CFR* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) would be requested as allowed by TSCA 40 *CFR* 761.75(c)(4). An exemption of TDEC 0400-20-11-.17(1)(h) would be requested for all alternatives as allowed under TDEC 0400-20-04-.08.				• Would comply with all chemical-, location-, and action-specific ARARs.	• Same as Onsite Alternatives.
Long-term effectiveness and permanence	• As the no action remedy does not meet one CERCLA threshold criterion (protection of human health and the environment), no additional summary analysis will be provided.	• Provides long-term effective and permanent waste disposal because of landfill design (designed to RCRA and TSCA) standards and use of WAC consistent with DOE Orders and ARARs. • Potential non-acute residual hazards may be slightly greater for the waste disposed of onsite than for that disposed of offsite because of higher regional population, wetter climatic conditions, and shallower depth to groundwater. However, land use controls and monitoring at the onsite disposal location would mitigate this risk.				• The offsite facility locations in arid environments reduce the likelihood of contaminant migration, and fewer receptors exist in the vicinity of a commercial offsite disposal facility and NNSS than near the ORR.	• Provides long-term effective and permanent waste disposal onsite because of landfill design and use of risk-based WAC. Also provides long-term effective and permanent waste disposal for waste meeting the offsite facility WAC.
		• Destruction of up to approximately 70 acres of woodland habitat within facility footprint.	• Destruction of up to approximately 67 acres of woodland habitat within facility footprint.	• Destruction of up to approximately 71 acres of woodland habitat within facility footprint.	• Destruction of up to approximately 109 acres of woodland habitat within facility footprint.		

Table 2.2. Summary of CERCLA evaluation criteria for disposal alternatives (cont.)

Evaluation criterion	No Action Alternative	Onsite Alternatives				Offsite Alternative	Hybrid Disposal Alternative
		East Bear Creek Valley	Central Bear Creek Valley	West Bear Creek Valley	Dual Site		
Long-term effectiveness and permanence (cont.)		• Up to approximately 1.6 acres of wetlands impacted. Impacts would be minimized through use of BMPs or mitigated in accordance with ARARs. • Surface water features, including a tributary creek, would require relocation. However, impacts would be minimized through use of BMPs or mitigated in accordance with ARARs. • Impacts to environmental features would be minimal as the site is located within the secured portion and industrial area of Y-12. • Underdrains are permanent.	• Up to approximately 4.9 acres of wetlands impacted. Impacts would be minimized through use of BMPs or mitigated in accordance with ARARs. • Surface water features, including a tributary creek, would require relocation. However, impacts would be minimized through use of BMPs or mitigated in accordance with ARARs. • Temporary drainage features are not expected to be used long term.	• Up to approximately 2.5 acres of wetlands impacted. Impacts would be minimized through use of BMPs or mitigated in accordance with ARARs. • Surface water features, including a tributary creek, would require relocation. However, impacts would be minimized through use of BMPs or mitigated in accordance with ARARs. • Underdrains are permanent.	• Up to approximately 5.8 acres of wetlands impacted. Impacts would be minimized through use of BMPs or mitigated in accordance with ARARs. • Surface water features would not require relocation. • Drainage features, such as underdrains, are temporary.		• Potential non-acute residual hazards may be slightly greater for the waste disposed onsite than for that disposed offsite because of higher regional population, wetter climatic conditions, and shallower depth to groundwater. However, land use controls and monitoring at the onsite disposal location should mitigate this risk. • The offsite facility locations in arid environments reduce the likelihood of contaminant migration, and fewer receptors exist in the vicinity of a commercial offsite disposal facility and NNSS than near the ORR. • Destruction of up to 50 acres of woodland habitat within facility footprint. • No wetlands are affected. • Temporary drainage features are not expected to be used long term.
Short-term effectiveness		• Onsite facility requires management of landfill wastewater through collection in the leachate collection system and in-cell catchments. • Transportation risks are significantly lower for the public than those under the offsite alternatives (onsite < 1.0 fatality/injury) over the disposal life cycle.				• No notable environmental effects would occur at the existing offsite facilities from increased ORR waste disposal. • Transportation risks are significantly greater for the public than for the Onsite Alternatives. Injuries/fatalities from transportation accidents estimated to range from 7–24 over the disposal life cycle. • Offsite facilities are located in arid regions and have minimal wastewater management requirements.	• Adverse environmental effects during construction are much lower than for other onsite facility options because this site was used as a borrow area previously. • Transportation risks to the public and workers are greater than Onsite Facility Alternatives, but less than those encountered for the Offsite Disposal Alternative. Up to three injuries/ fatalities from transportation accidents may occur over the disposal life cycle. • Onsite facility requires management of landfill wastewater through collection in the leachate collection system. Less wastewater volume due to smaller footprint than full size onsite facilities.
		• Wetland mitigation of up to approximately 1.6 acres.	• Wetland mitigation of up to approximately 4.9 acres.	• Wetland mitigation of up to approximately 2.5 acres.	• Wetland mitigation of up to approximately 5.8 acres.		
Reduction of toxicity, mobility, or volume through treatment		• Landfill wastewater treatment would reduce contaminants to levels required for discharge.				• Reduction in volume provided for disposal at NNSS.	• Reduction of volume is provided through mechanical volume minimization. • Landfill wastewater treatment would reduce contaminants to levels required for discharge.

Table 2.2. Summary of CERCLA evaluation criteria for disposal alternatives (cont.)

Evaluation criterion	No Action Alternative	Onsite Alternatives				Offsite Alternative	Hybrid Disposal Alternative
		East Bear Creek Valley	Central Bear Creek Valley	West Bear Creek Valley	Dual Site		
Implementability		• Implementation is technically feasible; landfill design and construction of the type presented in the conceptual design is commonly carried out. • Services and materials required for design, construct, and operate the landfill are readily available, as are qualified personnel, specialists, and vendors. Construction would involve the use of standard construction equipment, trades, and materials; no new technology development is required.				• Administrative and technical requirements are implementable as demonstrated by the current offsite shipment effort from ORR. • However, disposal of waste at commercial and DOE facilities relies on continued availability of offsite disposal capacity. Future changes in the states' acceptance of waste transport and disposal could challenge implementation of the alternative. Travel through multiple states could raise challenges.	• Implementation of the onsite disposal portion is technically feasible; landfill design and construction of the type presented in this conceptual design is commonly carried out. • Less new construction is required. The landfill is smaller and much of the existing infrastructure at EMWMF may be usable. • Services and materials required for design, construction, and operation of the landfill are readily available, as are qualified personnel, specialists, and vendors. Construction would involve the use of standard construction equipment, trades, and materials; no new technology development is required. • See also offsite bullets for this criterion, which apply to offsite portion.
		• Greater use of underdrain system required at this site. • Construction on steeper slopes. • Some new construction is required, including support facilities.	• Reliance on temporary drainage systems expected to be required only during construction to control surface water, perched groundwater, and infiltration. • No reliance on underdrains beneath waste footprint required to suppress the water table. • Slopes less pronounced than those at EBCV, so construction easier. • New construction is required, including support facilities.	• Greater use of underdrain system required at this site. • Slopes less pronounced than those at EBCV, so construction easier. • New construction is required, including support facilities.	• Reliance on drainage systems expected to be required only during construction. • No reliance on underdrains beneath waste footprint required. • Slopes less pronounced than those at EBCV, so construction easier. • Some new construction is required for support facilities and through construction of two landfills.		
Cost		• Cost per cubic yard of as-generated waste disposed is $463 (present worth 2021 dollars). • Total cost $903M (present worth 2021 dollars).	• Cost per cubic yard of as-generated waste disposed is $463 (present worth 2021 dollars). • Total cost $902M (present worth 2021 dollars).	• Cost per cubic yard of as-generated waste disposed is $474 (present worth 2021 dollars). • Total cost $924M (present worth 2021 dollars).	• Cost per cubic yard of as-generated waste disposed is $587 (present worth 2021 dollars). • Total cost $1145M (present worth 2021 dollars).	• Cost per cubic yard of as-generated waste disposed of is $960–$1105 (present worth 2021 dollars). • Total cost is $1870–$2152M (present worth 2021 dollars).	• Cost per cubic yard of as-generated waste disposed is $862 (present worth 2021 dollars). • Total cost is $1680M (present worth 2021 dollars).
State acceptance	• The State did not support the No Action Alternative.	• The State did not support the EBCV Alternative based on the understanding that a greater reliance on an underdrain system was required at this site.	• The State conditionally supported identification of the CBCV Site 7c as the preferred alternative. This conditional support of CBCV was based on its potential as the preferred site to meet DOE's estimated disposal capacity needs without relying on engineered systems for collecting and discharging groundwater beneath the waste footprint.	• The State did not support the WBCV Alternative based on the understanding that a greater reliance on an underdrain system was required at this site.	• The State conditionally supported identification of the Dual Site Alternative. This conditional support of the Dual Site was based on its potential to meet DOE's estimated disposal capacity needs without relying on engineered systems for collecting and discharging groundwater beneath the waste footprint.	• The State supported the offsite disposal alternative, because the offsite facilities have approved permits that comply with applicable regulations and are located in relatively flat, dry, unpopulated locations with deep water tables.	• The State conditionally supported the Hybrid Alternative. This conditional support of the Hybrid Disposal Alternative was based on: (1) the potential to meet DOE's estimated disposal capacity needs without relying on engineered systems for collecting and discharging groundwater beneath the waste footprint, and (2) the offsite facilities have already been permitted in relatively flat, dry, unpopulated locations with deep water tables.
Public Acceptance	The majority of commenters during the Public Comment Period were in favor of the preferred remedy as presented in the Proposed Plan, as were the majority of commenters during the additional public engagement period (see Sect. 2.10.9 and Part 3, Responsiveness Summary, in this ROD for detailed information).						

Source: DOE 2017a.

ARAR = applicable or relevant and appropriate requirement
BCV = Bear Creek Valley
bgs = below ground surface
BMP = best management practice
CBCV = Central Bear Creek Valley
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR = Code of Federal Regulations
DOE = U.S. Department of Energy
EBCV = East Bear Creek Valley
EMWMF = Environmental Management Waste Management Facility
M = million
NNSS = Nevada National Security Site
ORR = Oak Ridge Reservation
RAO = remedial action objective
RCRA = Resource Conservation and Recovery Act of 1976
ROD = Record of Decision
TDEC = Tennessee Department of Environment and Conservation
TSCA = Toxic Substances Control Act of 1976
WAC = waste acceptance criteria
WBCV = West Bear Creek Valley
Y-12 = Y-12 National Security Complex

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Land use controls would restrict access to the site and prohibit actions that could penetrate the cover and expose the waste. Barring extraordinary efforts to penetrate the cover, the landfill would be designed to remain effective for over 1000 years.

The Offsite Disposal Alternative and offsite disposal element of the Hybrid Disposal Alternative also relied on engineering and land use controls at the offsite disposal facilities to prevent inadvertent intrusion, including engineered barriers to intrusion and waste migration. Offsite disposal of waste to locations in the western United States may, in the long term, be considered more reliable at preventing exposure than onsite disposal on the ORR. Arid environments reduce the likelihood of contaminant migration or exposure via groundwater or surface water pathways. While the climate in Tennessee is wetter and could be considered less protective, the climate is considered for both determining what waste can be safely placed in a disposal cell to ensure long-term protection and how that cell would be constructed to ensure protectiveness.

2.10.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

This criterion reflected the statutory preference for remedial action alternatives to substantially reduce toxicity, mobility, or volume of hazardous substances through treatment.

The No Action Alternative does not reduce toxicity, mobility, or volume through treatment.

Onsite Disposal Alternatives would provide landfill wastewater treatment needed to meet ARARs, including portions of the CWA that address hazardous chemicals and radiological discharges, as well as NRC/Tennessee Department of Radiological Health requirements that address radiological discharges alone. That treatment would reduce contaminants to levels required for discharge to Bear Creek or its tributaries. Consolidation of waste within the landfill results in some volume reduction and compaction as heavy equipment incorporates the waste into the landfill matrix. Landfill wastewater from EMDF will be treated prior to discharge to be protective of recreational use (human health), specifically fish ingestion. WAC, which dictate the acceptance of waste within the landfill based on the ability to protectively accept the form, quantity, and/or radioactivity level, serve to control the radioactivity/toxicity disposed of at the EMDF to within specified limits that ensure protectiveness.

Waste generators would be required to treat wastes as needed to meet the EMDF WAC and ARARs before onsite disposal. However, that treatment is not part of this onsite remedy. Cleanup planning considers the OREM waste hierarchy, whereby the consideration for waste disposition is: recycle first, followed by disposal as a sanitary/industrial waste, followed by disposal in the onsite EMWMF/EMDF for LLW/mixed LLW, and lastly offsite disposal is considered if needed.

For waste disposed offsite, size reduction is assumed, which results in some volume reduction. Treatment, while provided by offsite facilities to meet their disposal requirements, is not accounted for in the offsite remedy in terms of cost so that equal comparisons may be made to onsite alternatives.

The Hybrid Disposal Alternative also would reduce the volume of waste prior to offsite shipment through assumed size reduction.

2.10.5 Short-term Effectiveness

This criterion addressed the effects on human health and the environment posed by implementing the alternative.

Short-term effectiveness includes protection of the community and workers during remedial action, short-term environmental effects, and the duration of remedial activities. Because the No Action Alternative includes no activity, there are no short-term impacts.

For the action alternatives, risk to human health was the most differentiating element. Under all disposal alternatives evaluated, risks to workers and the community from actions at the disposal facilities would be controlled to acceptable levels through compliance with regulatory requirements and health and safety plans.

Offsite transportation carried a much higher risk to human health than onsite transportation due to vehicular accidents and emissions associated with public roads/railroads travelled and the long distances involved. Projected fatalities associated with the offsite disposal alternative range from 8.7 for Option 1 to 2.5 for Option 2. By comparison, fatalities associated with the onsite disposal alternative were projected to be 0.3. Projected injuries associated with the offsite alternative ranged from 15.1 for Option 1 to 4.2 for Option 2. By comparison, injuries associated with the onsite alternative were projected to be 0.8.

Short-term environmental effects would be the greatest for the Onsite Disposal Alternatives. Construction and operation of EMDF would create local short-term environmental effects typically associated with a large construction project. Sensitive human receptors (e.g., residence, church, school) would not be impacted because of the distance of the proposed EMDF sites from these receptors. Disturbance to terrestrial resources would be expected, with land use resulting in losses/changes of habitat and displacement of wildlife from the construction areas. The greatest impact would be installation of EMDF in CBCV or WBCV, where up to 94 acres of forested land would be expected to be impacted. The other onsite alternatives had less, but still notable, impact on environmental habitat. From the alternatives within BCV considered for locating the EMDF, DOE considered brown field sites first, but ultimately the CBCV site provided the most beneficial attributes in total over those other sites.

Environmental effects could result from a spill during loading, transporting, and handling for the Offsite Disposal Alternative.

2.10.6 Implementability

This criterion examined the technical and administrative factors that affect implementation of an alternative.

Implementability for the No Action Alternative was not applicable.

All disposal alternatives were administratively and technically feasible. Currently, services and materials needed for pre-construction investigations, construction, and operation of the Onsite Disposal Alternatives exist. No impediments to future operation of the Onsite Disposal Alternatives are anticipated. The onsite EMDF of both the Onsite Disposal Alternatives and the Hybrid Disposal Alternative is more complex to implement than shipping waste offsite. However, the technology is well proven and an onsite disposal facility has already been constructed at ORR. Use of both onsite and offsite disposal in the Hybrid Disposal Alternative did introduce operational complexity as decisions concerning what is disposed onsite versus offsite would be needed. The EBCV site had the most notable implementation issues of the Onsite Disposal Alternatives as it is the steepest of the sites and has little room for support systems. Many other Y-12 facilities and operations are close to the site. However, this site would use the greatest amount of existing EMWMF infrastructure, thus avoiding construction of new support systems.

Transportation alternatives and disposal capacity for the Offsite Disposal Alternative are currently available. Reliance on offsite disposal facilities creates an element of long-term uncertainty into the availability of offsite disposal during the anticipated operational period, including risks of interruptions

caused by events outside of DOE control. Because CERCLA waste generation on the Oak Ridge NPL Site is projected to continue for roughly 3 decades, onsite disposal would provide greater certainty that disposal capacity is available when waste is generated, avoiding potential lengthy storage times, work stoppages, and other increased risks to human health and the environment created by delays in the cleanup of the Oak Ridge NPL Site.

2.10.7 Cost

Cost estimates developed to support the detailed analysis in the RI/FS were based on CERCLA FS-level scoping and are intended to aid in comparison among alternatives. EPA guidance states that these estimates should have an accuracy of +50 to -30 percent (EPA 1988).

There were no costs associated with the No Action Alternative since there was no coordinated disposal effort. All remediation projects on the Oak Ridge NPL Site would either need to be modified to not generate any waste streams, or increase their costs associated with individual disposal efforts.

The projected cost for the Offsite Disposal Alternative was approximately two times that of the Onsite Disposal Alternatives, as seen in Table 2.3. The estimated total project costs for onsite disposal ranged from $861–$1090 million, the Offsite Disposal Alternative ranged from $1799–$2065 million, and the Hybrid Disposal Alternative was in between at $1618 million. Both costs have the same assumed uncertainty of 25 percent in waste volumes and account for cost uncertainties.

Table 2.3. Estimated costs for disposal alternatives

	$ million (Fiscal Year 2021)					
Cost element	**East Bear Creek Valley**	**Central Bear Creek Valley**	**West Bear Creek Valley**	**Dual Site**	**Hybrid**	**Offsite**
Total cost (construction, operation, and closure)	862	861	883	1090	1618	1799–2065
Long-term maintenance[a]	52.5	52.5	52.9	85.4	39.4	NA
Present worth[b]	903	902	924	1145	1680	1870–2152

[a]Long-term maintenance includes 100 years of maintenance, surveillance, and monitoring.
[b]Present worth calculations use a discount rate of -0.31.5 percent per the *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, Circular A-94* (OMB 2020).

NA = not applicable
OMB = Office of Management and Budget

Selection of two smaller sites together (Dual Site Disposal Alternative) is the high range ($1090 million for both sites) of the onsite disposal estimate. Total estimated costs for capital investment included planning, construction/closure, and operation as well as long-term maintenance (e.g., maintenance, surveillance, and monitoring for a 100-year period following closure). Costs shown in Table 2.3 are given in Fiscal Year 2021 dollars along with present worth values.

2.10.8 State Acceptance

The State of Tennessee recognized DOE's concerns that the No Action Alternative would require each cleanup project to select a separate disposal option waste generated. At the time of the Proposed Plan, the State supported the Offsite Disposal Alternative; all of the Onsite Disposal Alternatives (including the onsite component of the Hybrid Disposal Alternative) required additional information before the State could accept. The State required the following:

- Evaluation of information collected on streams, springs, and groundwater that would affect the ability to contain the waste and protect humans and the environment, including information on the degree and reliance on underdrains to discharge groundwater or surface water during facility operations or after closure (Sect. 2.5)
- Agreement on the final list of ARARs, including justification of any waivers/exemptions to the ARARs (Sect. 2.13.2; Appendix A)
- Evaluation of realistic information on the amounts and types of waste to be disposed, including the WAC (Sects. 2.7 and 2.12.2.3)
- Inclusion of DOE Order-required performance assessment, composite analysis, and preliminary Disposal Authorization Statement in the Administrative Record (Sect. 2.12.2.3)
- Agreement to limit or manage mercury disposal to provide reasonable assurance the amount of mercury released in the future will meet the intent of the Tennessee Water Quality Control Act and will not adversely impact people fishing and eating fish downstream (Sect. 2.12.2.3)
- Agreement that permanent underdrains are not allowed to permanently suppress the water table to mitigate springs or streams at proposed landfill sites (Sect. 2.12.1)
- Verification that the amounts of hazardous and radioactive constituents that DOE may discharge to Bear Creek is consistent with CERCLA (Sect. 2.12.2.4).

Since the Proposed Plan, DOE and the State have worked together to resolve these issues, resulting in agreements and actions referenced in this section. Based on these agreements, the State supports construction of the EMDF at the CBCV Site 7c.

2.10.9 Community Acceptance

2.10.9.1 Proposed Plan public review and comment

DOE held a public review and comment period from September 10, 2018 to January 9, 2019, and hosted two information sessions and a public meeting on November 7, 2018, to obtain public input on the proposed action for onsite disposal of CERCLA waste in EMDF. The meeting was publicized in all of the local newspapers, on social media, and by mailing reminders to all 15,000 households in Oak Ridge. A transcript of the public meeting is contained in the Administrative Record for this ROD. The original public comment period duration was 45 days; after several requests for extensions were granted, DOE provided a total of 120 days for comments to be received.

The Responsiveness Summary in Part 3 of this ROD presents DOE's responses to comments received from the Proposed Plan public review and comment period. DOE received comments from 194 individual commenters via several methods: email, comment cards submitted directly to DOE representatives, comment cards turned in at public meetings, speakers asking questions at the public meeting, and correspondence sent via U.S. Postal Service.

Analysis of the comments received showed that the majority of commenters were in favor of the preferred remedy as presented in the Proposed Plan. In addition to individuals and citizens who submitted comments in favor of the preferred remedy, formal written support was received from the Roane County Commission (Host County), the Knoxville Building and Construction Trades Council, and the Atomic Trades and Labor Council. Although the SSAB did not submit comments during the public comment period, they had provided earlier endorsement of an onsite disposal facility in written communications (SSAB 2014).

Consistent through the supportive comments were the following topics:

- Onsite disposal is safe, secure, protective, and offers timely disposal of waste.
- There is an economic benefit to the area through jobs.
- Availability of onsite disposal capability allows for timely and cost-effective remediation of the Oak Ridge NPL Site.
- The success of existing EMWMF for safe and compliant waste disposal.

Concerns about or opposition to the preferred remedy were received from the Oak Ridge Environmental Quality Advisory Board (an Oak Ridge city entity), the Southern Environmental Law Center, the Tennessee Chapter of the Sierra Club, the Advocates for the Oak Ridge Reservation, and individual citizens. While many of the remaining commenters were clearly against onsite disposal, some of the commenters were requesting more information, wanted input into what could be placed in an onsite disposal facility, or preferred another onsite alternative. Many of the comments generally described the following concerns:

- Opportunity to review and comment on the WAC prior to issuing the ROD
- Concerns with disposing of mercury-contaminated waste onsite
- Need for waivers/exemptions for regulatory compliance
- Use of partially forested “greenfield” area rather than an area already committed to waste disposal
- Location’s underlying geology and rainfall
- Overestimation of offsite disposal cost and risk
- Impact of onsite hazardous waste disposal facility on property values and attracting people/businesses to Oak Ridge.

There were also numerous miscellaneous comments on a range of related topics, including:

- Requests for additional detailed technical information
- Request for additional time for the comment period (was granted)
- Request for compensation from DOE to the City of Oak Ridge
- Two proposals from offsite disposal facilities to take the LLW that would likely be disposed in the EMDF.

2.10.9.2 Additional public engagement

Following development of the D1 ROD, the FFA parties recommended additional public engagement to provide additional information related to WAC, discharge limits, and siting of the EMDF (specifically related to groundwater levels and the GWFD), developed since the Proposed Plan. The additional information was presented in a series of three fact sheets (Site Groundwater Characterization, WAC, and

Water Quality Projected for Bear Creek). Several EMDF-project framework documents were also provided (D1 EMDF ROD, the Proposed Plan, the RI/FS), along with other additional resources for information. DOE held an additional 30-day public review and comment period from May 9 to June 7, 2022, and hosted a public meeting on May 17, 2022, to obtain public input on the additional information.

DOE received comments from 68 individual commenters via email, comments turned in at the public meeting, speakers asking questions at the public meeting, and correspondence sent via U.S. Postal Service. Comments were requested on the three fact sheets; however, all additional comments received are included in the Responsiveness Summary in Part 3 of this ROD, along with DOE's responses to the additional comments.

Analysis of the additional public engagement comments received showed that the majority of commenters were in favor of the EMDF project overall, citing the continuation of efficient and cost-effective cleanup of contaminated and aging facilities, maintaining accelerated cleanup momentum in Oak Ridge, retention of the trained and skilled workforce, providing opportunities for supporting future DOE programs and missions, the improved safety from keeping waste shipments off public roadways, and isolating wastes in a manner that is protective of people and the environment.

Remaining commenters expressed concerns or opposition to the EMDF or requested additional information and/or additional public review of the requested additional information. The concerns expressed were similar to those provided in public comments to the Proposed Plan: need for waivers for regulatory compliance, building EMDF in a "greenfield", request for additional WAC information and additional public review, and groundwater levels at the EMDF location and rainfall. Miscellaneous comments included topics such as climate change considerations, overall cleanup plan for the ORR and whether EMDF has capacity for all future remediation waste, plans for ongoing fish sampling and monitoring, additional information on offsite disposal cost evaluations, EMWMF past performance and lessons learned, and requests for additional engagement with affected communities.

2.10.10 NEPA Values

Although not an ARAR, throughout the CERCLA process, NEPA values are incorporated in accordance with the Secretarial Policy Statement on NEPA (DOE 1994).

There were no NEPA values to evaluate for the No Action Alternative as the future waste disposal decisions are unknown and would be addressed for NEPA compliance as appropriate.

NEPA values were evaluated for the disposal alternatives. Those values associated with sensitive resources were discussed in the RI/FS (DOE 2017a) under compliance with ARARs or short-term effectiveness and are not key differentiating values.

Impacts on land use (a NEPA value) are summarized in Table 2.4 for the Onsite Disposal Alternatives.

Table 2.4. Land use considerations for Onsite Alternatives

Land use	Onsite EMDF locations				
	East Bear Creek Valley[a]	Central Bear Creek Valley	West Bear Creek Valley	Dual Site	Hybrid[a]
Acreage for development	71	82	94	127	53
Footprint of disposal facility	48	47	52	68	27
Area of permanent commitment	70	67	71	109	50

[a]These locations assume some use of existing facilities/committed acreage; therefore, acreage for development/permanent commitment is lower.

EMDF = Environmental Management Disposal Facility

Land use within the permanent institutional control boundary of all disposal locations, both onsite and offsite, would be restricted. Support areas used during construction and operations of disposal facilities could be released for other uses after facility closure. The Onsite Disposal Alternatives would cause a permanent land use change of up to 109 acres (for the Dual Site Disposal Alternative). Construction of EMDF on the selected site in CBCV would result in a loss of 82 acres of land for alternate uses.

All disposal alternatives would irreversibly and irretrievably use resources. The Hybrid and Onsite Disposal Alternatives would use material for the construction of the landfill. However, none of the material was considered difficult to replace. Fuel would be used for all alternatives, but to a much greater extent with the Hybrid and Offsite Disposal Alternatives.

The socioeconomic impacts associated with the construction and operation of EMDF to support cleanup of ORR was evaluated by the Howard H. Baker Center of Public Policy at the University of Tennessee (University of Tennessee 2015). Construction and operation of this facility were estimated to have a significant positive economic impact on the Anderson (including the city of Oak Ridge), Roane (including the city of Oak Ridge), and Knox Counties region as measured by personal income, sales and use tax revenue, and employment.

Direct nominal spending in Tennessee attributable to the production of the new onsite waste disposal facility would total approximately $723.3 million. When circulated through the state economy, these funds would generate $1.3 billion in output benefits, $694.7 million in personal income benefits for residents, and $54.1 million in sales and use tax revenue for state and local governments in Tennessee. After discounting these nominal values, the project provides $637.7 million in discounted output benefits, $344.5 million in discounted personal income benefits for state residents, $17.8 million in discounted sales and use tax revenue for the state and local governments in Tennessee, and a total of 6830 individuals employed from the project (University of Tennessee 2015).

Implementation of the Offsite Disposal Alternative would have a lower positive socioeconomic impact in East Tennessee compared to the Onsite Disposal Alternatives. In addition, the additional truck and/or rail traffic through the area may be a detriment to the quality of life of some residents. The perception that there would be an increased local traffic risk may be an issue for future development, but this is likely to be a small impact.

Programmatic cost savings in implementing onsite disposal instead of offsite disposal would enable quicker remediation progress at individual sites, allowing reuse of property at Y-12 and ORNL and resulting in additional benefits to the local community.

The areas immediately surrounding the proposed EMDF site are currently unpopulated DOE-controlled property. The nearest residential area (Country Club Estates) is approximately 0.8 mile from the Dual Site or CBCV sites and approximately 1 mile from the WBCV site. The Scarboro Community located approximately 1.5 miles northeast of the EBCV site would not be impacted by the construction, operation, or closure of EMDF. All nearby communities are separated by a large ridge (Pine Ridge) from the proposed EMDF sites. Additionally, surface water and groundwater originating in the proposed disposal areas in BCV move away from these residential areas. The distance and Pine Ridge provide a visual and sound barrier between the residents and the waste disposal construction and operational activities. The surrounding communities would not be affected by construction traffic since access to BCV is restricted by ORR security. Waste would be primarily shipped to the disposal facilities on dedicated haul roads operated on the ORR, so there would be no interaction between the public and the transport trucks. These dedicated haul roads also would minimize public interaction with trucks.

2.10.11 Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental Justice efforts work with communities to address the needs of vulnerable populations by decreasing environmental burdens and increasing environmental benefits.

Environmental justice evaluation consists of two components: (1) description of potential impacts on and existing risks to minority populations, low-income populations, and/or indigenous peoples; and (2) description of potential impediments to meaningful involvement from these communities.

Description of potential impacts

The environmental justice impacts associated with the No Action and Offsite Alternatives are higher than the onsite alternative because contamination would remain near communities for a longer period of time due to the slower pace of remediation. In addition, the offsite alternative has a greater potential for future impacts because of the required transport of waste loads offsite from the ORR, through the city of Oak Ridge, and through other communities along the route. This increases traffic and the potential impacts to nearby communities and communities along the route in the event of a spill or other accident.

For the onsite EMDF alternative, environmental justice concerns have been raised regarding communities immediately north of the main Y-12 industrial area, though the EMDF does not impact environmental conditions in this area. Based on a review of the EPA Environmental Justice screening tool and the 2021 Census Bureau data, there are no Environmental Justice or underserved communities in close proximity to the proposed EMDF. The closest community (Country Club Estates) is approximately 1 mile away and on the opposite side of Pine Ridge from the proposed EMDF site. DOE continues to reach out to the Oak Ridge and surrounding communities, including potential underserved communities. The 2021 Census Bureau information identified less than 7 percent of the Oak Ridge residents were identified as Hispanic or Latino origin. In addition, no discrete Hispanic or Latino neighborhoods have been identified in proximity to the EMDF.

The CBCV Site 7c is situated on the ORR, on the south slope of Pine Ridge and in BCV (Fig. 2.3). The closest communities are approximately 0.8 mile away, on the north slope of Pine Ridge. Pine Ridge provides a visual and sound barrier between the EMDF and the nearby Country Club Estates and Scarboro communities. Pine Ridge also acts as an effective groundwater and surface water barrier and there are no specific pathways for groundwater or surface water to flow from Bear Creek over or through Pine Ridge (see Sect. 2.5). In addition, Pine Ridge impedes air flow, with air flow typically down valley instead of

across the ridge. Similar to the currently operating EMWMF, dust will be controlled in accordance with ARARs and operating procedures.

The legacy cleanup projects with waste disposal slated for the EMDF are located at both Y-12 and ORNL on the ORR. The ORNL legacy cleanup projects are not close to either of these communities. The Y-12 legacy cleanup projects are closer to the Scarboro community than to the EMDF. Significant quantities of mercury are present in unused facilities at Y-12, along with radionuclides associated with previous ORR mission activities. DOE has documented the mercury contamination exiting Y-12 via Lower East Fork Poplar Creek (LEFPC), which flows through the City of Oak Ridge. Remediation of mercury-contaminated buildings and soils will mitigate the continued releases of mercury into LEFPC. Expedited cleanup of these projects will more quickly move contamination further away from the impacted communities and provide safe disposal of the contaminated debris in an engineered landfill.

The Scarboro community public outreach concerning the proposed onsite disposal facility began in 2015. Scarboro community leaders have expressed support for the EMDF several times, including a letter of support to EPA Region 4 (letter from 27 Scarboro community leaders to Ms. L'Tonya Spencer-Harvey, EPA Region 4 Public Affairs Specialist/Community Involvement Coordinator, dated 11/29/2021). The letter specifically mentions reduction of environmental risk and continued environmental impact. In addition, the letter mentions the benefits provided by the EMDF construction and operation, including creating new economic opportunities from both well-paying cleanup jobs and the economic benefit from new research and national security missions on land made available from the cleanup actions.

Potential Impediments to Meaningful Involvement

The following impediments to meaningful involvement from communities with environmental justice concerns in this CERCLA effort were identified, as well as a brief description of how they are addressed. The EMDF project is not a stand-alone project and is able to take advantage of a larger, vigorous public outreach program in place for the entire ORR with additional support from each of the major contractors. Therefore, impediments to meaningful involvement have been addressed by the ORR as a whole instead of piecemeal for each project.

- Lack of publicly available information:
  - Site Specific Citizen Advisory Board has been established and holds regularly scheduled meetings on their choice of topics. A yearly update on waste disposal on the ORR is provided.
  - Monitoring data for the ORR is made available to the public through the OREIS database. This offers a useful graphical interface so members of the public can select an area of interest of their own choosing.
  - EMDF documents are made available through the Public Reading Room in Oak Ridge and electronically through the website https://doeic.science.energy.gov/.
  - The ORR provides an Annual Site Environmental Report readily available to the public through the Public Reading Room in Oak Ridge and on the internet: https://doeic.science.energy.gov/aser/.
- Lack of transportation to reading rooms and public meetings:
  - DOE ORR is in contact with community leaders and has provided points of contact for those that would like available information.

2.11 PRINCIPAL THREAT WASTES

The NCP Sect. 300.430(a)(1)(iii)(A) establishes an expectation that lead agencies will use treatment to address the principal threats posed by contamination wherever practicable. The principal threat concept is applied to the characterization of source materials. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. *A Guide to Principal Threat and Low-Level Threat Waste* (EPA 1991) states that waste that generally will be considered to constitute principal threats include, but are not limited to, the following:

- Liquid source material – waste contained in drums, lagoons, or tanks and free product in the subsurface (i.e., non-aqueous phase liquids) containing COCs (generally excluding groundwater)
- Mobile source material – surface soil or subsurface soil containing high concentrations of COCs that are (or potentially are) mobile due to wind entrainment, volatilization (e.g., VOCs), surface runoff, or subsurface transport
- Highly toxic source material – buried, drummed, non-liquid wastes; buried tanks containing non-liquid waste; or soils containing significant concentrations of highly toxic materials.

The decision documented in this ROD is not determining a need to remediate mobile source material, liquid or drummed buried waste, or highly toxic soils. In addition, per the Administrative WAC and the mercury management approach developed by the FFA parties (Sect. 2.12.2.3), RCRA D009 mercury characteristic hazardous waste is prohibited from onsite disposal, and no liquids are accepted for disposal (e.g., elemental liquid mercury); therefore, the concept of principal threat wastes does not apply to this decision. Decisions covering removal and remedial actions that will result in the generation of CERCLA waste will address the potential for principal threat waste.

2.12 SUMMARY OF PREFERRED REMEDY

This section discusses the rationale for the selected remedy, provides more details about the selected remedy, summarizes the estimated costs for the remedy, and discusses the expected outcome of implementing the remedy.

Based on the evaluation of alternatives and the input received from the public, the Onsite Disposal Alternative, specifically the construction of the EMDF in CBCV (Site 7c), is selected for the permanent disposal of remediation waste generated by future CERCLA actions on the Oak Ridge NPL Site. While BCV, as part of the larger ORR, has been defined for future mission use, including waste management, in DOE's *Oak Ridge Reservation Planning: Integrating Multiple Land Use Needs* (DOE 2021a) and End State Vision (DOE 2004), the selection of the CBCV Site 7c also includes the need to modify the current and future land uses defined in the BCV Phase I ROD (DOE 2000) that are used to set LUCs and remediation goals for Zones 1 and 2. For Zone 1 (the area adjacent to the proposed EMDF site), the near-term and long-term land usage for purposes of determining LUCs and setting remediation goals is modified from unrestricted use to restricted recreational. Land usage in Zone 2, the area in which the EMDF will be constructed, is changed from recreational use in the near term and unrestricted in the long term to DOE-controlled industrial use (same as for Zone 3), for purposes of setting LUCs and determining remediation goals, with approval of this ROD. Figure 2.5 illustrates these revised zone designations in BCV that will be used in setting both near- and long-term remediation goals. These modifications, which are needed based on this new CERCLA decision, are consistent with the BCV Phase I ROD, which states, "These initial goals will remain in effect unless new technologies, land use requirements, regulatory requirements, or subsequent CERCLA decisions for BCV establish a basis for revision." The BCV RAR

CMP will be updated to adopt these revised designations and accompanying watershed LUCs prior to facility startup. Consistent with a milestone for a RDR update established in Appendix E, the CERCLA waste disposal (EMWMF) operations LUCIP will be updated to address EMDF (or a new, separate LUCIP will be created), and as a secondary document will be attached to the EMDF RDR primary document for approval.

Restricted recreational use (Zone 1) is selected because it serves as a buffer area to Zone 2, the location of the EMDF, and the public is restricted from entering the BCV area where Highway 95 borders Zone 1. Limited turkey and deer hunting is allowed in some surrounding DOE areas and portions of BCV. Typically, however, the public is restricted from entering the BCV area at Highway 95 and to the east, as it serves as a buffer area to Y-12 (*No Trespassing* is posted at Bear Creek Road and the road is patrolled by DOE security forces on a regular, daily basis). Limited hunt access location maps/dates may be obtained from the local hunting authorities and are adjusted as necessary to reflect current conditions across the ORR. Fishing in Bear Creek, not included in open hunt accesses, is deterred as part of DOE's *No Trespassing* postings. Further, current State of Tennessee fish consumption advisories exist for Bear Creek, due to elevated mercury and PCB concentrations in fish, and will continue to be posted as long as fish continue to present a consumptive health hazard per TDEC decisions. Although these land use designations describe how protectiveness will be maintained for users of the property, protectiveness of surface water and groundwater will be consistent with the state's classified uses of those resources.

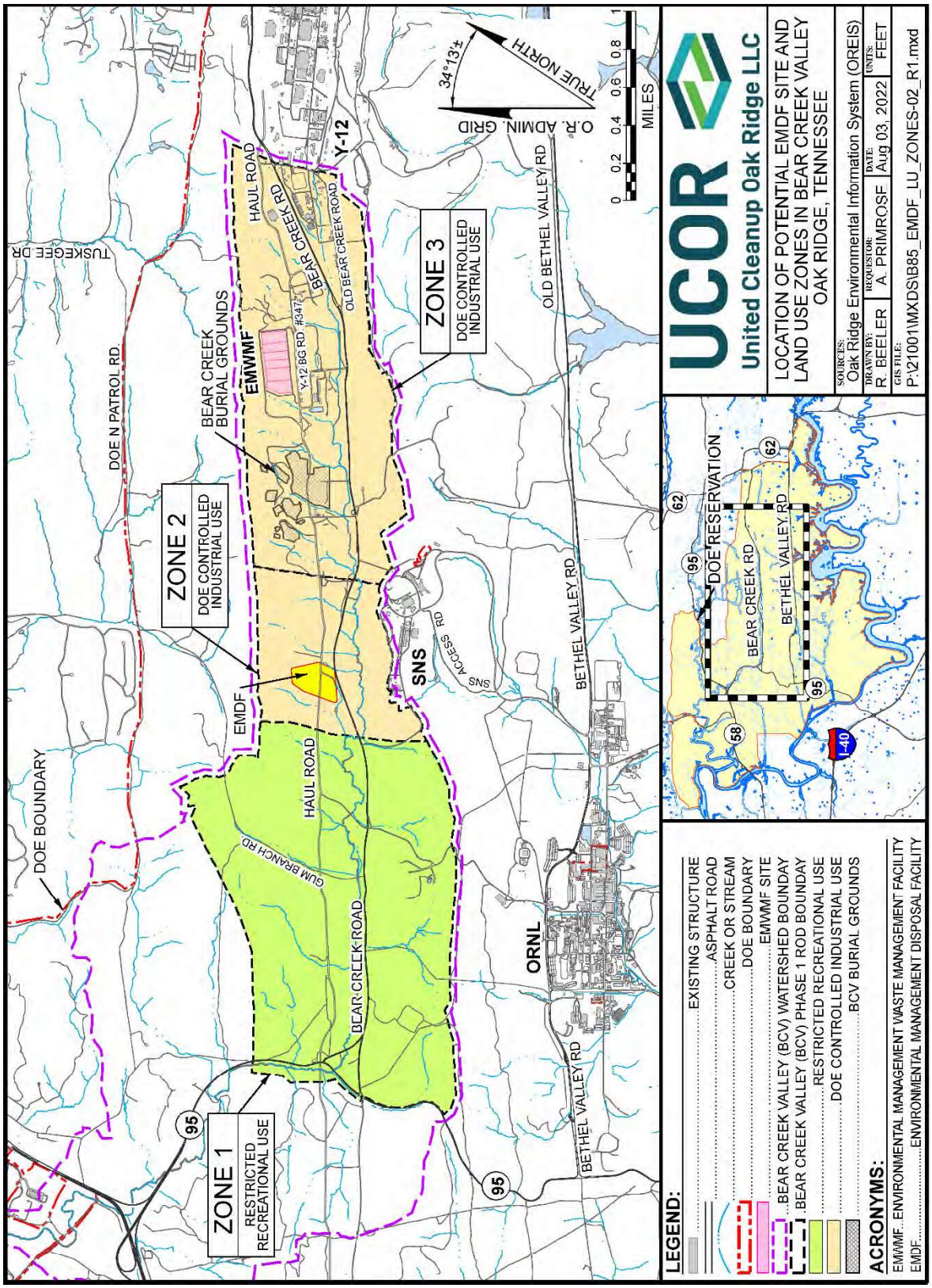


Fig. 2.5. Revised Bear Creek Valley land use designations, defined for purposes of setting cleanup goals

2.12.1 Summary of the Rationale for the Selected Remedy

Based on the considerations and the information currently available, the Onsite Disposal Alternative is the selected alternative to manage remediation waste generated by future CERCLA actions on the Oak Ridge NPL Site.

The selected remedy meets CERCLA threshold criteria and provides the best balance of all other criteria. DOE has determined that the selected alternative satisfies the requirements of CERCLA 121(b) to (1) be protective of human health and the environment, (2) attain ARARs that are identified at the time of ROD signature or provide grounds for invoking a waiver under 40 *CFR* 300.430(f)(1)(ii)(C), (3) be cost effective, (4) use permanent solutions and resource recovery technologies to the extent practicable, and (5) satisfy the preference for treatment as a principal element of the remedy. Element 5 is addressed through treatment required for individual waste lots generated under other CERCLA decision documents (e.g., waste handling plans), as needed, to meet the EMDF WAC before onsite disposal. CERCLA's preference for treatment is also addressed by treatment of landfill wastewater to meet ARARs and discharge limits prior to release.

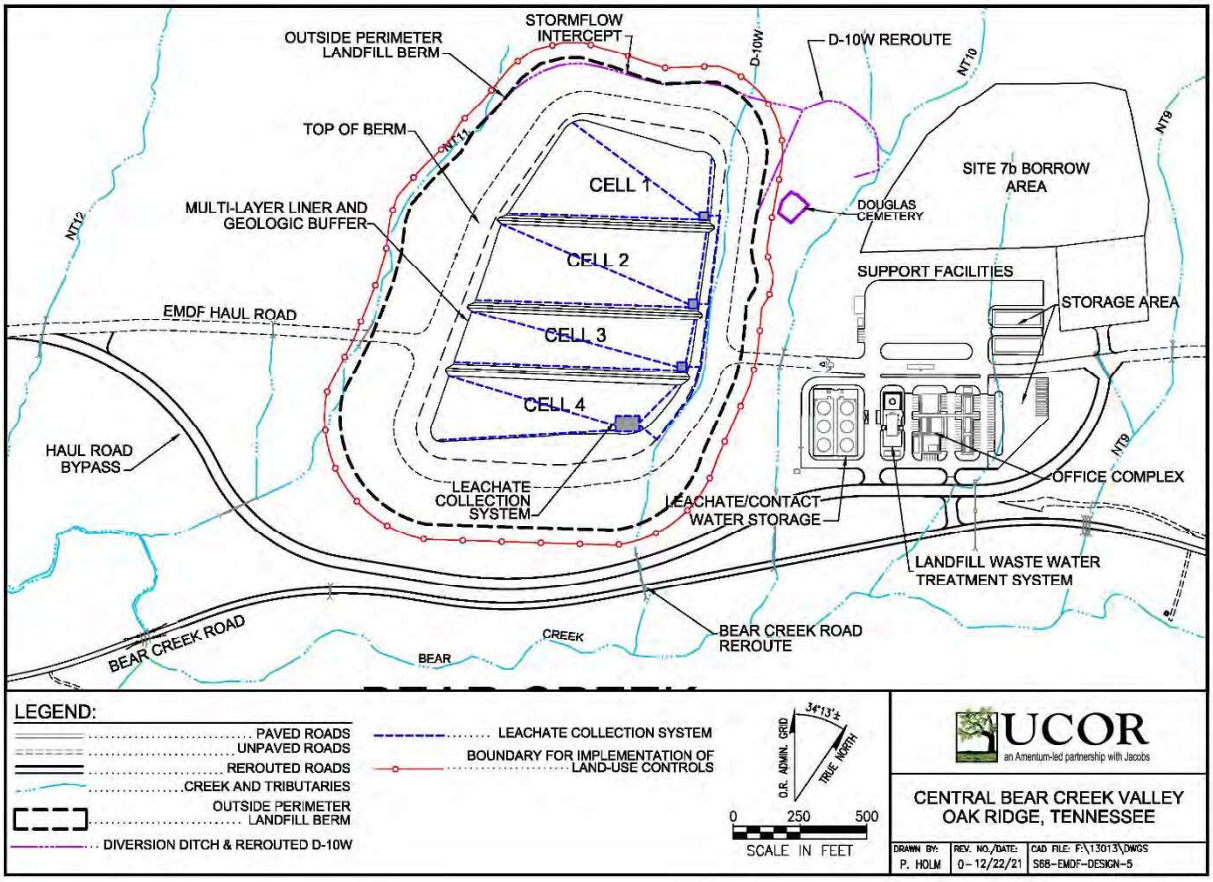
DOE selected onsite disposal with the CBCV Site 7c as the location for the following reasons:

- The site facilitates timely CERCLA remediation of the Oak Ridge NPL Site by providing a dedicated onsite disposal location that is protective of human health and the environment, cost-effective, compliant with all federal and state requirements or provides grounds for invoking a waiver or exemption, and effectively balances the CERCLA remedy selection criteria.
- The site is located in a secure location (under DOE control) within the ORR in an area not considered for reindustrialization or reuse.
- The site minimizes short-term risks to humans through transportation or industrial accidents.
- The site is located along the Haul Road, allowing incoming waste from Y-12 and ORNL to remain fully on DOE property and out of commerce, and the existing CERCLA waste management area (i.e., EMWMF) is nearby (approximately 1.5 miles to the east, following the Haul Road).
- The overall terrain is not as steep as other proposed locations, provides the needed capacity, and there is room for collocated support systems installation as there are no other activities nearby.
- Permanent underdrains are not required to control the groundwater table. Underdrains will not be used as corrective actions for groundwater intrusion into the geologic buffer. Temporary drainage features may be necessary to divert surface water, perched groundwater, and infiltration from excavations and improve ground conditions to aid construction. The absence of underdrains is critical to the state's acceptance of this remedy. Should different conditions arise in the future, any consideration of a proposal for an underdrain as defined by agreement of the FFA parties would be considered to fundamentally alter the remedy in performance and scope, requiring a ROD amendment per 40 *CFR* 300.435(c)(2)(ii).
- Compared to other sites considered, the CBCV Site 7c provided the best collective features from several perspectives: hydrologic (proximity to surface water, no reliance on underdrains), proximity to public, proximity/access to future Y-12 and ORNL cleanup projects, topography (e.g., natural separation from Pine Ridge due to existing natural saddle), and site geologic formations.

2.12.2 Description of the Selected Remedy

As discussed below, the selected remedy includes the construction of EMDF in CBCV, providing up to 2.2 million cy of additional disposal capacity for ORR CERCLA waste. EMDF will be designed and constructed to meet ARARs, including a liner and cap system compliant with RCRA requirements. Surface

water and groundwater will be managed by diverting water around the facility and constructing a liner and geologic buffer system that will isolate the facility from groundwater. A leachate collection system and other support facilities, including a LWTS, will also be designed and constructed as part of EMDF; final details will be included in a post-ROD RDR, a primary document that requires approval by all three parties. Long-term monitoring and maintenance of EMDF to ensure the integrity of the facility and institutional controls to prevent access to waste in the future are also part of the selected remedy. While not ARARs under CERCLA, the remedy will also comply with all appropriate internal DOE Directives. Figure 2.6 presents a conceptual layout of the landfill and its supporting features. The footprint and supporting features could change during the design of the landfill.



Note: settling basins for uncontaminated stormwater will be provided in the final design.

Fig. 2.6. EMDF conceptual site layout

The components of the selected remedy include the following:

- Maintain a 15-ft separation between the base of emplaced wastes and seasonal high water table of the uppermost unconfined aquifer, consistent with TDEC 0400-11-01-.04(4)(a)(2). This requirement has been added as an RAO in order to assure protectiveness during operation and post-closure. Included within the 15 ft would be the facility's 10-ft geologic buffer and the 5-ft liner system. Site-specific groundwater investigations indicate that parts of the site footprint can clearly meet this requirement; however, for higher elevations in the site – particularly in the area of the knoll feature in the CBCV Site 7c footprint – TDEC and EPA have expressed concern that predicted post-construction groundwater conditions used for preliminary design may not be achievable. Therefore, a post-ROD

field demonstration (see Sect. 2.14.4) will be performed in coordination with TDEC and EPA, to obtain additional groundwater data that will be reviewed and evaluated in order to support a final design.

- Final WAC for EMDF that includes administrative and analytical waste limitations to only accept waste for disposal that can be compliantly managed within the facility to ensure protection of human health and the environment. There are numerous ARARs within the EMDF WAC, including controls on the disposal of RCRA-regulated hazardous waste and TSCA-regulated waste. The remedy requires that wastes not meeting the EMDF WAC either be treated to meet the WAC or sent offsite for disposal. Additional operational-based constraints on the size, weight, dimensions, and similar physical characteristics, as well as radionuclide inventory, will be established and proceduralized to ensure waste can be safely received and disposed using available equipment and provide daily protection to workers, the public, and the environment. (Note: operations-based constraints are not relied upon to demonstrate CERCLA protectiveness.)
- The design, construction, and operation of EMDF at the CBCV Site 7c to satisfy design-based and performance-based requirements of DOE and ARARs. The design, construction, and operation of EMDF at the CBCV site to satisfy design-based and performance-based requirements of ARARs and to include climate resiliency measures.
- The construction of EMDF with up to 2.2 million cy of disposal capacity, with multiple waste cells to accept CERCLA waste. Final capacity will be determined during the facility design process. Construction of EMDF will be completed in phases as remediation progresses.
- Engineered features such as a clean-fill dike to meet stability and seismic requirements, a multi-layer base liner system with a double leachate collection/detection system to isolate waste from groundwater, and a multi-layer cover to reduce infiltration and isolate the waste from human and environmental receptors over the long term. The EMDF liner system and cover system will be consistent with RCRA and TSCA substantive requirements as defined by this ROD's ARARs.
- Inclusion of a low-hydraulic conductivity geologic buffer layer (either native or engineered) between the landfill liner and the seasonal high water table.
- Construction of groundwater and surface water drainage features to divert water around the facility, as needed, to ensure long-term protection of human health and the environment and to achieve ARARs.
- Construction of support facilities adjacent to the footprint of the landfill. Support facilities and infrastructure may include operations/support trailers; staging/laydown areas; borrow areas; stockpile areas; parking areas; wastewater storage tanks or basins; truck loading stations; electrical, water, and communication utilities; truck weigh scale; guard stations; wastewater and stormwater management systems; storage/staging areas; material stockpile areas; and spoil areas.
- Construction and operation of a LWTS consistent with ARARs to minimize the release of contaminants into adjacent and downstream surface water bodies for uptake by potential receptors. The specific remediation goals for landfill wastewater are presented in Sect. 2.12.2.4.
- Use of fill material during operation of EMDF, including, but not limited to, crushed concrete, block and brick masonry, waste soil, clean soil, and other soil-like material consistent with ARARs.
- Engineered perimeter structures, such as mechanically stabilized earth walls or similar structures, if needed. These structures may be necessary and will be allowed to meet the required separation between waste and groundwater specified by the RAO.
- Closure of EMDF, consistent with ARARs, after operations are complete.
- Performance monitoring during the operation and post-closure periods of EMDF, consistent with ARARs and to inform the need for any necessary corrective actions, if necessary.

- Long-term maintenance, surveillance, and monitoring of EMDF, consistent with ARARs, to ensure the integrity of the engineered facility for as long as the waste remains a threat to human health or the environment.
- Institutional controls at EMDF implemented and monitored to prevent access to the waste in the future for as long as the waste remains a threat to human health or the environment, consistent with ARARs.
- Change of the initial land use designations (from the BCV Phase I ROD) used to set remediation goals in BCV Zones 1 and 2. Zone 1 is modified to restricted recreational, and Zone 2 is modified to DOE-controlled industrial land use for purposes of setting remediation goals for near-term and long-term considerations, as introduced in Sect. 1.2 and further discussed in Sect. 2.6. Note: The land use changes do not affect the surface water use classification.

2.12.2.1 Conceptual design of EMDF and infrastructure

EMDF is anticipated to be designed to have a capacity of up to 2.2 million cy; however, the capacity could vary as site conditions dictate. The landfill will not be constructed over NT-10 or NT-11, but the berm may be placed over D-10W. The landfill will be sited to provide a minimum 300-ft buffer zone between the waste and the Maynardville Limestone geologic unit. Figure 2.6 provides a conceptual site layout of EMDF.

As needed around the periphery of the lined footprint (i.e., beneath and/or outside the berms), a network of water intercepts will direct shallow groundwater and surface water away from the footprint and into the natural drainages. A geologic buffer beneath the multi-layer liner system will be designed to provide vertical separation between the bottom of the liner system and the seasonal high water table.

The multi-layer liner system will be constructed to prevent leachate from migrating from the disposal unit and impacting the environment. The composite liner system will consist of geosynthetics layered with natural materials to isolate waste as well as to collect leachate and detect leakage. Leachate will flow from the leachate and leak detection collection and removal systems piping within the disposal cells to manholes for transfer into the landfill wastewater management system.

Contact water (stormwater resulting from precipitation that falls into an active cell and comes in direct contact with landfill waste and does not infiltrate to the leachate collection system) will be removed through a series of catchment basins, pumps, manholes, and pump stations, as needed, to transfer contact water to the landfill wastewater storage system prior to treatment.

The landfill wastewater storage, collection systems, and associated mechanical equipment for landfill wastewater management; conveyance systems for transferring wastewater; and the LWTS will be constructed to manage both the leachate and contact water generated at the landfill. Secondary containment is an important design consideration, and the wastewater collection tanks will have secondary containment.

The landfill siting and design reduce concerns from climate change and provide resiliency to potential increase in rainfall and flood events through the following measures:

- Located outside the 100-year floodplain and on Pine Ridge, away from and at a greater elevation than Bear Creek. Waste elevation is approximately 60 ft higher than Bear Creek elevation in this area.
- Landfill does not cross one of the northern tributaries. Tributary immediately west of the landfill will be armored and widened to improve run-off. Tributary immediately east of the landfill will be diverted into an adjacent tributary. Culverts beneath the existing Haul Road will be oversized to improve drainage from the area and eliminate ponding.
- Upgradient diversion ditch is considerably oversized – greater than 100-year storm event.

Additional considerations will be part of the post-ROD RDR for the final design that will be submitted for FFA party review and approval.

2.12.2.2 Construction activities

The EMDF construction will be conducted in phases over the cleanup time frame. Cost estimates assume this phased construction approach. The landfill will have multiple cells and it is anticipated that each phase will construct one or more cells. A phased approach accommodates the uncertainty in waste volume estimates.

The construction of EMDF and infrastructure systems will comply with the ARARs included in Appendix A.

Early Site Preparation. The site preparation scope that precedes Phase 1 construction is assumed to include clearing interferences to site development, such as realigning Bear Creek Road and Haul Road to the south and extending utilities to the general area. The existing haul road will remain in place and be used to transport waste to the EMWMF until the Phase 1 construction begins. Materials from excavation of the site will be used wherever possible, and if needed, borrow material for EMDF construction will be obtained from the knoll just east of the facility and other locations at ORR, which will be developed during this early phase.

As the overall design of the landfill progresses, the scope of activities in the site preparation phase may be modified. As indicated, the landfill capacity will be constructed in three phases, with the first construction phase to occur following closely after completion and FFA approval of the final design. Construction of future Phases 2 and 3 will be determined based on capacity needs as the ORR cleanup program progresses.

Phase 1 Construction. The site will be graded to the top of the geologic buffer and the perimeter berm will be constructed to support the first cell(s). If in situ materials are not suitable for use as a geologic buffer, then the area will be excavated and conditioned materials will be placed on the floor and inside berm slopes beneath the footprint of the first cell(s). The liner then will be installed. If multiple cells are being constructed, intercell berms will be installed. The perimeter road will be constructed along the top of the berm and into the floor of EMDF. Dump ramps also will be installed into individual cells. During Phase 1 construction, needed surface water and groundwater diversion systems will be constructed to direct water away from the entire site footprint.

Ditches will be installed for the management of stormwater. Diversion ditches and interceptor trenches can work together to intercept surface water and shallow stormflow from the steeply sloped section of Pine Ridge above EMDF. Along the east side of EMDF, D-10W will be diverted to NT-10, as needed.

Phase 1 construction will include the LWTS; landfill wastewater storage; collection systems and associated mechanical equipment for landfill wastewater management at EMDF; installation of office space; distribution of utilities; construction of site access road, security fencing, lighting; and the site infrastructure.

Phase 2 Construction. Phase 2 will include construction of the geologic buffer and liner system for the second set of cell(s). Any additions to the perimeter road and berm will be built. The landfill wastewater transfer systems for the new cells will be completed. The security fence and lights will be expanded to cover the additional operating space and site access roads will be modified to accommodate the revised layout.

Phase 3 Construction. Phase 3 will include construction of the liner system for the final cell(s), as well as any remaining landfill wastewater transfer systems, roads, and berms. Security fencing, lights, and site access roads will assume final configuration for the last phase of operations.

Between each phase of construction, there will be an opportunity to enhance the design for the subsequent phase or to initiate design for facility closure if waste generation forecast so indicates.

2.12.2.3 Waste characteristics, remedy performance, and waste acceptance criteria

Performance of the remedy depends on site characteristics, facility design, and waste characteristics, as well as post-closure monitoring, maintenance, and institutional controls. Site characteristics relevant to site selection and performance of the EMDF disposal system are described in Sect. 2.5. Disposal facility design characteristics, material types and the protective functions of engineered barriers and water management systems are described in the introduction of Sect. 2.12.2 and in Sect. 2.12.2.1. Operational practices, final cover design, post-closure monitoring and maintenance, and land use controls that support facility performance are described in Sects. 2.12.2.5 through 2.12.2.8.

The remainder of this section summarizes waste characteristics, the results of EMDF performance modeling (post-closure risk analysis based on estimated radionuclide inventory), and the development of WAC to ensure robust, long-term protection of human health and the environment. The WAC are an important element of the total EMDF disposal system that provide added long-term protection (defense in depth) in combination with site characteristics, facility design, operations, and post-closure care for the remedy. The supplemental analysis evaluates long-term protectiveness after other protections fail (such as the aforementioned site characteristics, facility design) and will be used to inform the design and the WAC.

Waste Characteristics. Characteristics of CERCLA waste streams proposed for disposal at EMDF were described in the RI/FS (DOE 2017a) and summarized in the Proposed Plan (DOE 2018a). A detailed estimate of the EMDF radionuclide inventory at closure was developed to support an EMDF Performance Assessment (PA) (*Performance Assessment for the Environmental Management Disposal Facility Oak Ridge, Tennessee*; UCOR 2020) required under DOE Orders. (The DOE Order-required PA, Composite Analysis [CA], and preliminary Disposal Authorization Statement can be found in the Administrative Record.) The total amounts (inventory) and concentrations of radioactivity in LLW and mixed LLW accepted for disposal are the primary considerations for analysis of potential carcinogenic risk to human health posed by the remedy. Risk posed by non-radiological contaminants (e.g., mercury, PCBs) is managed by meeting ARARs for hazardous/toxic contaminants, through FFA party agreements discussed later in this section, and/or any inventory limits that may be established in the WAC Compliance Plan. DOE has completed the PA/CA process to demonstrate protectiveness with methodologies described within DOE Orders; a supplemental analysis will be performed to demonstrate protectiveness using CERCLA methodology.

For the DOE-approved EMDF PA, fate and transport modeling applied to a conservatively estimated radionuclide inventory[7] was used to predict potential exposures (radiological dose) to future hypothetical receptors resulting from release or inadvertent intrusion, based on dominant contaminant transport and exposure pathways to the receptor. The process used to determine which radioisotopes to consider in the EMDF performance modeling began with identification and quantification of radioisotopes expected to be present in waste resulting from Y-12 and ORNL cleanup. This list of radionuclides was based on substantial historical and forecast information available for future ORR CERCLA cleanup projects. An initial list of potential radionuclides was based on a combination of radionuclide concentration data sources that included

[7] The estimated (projected at closure) inventory provided in the PA estimates the top five radionuclide activity inventories are uranium-234 and -238, nickel-63, cesium-137, and strontium-90 (UCOR 2020).

(1) EMWMF waste characterization data for previously generated and disposed (historical) Y-12 and ORNL waste lots; (2) data from detailed facility and environmental characterization studies; and (3) data from the targeted decontamination and decommissioning (D&D) facilities, which included radionuclide quantities derived from various types of facility safety analyses and other sources. A screening process (described below) resulted in a final estimated inventory at closure for 53 radionuclides (Table 2.5). The estimated average concentrations were biased toward high values to manage uncertainty, and the overall projected waste volumes included a 25 percent contingency to further account for uncertainty and incorporate conservatism in the projected inventory.

Table 2.5. EMDF estimated radionuclide inventory (at closure)

Radionuclide	Estimated inventory (Ci)	Facility average concentration (pCi/g)	Screening result
Ac-227	9.33E-03	2.92E-03	IHI, RGW
Am-241	1.89E+02	5.90E+01	IHI, RGW
Am-243	9.49E+00	2.97E+00	IHI, RGW
Ba-133	9.65E+00	3.02E+00	IHI
Be-10	8.09E-05	2.53E-05	IHI, RGW
C-14	1.73E+00	5.40E-01	IHI, RGW
Ca-41	1.35E-01	4.21E-02	IHI, RGW
Cf-249	6.55E-06	2.05E-06	IHI
Cf-250	4.44E-05	1.39E-05	IHI
Cf-251	1.27E-06	3.96E-07	IHI
Cm-243	1.37E+00	4.30E-01	IHI, RGW
Cm-244	4.03E+02	1.26E+02	IHI, RGW
Cm-245	1.22E-01	3.83E-02	IHI, RGW
Cm-246	5.08E-01	1.59E-01	IHI, RGW
Cm-247	3.32E-02	1.04E-02	IHI, RGW
Cm-248	1.79E-03	5.59E-04	IHI, RGW
Co-60	1.20E-01	3.76E-02	IHI
Cs-137	7.10E+03	2.22E+03	IHI
Eu-152	1.73E+02	5.40E+01	IHI
Eu-154	3.90E+01	1.22E+01	IHI
H-3	1.48E+01	4.64E+00	IHI, RGW
I-129	1.12E+00	3.50E-01	IHI, RGW
K-40	1.05E+01	3.28E+00	IHI, RGW
Mo-93	1.24E+00	3.88E-01	IHI, RGW
Nb-93m	7.45E-01	2.33E-01	IHI, RGW
Nb-94	5.21E-02	1.63E-02	IHI, RGW
Ni-59	9.72E+00	3.04E+00	IHI, RGW
Ni-63	4.06E+03	1.27E+03	IHI
Np-237	1.04E+00	3.25E-01	IHI, RGW
Pa-231	7.64E-01	2.39E-01	IHI, RGW
Pb-210	1.18E+01	3.68E+00	IHI, RGW
Pm-146	5.31E-04	1.66E-04	IHI
Pu-238	3.00E+02	9.38E+01	IHI, RGW
Pu-239	1.86E+02	5.83E+01	IHI, RGW
Pu-240	1.98E+02	6.20E+01	IHI, RGW
Pu-241	6.52E+02	2.04E+02	IHI, RGW
Pu-242	5.53E-01	1.73E-01	IHI, RGW
Pu-244	1.18E-02	3.68E-03	IHI, RGW
Ra-226	2.56E+00	8.01E-01	IHI, RGW

Table 2.5. EMDF estimated radionuclide inventory (at closure) (cont.)

Radionuclide	Estimated inventory (Ci)	Facility average concentration (pCi/g)	Screening result
Ra-228	7.06E-02	2.21E-02	IHI, RGW
Re-187	1.03E-05	3.21E-06	IHI
Sr-90	6.14E+02	1.92E+02	IHI, RGW
Tc-99	4.99E+00	1.56E+00	IHI, RGW
Th-228	6.74E-06	2.11E-06	IHI, RGW
Th-229	1.82E+01	5.71E+00	IHI, RGW
Th-230	6.14E+00	1.92E+00	IHI, RGW
Th-232	1.13E+01	3.52E+00	IHI, RGW
U-232	3.26E+01	1.02E+01	IHI, RGW
U-233	1.33E+02	4.16E+01	IHI, RGW
U-234	2.01E+03	6.30E+02	IHI, RGW
U-235	1.27E+02	3.97E+01	IHI, RGW
U-236	2.87E+01	8.98E+00	IHI, RGW
U-238	1.22E+03	3.81E+02	IHI, RGW

IHI = Inadvertent Human Intrusion Scenario (screening basis – half-life > 5 years)
RGW = Release to Groundwater Scenario (screening basis – drinking water dose < 0.4 mrem/year

Following identification of potential radionuclides, a screening process was implemented to focus on radioisotopes of concern. The first screening step was to exclude isotopes with half-lives less than 1 year; this resulted in a list of 70 potential radioisotopes of concern. In modeling radionuclide exposure scenarios, inconsequential risk contributors were screened by the following processes (a detailed description of the process can be found in the EMDF PA, and will be summarized in the WAC Compliance Plan[8]):

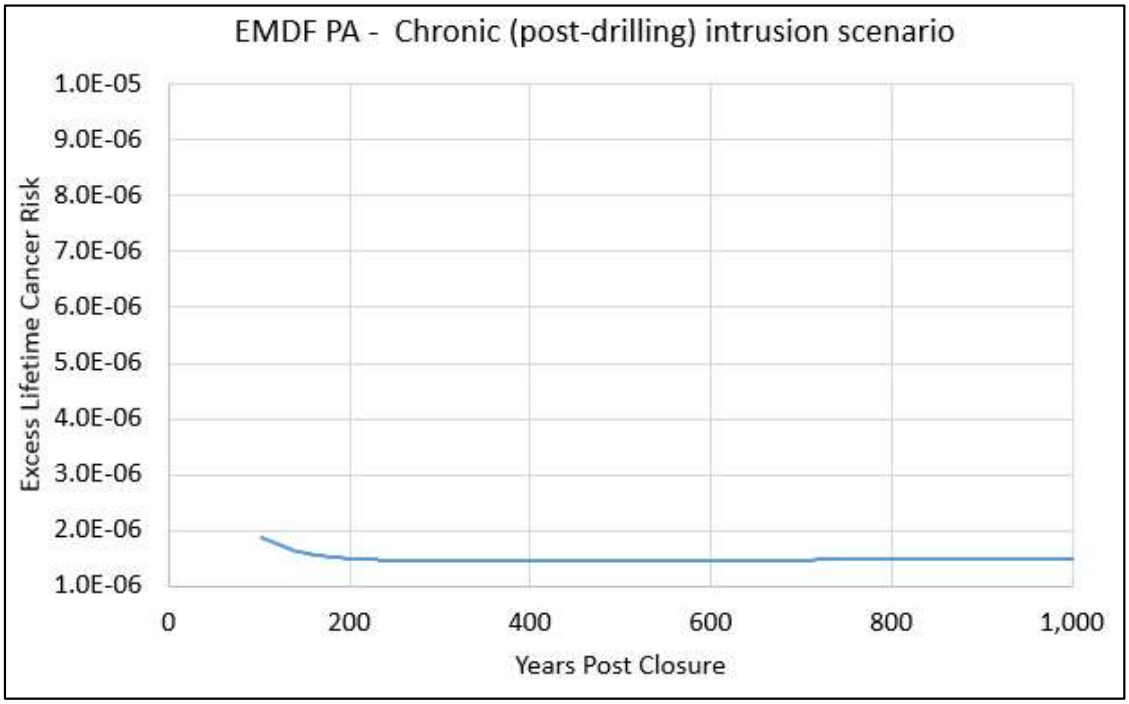
(1) A phase 1 screening of radionuclides eliminated seven radionuclides with half-lives less than 5 years (one daughter product with a half-life of less than 5 years [thorium-228] was retained). Two other radionuclides (krypton-85 and molybdenum-100) were eliminated as unlikely to be present in EMDF solid LLW materials. A set of 62 radionuclides for subsequent analysis was retained. Due to data quality limitations, suitable estimates of activity inventories for nine radionuclides (chlorine-36, cadmium-113m, cesium-135, palladium-107, selenium-79, samarium-151, tin-126, tin-121m, and zirconium-93) were not possible; therefore, only 53 of these 62 radionuclides (Table 2.5) were carried forward for the Inadvertent Human Intrusion (IHI) exposure scenario in the PA.

(2) A phase 2 screening of the 62 radionuclides was based on a conservative release to groundwater model (screening model) that demonstrated minimal impacts (< 10 percent of the allowable 4 mrem/year drinking water dose) to human health for 14 additional radionuclides having a combined water ingestion dose of less than 0.4 mrem/year. Six other radionuclides (chlorine-36, cesium-135, palladium-107, selenium-79, tin-126, and zirconium-93) were removed because of lack of suitable data to estimate the inventory (i.e., six of the nine data-limited radionuclides cited above). This water pathway screening left 42 radionuclides for consideration in the Release to Groundwater (RGW) exposure scenario in the PA; these 42 radionuclides are identified in Table 2.5 as RGW under the Screening results column.

Remedy Performance. Long-term post-closure performance of the EMDF remedy is demonstrated with the results of the PA analyses expressed in terms of ELCR. The limiting (highest dose or risk) hypothetical

[8] The WAC Compliance Plan is a primary document (approved by EPA and TDEC) that will provide details regarding the development of WAC and acceptance of waste at the EMDF through the application of these WAC limits, ARARs, and this ROD, along with more extensive information regarding generating, accepting, and tracking the waste.

IHI scenario assumes a temporary loss of institutional control that allows drilling of a water well through the cover and waste and accidental incorporation of waste into garden soil used to grow food. The primary exposure pathways include food ingestion and external exposure to contaminated soil, but not consumption of well water (UCOR 2020, Sect. 6.6). Risk due to consumption of contaminated groundwater is analyzed under the RGW scenario. (The other hypothetical intrusion scenarios included in the PA do not incorporate residency on the EMDF cover, but do assess direct exposure to waste during drilling and shielded exposure during excavation on the cover.) Risk results for the limiting IHI exposure scenario fall within the CERCLA risk range (Fig. 2.7) and demonstrate the EMDF will be protective of inadvertent human intruders during the post-closure period.

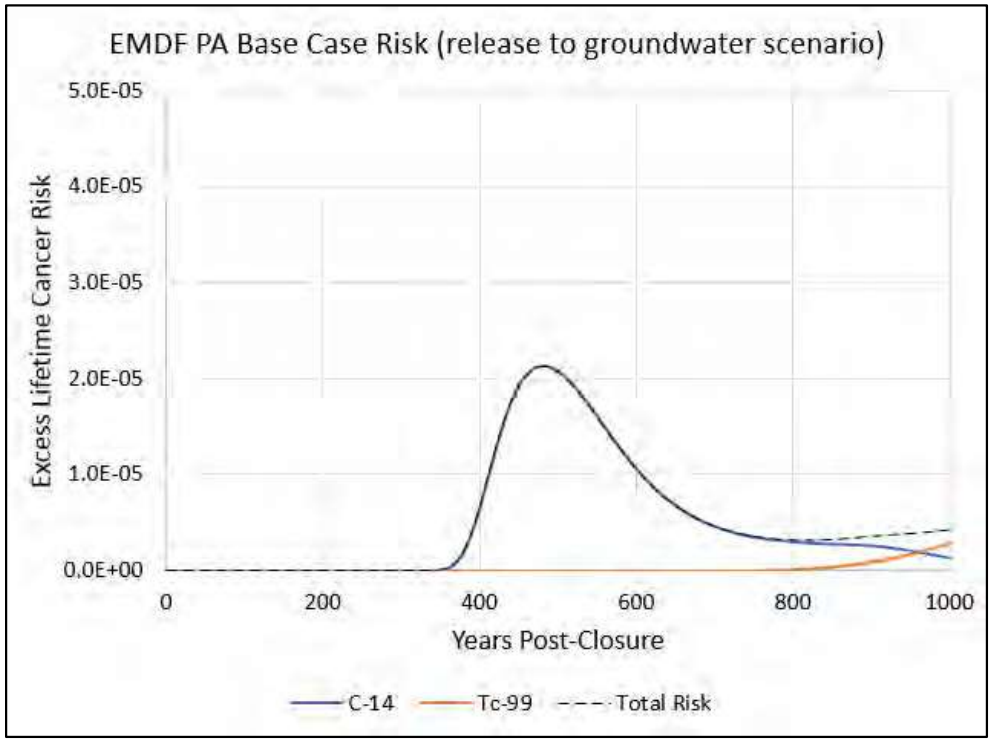


Based on: UCOR 2020

Fig. 2.7. Risk results for the Inadvertent Human Intrusion exposure scenario, based on EMDF performance modeling

The RGW scenario analyzed in the EMDF PA assumes that a resident farmer occupies the site and drinks contaminated groundwater from a well located 100 m from the edge of waste. Other exposure pathways include ingestion of contaminated food grown using Bear Creek surface water for irrigation and livestock and ingestion of fish, but well water ingestion is the primary contributor to excess cancer risk. Release and transport modeling indicate that only carbon-14, technetium-99, and iodine-129 contribute significantly to calculated dose (or excess cancer risk) through 10,000 years post-closure. Within the DOE compliance period of 1000 years post-closure, the PA RGW analysis demonstrated that based on the estimated EMDF radionuclide inventory, site characteristics, and assumptions regarding the long-term performance of engineered barriers, peak dose (which includes any dose contributions from progeny) to maximally exposed individuals is approximately 1 mrem/year, which is below the regulatory dose limits. Cancer risk results for the RGW exposure scenario modeling, based on the same estimated inventory and EMDF performance assumptions applied in the PA, fall within the CERCLA risk range (Fig. 2.8) and demonstrate that the EMDF will be protective of hypothetical, maximally exposed members of the public during the 1000-year post-closure compliance period. As described later in this section, the FFA parties agreed to evaluate a supplemental release scenario with additional assumptions regarding future landfill performance and exposure pathways. Results of the supplemental analysis will inform development of the WAC Compliance

Plan and landfill design. In addition, the supplemental analysis will be performed to demonstrate protectiveness using CERCLA methodology.



Based on: UCOR 2020

Fig. 2.8. Risk results for the Release To Groundwater (resident farmer) exposure scenario, based on EMDF performance modeling

Waste Acceptance Criteria. Waste that is accepted for placement in EMDF is limited by WAC, which are divided into two categories: administrative and analytic. These criteria are derived from various constraints placed upon EMDF, such as specific risk limits or ARARs and design elements in regulatory-based laws and guidance, as well as constraints on waste acceptance that are established through discussion among the FFA parties and are documented in this ROD. The WAC will be implemented through a post-ROD, FFA primary document, the WAC Compliance Plan. The WAC are established to provide a complementary protective element of the EMDF disposal system that augments the other natural and engineered EMDF safety features to protect the public and environment over the long term after EMDF closure.

WAC categories include the following:

- **Administrative WAC** are requirements or standards of federal laws and promulgated state laws that are deemed applicable or relevant and appropriate to the hazardous substances, pollutants, or contaminants being addressed by a cleanup action being taken under CERCLA. They also include WAC agreements among the FFA parties, specifically those addressing prohibited wastes. Approval of this ROD documents these agreements.
- **Analytic WAC** include concentration limits presented in this ROD and are derived from the work presented in the PA performed under DOE Directives (DOE 2001, 2011, 2013). In addition, the FFA parties agreed to evaluate a supplemental scenario based on alternate assumptions regarding future landfill performance and exposure pathways. This supplemental analysis and results will inform

development of the WAC Compliance Plan by performing additional sensitivity/uncertainty analysis, possible revision to and/or addition of total inventory (mass) limits, and informing the landfill design.

These two elements of the WAC (along with additional procedures for implementing those WAC that will be detailed in the WAC Compliance Plan) must be met before waste may be placed in the EMDF for disposal. Each waste lot[9] will be certified by the generator as complying with all WAC before approval is provided to begin shipments. For example, if treatment is required for disposal (e.g., in the case of waste treated to meet LDRs), the generator is responsible for that treatment of the waste and for obtaining any necessary approvals through Waste Handling Plans or other CERCLA documents. The generator would provide evidence of that treatment and that it meets the applicable requirement(s). The WAC Attainment Team verifies that waste profiles developed by the generator adequately demonstrate that the EMDF WAC are satisfied. Waste not meeting the WAC cannot be disposed in EMDF without a variance approved by DOE, EPA, and TDEC. If no variance is requested or if a variance is denied, such waste will be disposed offsite. Details of these processes will be included in the WAC Compliance Plan, and more information is given below.

In addition to administrative and analytic WAC requirements, operation-based constraints on the size, weight, dimensions, and similar physical characteristics of CERCLA waste, as well as Safety Basis radioactivity constraints developed specifically for the EMDF and in compliance with Safety Basis guidance, will be established and formalized in EMDF plans and procedures to ensure waste can be safely received and disposed at EMDF. These operational constraints and limits are established to protect the workers during transportation, handling, and placement of waste into EMDF (i.e., during operations). These constraints are compliant with DOE Directives for the safe handling of LLW and operations of a LLW disposal facility. These operational-based constraints will be contained and maintained in operating plans and procedures and do not change the administrative or analytic WAC. (Note: operations-based constraints are not relied upon to demonstrate CERCLA protectiveness.)

Administrative WAC

Administrative WAC are mandatory requirements derived from ARARs (included in Appendix A) that satisfy design-based and other substantive, performance-based requirements or agreements among the FFA parties. Several of the administrative WAC are derived from RCRA and TSCA regulations. For example, hazardous waste must be treated to meet LDRs (ARARs) to be disposed in EMDF; those ARARs (see Table 2.6 and Appendix A, Table A.3) include citations to the various LDR numerical standards that are required to be met. Because of the decision to build EMDF under the CERCLA regulatory process, only the substantive portions of these ARARs apply (e.g., numerical standards); therefore, EMDF is not a permitted landfill under any of these regulations and is authorized to accept only wastes generated as a result of CERCLA actions on the ORR. The Administrative WAC are summarized in Table 2.6. Note that agreements by the FFA parties that form the basis for some of the administrative WAC are documented by approval of this ROD. In particular, agreements that address the mercury management approach for the EMDF are further detailed at the end of this section. Administrative WAC that limit or prohibit hazardous/toxic contaminants, namely those which are taken directly from RCRA and TSCA requirements but also, for example, the prohibition on mercury hazardous (D009) waste, are the basis to ensure the remedy meets the RAO to prevent exposure of people to CERCLA waste (or contaminants released from the waste into the environment) through meeting chemical-, location, and action-specific ARARs, and by preventing exposure that exceeds a human health risk of 10^{-4} to 10^{-6} ELCR or HI of 1. Additional evidence

[9] A "waste lot" will be the primary unit of waste used to determine WAC compliance for disposal in the EMDF. A waste lot will be developed based on characterization and the associated mass/volume of the waste. Criteria to be used in defining one or more waste lots during planning activities could include material type, similarity of contaminants, or any other logical grouping that enhances the ability of the cleanup project to characterize and manage its wastes. Waste lot compliance will be evaluated and managed by examining the overall impact to the waste cell inventory (through a sum-of-fraction calculation) to ensure protectiveness.

demonstrating an HI of 1 will be met by this remedy, based on expected similarities with EMWMF waste, was provided in Sect. 2.7.

Table 2.6. EMDF administrative WAC

Waste prohibited or limited by definition or decision	Basis of prohibition/limitation
Waste must be generated as part of a CERCLA action on the Oak Ridge NPL Site. Waste generated at other sites within the State of Tennessee where contamination can be related to Oak Ridge NPL Site releases would require FFA party consideration and agreement.	Triparty agreement[a]
Transuranic waste (defined in 40 *CFR* 191.02), high-level waste (defined in 10 *CFR* 60.2), spent nuclear fuel (defined in 10 *CFR* 72.3), 11e(2) byproduct waste (defined in 10 *CFR* 20.1003), and/or greater than NRC Class C waste (defined in 10 *CFR* 61.55) are prohibited. These waste types are excluded from the definition of low-level waste (defined in TDEC 0400-20-11-.03[21]).	Triparty agreement[a] and regulatory definitions
RCRA-listed hazardous wastes are prohibited.	Triparty agreement[a]
Infectious/pathogenic wastes and pyrophoric/detonatable/explosive wastes are prohibited, as are wastes that could generate quantities of toxic gases/vapors/fumes.	Triparty agreement[a] TDEC 0400-20-11-.17(7)(a)(4) TDEC 0400-20-11-.17(7)(a)(5) TDEC 0400-20-11-.17(7)(a)(6)
Containerized compactible waste shall either have voids filled with non-compressible material (e.g., soil, grout), or be capable of being crushed by available landfill operations equipment. Non-crushable containers (B-25 boxes, etc.) shall have remaining voids filled with non-compressible material. Cardboard or fiberboard boxes shall not be used as containers for waste disposal.	Triparty agreement[a] TDEC 0400-20-11-.17(7)(b)(1) TDEC 0400-20-11-.17(7)(b)(3) TDEC 0400-20-11-.17(7)(a)(1)
Free liquids are prohibited; RCRA and TSCA waste packages shall have no free liquids.	40 *CFR* 761.75(b)(8)(ii) TDEC 0400-12-01-.06(14)(o)(3) TDEC 0400-20-11-.17(7)(a)(3)
Bulk liquids exceeding 500 ppm PCBs are prohibited. Bulk liquids containing PCBs at or below 500 ppm must be treated such that they no longer contains free liquids. PCB containers with PCB liquids between 50 ppm and 500 ppm are allowed with additional sorbent material included. (see Appendix A for information)	40 *CFR* 761.75(b)(8)(ii)
Bulk or non-containerized liquid hazardous waste or hazardous waste containing free liquids (whether or not sorbents are added) are prohibited.	TDEC 0400-12-01-.06(14)(o)(l)
Unless very small, containers must be either at least 90% full when buried in the landfill or crushed, shredded, or similarly reduced in volume to the maximum practical extent before burial in the landfill.	TDEC 0400-12-01-.06(14)(p)
Waste must not contain or be capable of generating quantities of toxic fumes or gases harmful to persons transporting, handling, or disposing the waste.	TDEC 0400-12-01-.06(2)(h)(2)
RCRA hazardous waste that is not treated to meet LDR treatment requirements or alternative treatment standards for hazardous debris or soil is prohibited from disposal. Treated RCRA hazardous waste with TCLP regulatory levels less than LDR treatment requirements (e.g., selenium) that do not meet the lower of the 40 *CFR* 261.24 regulatory level or LDR treatment requirement is prohibited from disposal (This is not applicable to mercury characteristic waste (D009) as generated – see exception in this table). Note: LDR requirements have associated numerical or technology standards that must be met prior to land disposal; see ARARs in Table A.3 and appropriate citations given there.	TDEC 0400-12-01-.10(3)(a) TDEC 0400-12-01-.10(3)(f)(1) TDEC 0400-12-01-.10(3)(j)(2) Triparty agreement[a]
RCRA (D009) mercury characteristic hazardous waste, as determined by the method specified in 40 *CFR* 261.24, is prohibited from disposal.	Triparty agreement[a]

Table 2.6. EMDF administrative WAC (cont.)

Waste prohibited or limited by definition or decision	Basis of prohibition/limitation
Waste shall be limited to prevent nuclear criticality during all phases of waste cell operation, including active waste disposal operations and inactive, post-closure periods.	Analysis per DOE Order 420.1C (DOE 2015), latest revision of the order Triparty agreement[a]

[a]*Triparty agreement* refers to discussions held for the given prohibition/limitation and decisions/agreements reached among the three FFA parties regarding the specific WAC given here, which are documented by the approval of this ROD.

ARAR =applicable or relevant and appropriate requirement
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR = Code of Federal Regulations
DOE = U.S. Department of Energy
EMDF = Environmental Management Disposal Facility
FFA = Federal Facility Agreement
LDR = land disposal restrictions
NPL = National Priorities List
NRC = U.S. Nuclear Regulatory Commission
PCB = polychlorinated biphenyl
RCRA = Resource Conservation and Recovery Act of 1976
ROD = Record of Decision
TCLP = Toxicity Characteristic Leaching Procedure
TDEC = Tennessee Department of Environment and Conservation
TSCA = Toxic Substances Control Act of 1976
WAC = waste acceptance criteria

Analytic WAC

Analytic WAC are numerical limits for radiological contaminants present in waste proposed to be disposed that provide the basis for application of a sum-of-fractions constraint at closure to ensure compliance with ARARs (e.g., the critical organ dose criteria ARAR associated with the NRC-based performance objective for releases from LLW disposal facilities at TDEC 0400-20-11-.16(2) [10 *CFR* 61.41]). Analytic WAC proposed for EMDF are based on: (1) exposure due to a hypothetical IHI into the waste 100 to 1000 years post-closure (IHI scenario, UCOR 2020), and (2) the analysis of release of radionuclides beneath the EMDF that could expose a hypothetical future human receptor via contaminated groundwater 100 to 1000 years post-closure (RGW scenario, UCOR 2020). Consistent with DOE Orders, analytic WAC based on the two exposure scenarios analyzed in the PA provide waste lot concentration limits (IHI scenario) and landfill inventory limits (RGW scenario) that are protective within a 1000-year post-closure compliance period. DOE Order 435.1 specifies a 100-year post-closure institutional control period during which the probability of IHI is assumed to be zero, and the 1000-year regulatory compliance period. Table 2.7 provides radionuclide WAC limits based on the IHI and RGW scenario results in the PA during the 1000-year compliance period. As described later in this section, the FFA parties agreed to evaluate a supplemental release scenario with additional assumptions regarding future landfill performance and exposure pathways. Results of the supplemental analysis will inform development of the WAC Compliance Plan and landfill design. In addition, the supplemental analysis will be performed to demonstrate protectiveness using CERCLA methodology.

Some radionuclides included in Table 2.7 were not modeled in the PA (Table 2.5) but will be considered in the supplemental scenario analysis described later in this section. The FFA parties agreed the supplemental analysis will evaluate additional assumptions regarding future landfill performance and exposure pathways. Results of the supplemental analysis will inform development of the WAC Compliance Plan and landfill design, as described later in this section. Results of the analysis will be summarized in a table in the WAC Compliance Plan to show how WAC for each relevant radionuclide (Table 2.5) and chemicals are selected from candidate criteria, including ARARs, fish-based risk limits, water-based limits, etc. The chemicals will be described further in the WAC Compliance Plan but may include and not be limited to the following:

- Uranium as metal
- Mercury
- Lead
- Antimony
- Beryllium
- Chromium.

Table 2.7. Summary of EMDF radiological WAC

Radioisotope	EMDF Waste Concentration Limits [a,b,c] [applied to waste lots]			EMDF Landfill Inventory Limits [applied to facility as a whole]		
	Waste Lot Conc. Limit (pCi/g)	CODE	Basis	Landfill Inventory Limit (Ci) [d]	CODE	Basis
Ac-227	1.3E+06		Intruder analysis	[e]	T2	
Am-241	1.0E+05	A	Class C limit	[e]	T2	
Am-243	1.0E+05	A	Class C limit	[e]	T2	
Ba-133	5.5E+07		Intruder analysis			
Be-10	6.0E+06		Intruder analysis	[e]	T2	
C-14	3.1E+04		Intruder analysis	47.3	T1	TDEC 0400-20-11-.16(2) [10 *CFR* 61.41] ARAR
Ca-41	2.3E+06		Intruder analysis	[e]	T2	
Cd-113m	4.5E+06	X	Intruder analysis		T2	
Cf-249	7.9E+04		Intruder analysis			
Cf-250	1.0E+05	A	Class C limit			
Cf-251	1.0E+05	A	Class C limit			
Cl-36	6.6E+2	X	Intruder analysis		T2	
Cm-243	1.0E+05	A	Class C limit	[e]	T2	
Cm-244	1.0E+05	A	Class C limit	[e]	T2	
Cm-245	1.0E+05	A	Class C limit	[e]	T2	
Cm-246	1.0E+05	A	Class C limit	[e]	T2	
Cm-247	6.8E+04		Intruder analysis	[e]	T2	
Cm-248	1.6E+04		Intruder analysis	[e]	T2	
Co-60	4.7E+09		Intruder analysis			
Cs-137	2.3E+05		Intruder analysis			
Eu-152	3.6E+06		Intruder analysis			
Eu-154	6.3E+07		Intruder analysis			
H-3	5.7E+08		Intruder analysis	3.31E+13	T1	TDEC 0400-20-11-.16(2) [10 *CFR* 61.41] ARAR
I-129	6.1E+03		Intruder analysis	[e]	T2	
K-40	1.8E+04		Intruder analysis	[e]	T2	
Mo-93	5.5E+04		Intruder analysis	[e]	T2	
Nb-93m	1.6E+10		Intruder analysis	[e]	T2	
Nb-94	1.6E+04		Intruder analysis	[e]	T2	
Ni-59	7.6E+07		Intruder analysis	[e]	T2	
Ni-63	6.4E+07		Intruder analysis			
Np-237	1.0E+05		Intruder analysis	[e]	T2	
Pa-231	4.1E+04		Intruder analysis	[e]	T2	
Pb-210	2.1E+04		Intruder analysis	[e]	T2	
Pd-107	1.9E+08	X	Intruder analysis		T2	
Pm-146	9.6E+09		Intruder analysis			
Pu-238	1.0E+05	A	Class C limit	[e]	T2	
Pu-239	1.0E+05	A	Class C limit	[e]	T2	
Pu-240	1.0E+05	A	Class C limit	[e]	T2	
Pu-241	3.5E+06	A	Class C limit	[e]	T2	
Pu-242	1.0E+05	A	Class C limit	[e]	T2	

Table 2.7. Summary of EMDF radiological WAC (cont.)

Radioisotope	EMDF Waste Concentration Limits [a,b,c] [applied to waste lots]			EMDF Landfill Inventory Limits [applied to facility as a whole]		
	Waste Lot Conc. Limit (pCi/g)	CODE	Basis	Landfill Inventory Limit (Ci) [d]	CODE	Basis
Pu-244	6.3E+04		Intruder analysis	[e]	T2	
Ra-226	8.8E+02		Intruder analysis	[e]	T2	
Ra-228	7.2E+08		Intruder analysis	[e]	T2	
Re-187	No limit		Intruder analysis			
Se-79	6.4E+03	X	Intruder analysis		T2	
Sm-151	8.2E+08	X	Intruder analysis		T2	
Sn-121m	1.3E+07	X	Intruder analysis		T2	
Sn-126	1.2E+04	X	Intruder analysis		T2	
Sr-90	3.3E+05		Intruder analysis	[e]	T2	
Tc-99	4.8E+04		Intruder analysis	1070	T1	TDEC 0400-20-11-.16(2) [10 *CFR* 61.41] ARAR.
Th-228	No limit		Intruder analysis	[e]	T2	
Th-229	6.3E+04		Intruder analysis	[e]	T2	
Th-230	2.4E+03		Intruder analysis	[e]	T2	
Th-232	4.8E+03		Intruder analysis	[e]	T2	
U-232	1.2E+04		Intruder analysis	[e]	T2	
U-233	3.9E+04		Intruder analysis	[e]	T2	
U-234	3.9E+04		Intruder analysis	[e]	T2	
U-235	3.5E+04		Intruder analysis	[e]	T2	
U-236	4.5E+04		Intruder analysis	[e]	T2	
U-238	4.1E+04		Intruder analysis	[e]	T2	
Zr-93	1.6E+08	X	Intruder analysis		T2	

[a]EMDF intrusion-based activity concentration limits are adopted for radionuclides if those limits are lower than or equal to NRC Class C limits. The remaining radionuclides have waste lot concentration limits administratively set to NRC Class C limits.
[b]Limits based on 1000-year post-closure compliance period maximum annual intruder dose per DOE Order 435.1 chronic performance measure.
[c]Maximum volume over which Waste Lot Concentration limits will be applied will be the largest expected waste lot volume containing that COC.
[d]Total activity inventory limits for H-3, C-14 and Tc-99 calculated assuming a bulk density of 1.9 g/cm^3 (equivalent to a total landfill mass of 3.2E+12 g waste plus clean fill).
[e]Radionuclide passed phase 2 screening and was carried forward in the PA RGW analysis

CODES:
A = This is an administratively set limit, the basis for the limit is given.
T1 = Tier 1 radioisotopes are those that contribute to risk during the 1000-year post-closure period in the RGW scenario.
T2 = Tier 2 radioisotopes are those that have been identified in inventory or as progeny, but do not contribute measurably to risk based on the projected inventory and analysis to date. These radionuclides are planned to be further evaluated in the supplemental scenario analysis to be covered in the WAC Compliance Plan. No landfill inventory limits are given for Tier 2 radioisotopes in this ROD.
X = Less commonly reported fission products (Cd-113m, Pd-107, Se-79, Sm-151, Sn-121m, Sn-126, and Zr-93) as well as Cl-36, could not be verified against the original data sources as COCs; therefore, not included in the estimated EMDF inventory but retained as Tier 2 COCs.

ARAR = applicable or relevant and appropriate requirement
CFR = Code of Federal Regulations
COC = contaminant of concern
DOE = U.S. Department of Energy
EMDF = Environmental Management Disposal Facility
NRC = U.S. Nuclear Regulatory Commission
PA = Performance Assessment
RGW = Release to Groundwater scenario
ROD = Record of Decision
TDEC = Tennessee Department of Environment and Conservation
WAC = waste acceptance criteria

Waste Lot Concentration Limits

Results from the IHI scenario analysis provide waste lot concentration limits for the 53 radionuclides modeled in the PA and for eight additional radionuclides (Table 2.7, Note X). This analysis of a maximally exposed individual is similar to analyses performed by the NRC in developing LLW classification limits. The waste lot concentration limits are applicable to individual waste lots, but not to the landfill as a whole. The intrusion-based WAC protect human health in the case of future hypothetical inadvertent intrusion into the disposal facility by drilling a well through the EMDF cover system and into the waste and then tilling the excavated waste into a garden near the disposal facility. The primary exposure pathways include food ingestion and external exposure to contaminated soil, but not consumption of well water (UCOR 2020, Sect. 6.6).

Table 2.7 provides the EMDF inadvertent intrusion-based concentration limits (WAC) or the NRC Class C concentrations (10 *CFR* 61.55, *Waste Classification*) in the second column. For each radionuclide, the more restrictive of these two values is given in the table and thus represents either an administratively applied value (when the NRC Class C limit is more restrictive) or the analytical WAC limit if that concentration is more restrictive. Note these waste lot concentration limits alone do not dictate the total amount of a particular radionuclide allowed for disposal; the limits are not applied to the landfill as a whole and do not represent landfill inventory limits.

Landfill Inventory Limits

Results from the RGW scenario analysis in the PA are used to calculate landfill inventory limits based on the NRC performance objective ARAR. These inventory limits are the maximum radioactivity values allowed per the ARAR critical organ dose criteria for protection of the public; these dose criteria are considered protective under CERCLA by EPA.[10] The PA results show that out of 42 radionuclides modeled, only tritium, carbon-14, and technetium-99 have the potential to reach the 100-m well and contribute to risk within the 1000-year post-closure compliance period. Peak (within 1000 years) effective doses (organ-weighted whole body dose equivalents) associated with the estimated inventories for those three radionuclides are used to calculate inventory limits that correspond to the limiting (most restrictive) critical organ dose criterion (25 mrem/year to whole body, 75 mrem/year to thyroid, or 25 mrem/year to any other critical organ) given by the NRC-based performance objective for LLW disposal facilities (TDEC 0400-20-11-.16[2]). The resulting ARAR-based analytic landfill inventory limits for these three radionuclides are presented in column 5 of Table 2.7. Radionuclides reaching the 100-m well location within the 1000-year post-closure compliance period are coded "Tier 1" radionuclides in the table, indicating landfill inventory limits have been determined for those COCs based on the PA analysis.

As described later in this section, the FFA parties agreed to evaluate a supplemental release scenario with additional assumptions regarding future landfill performance and exposure pathways. Results of the supplemental analysis will inform development of the WAC Compliance Plan and landfill design. In addition, the supplemental analysis will be performed to demonstrate protectiveness using CERCLA methodology.

Supplemental Release Scenario

The dose assessments for the two EMDF PA scenarios have been used to develop analytic WAC, consistent with DOE requirements. Although the results of these dose assessments demonstrate protectiveness under the CERCLA risk range under the assumptions made for inputs to the RESRAD computer modeling

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[10] EPA Office of Solid Waste and Emergency Response, *Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination*, OSWER No. 9200.4-18, August 22, 1997.
Franklin Hill, EPA Region 4 Superfund Division Director, *Regional Response to NRRB* [National Remedy Review Board] *Comments and Recommendations Oak Ridge Reservation Superfund Site, Oak Ridge, Tennessee*, April 19, 2018.
EPA Administrator, *Dispute Resolution Decision on radiological discharge limits for the Oak Ridge Reservation*, December 31, 2020.

program and at the point of compliance allowed by the DOE 435.1 Order and guidance, the FFA parties have agreed to further assess potential human health risks through evaluation of a supplemental scenario in which the results could be used in the design and to inform decisions in the final WAC Compliance Plan.

DOE has completed the PA/CA process to demonstrate protectiveness with methodologies described within DOE Orders; a supplemental analysis will be performed to demonstrate protectiveness using CERCLA methodology. Beyond the dose assessments completed as part of the PA required under DOE Order 435.1 and reviewed by the Low-Level Waste Disposal Facility Federal Review Group (referred to as LFRG), the additional hypothetical release scenario is being evaluated to understand the impact of changes in long-term degradation of the EMDF engineered closure cap on potential cancer and non-cancer health risks to ensure that CERCLA requirements are addressed.

The supplemental analysis will calculate potential cancer and non-cancer health risks under a hypothetical "bathtubbing scenario." This scenario assumes that rainfall infiltrates faster into the landfill through a degraded landfill cover than the resulting leachate moves out through the base liner. These conditions are assumed to cause leachate to pond within the landfill. Just like water spills from a bathtub that does not drain fast enough, the leachate is assumed to spill over the top of the base liner system. Some of the leachate is assumed to percolate into the ground, impacting groundwater without passing through the landfill liner, and the rest is assumed to flow into a nearby stream. Pathways of drinking water, crop/livestock consumption, and fish consumption (including bioaccumulation in fish) will be included in the model. The modeling will also examine the impacts at a "point of compliance" at the location consistent with that used for RCRA landfills, which is at the waste management boundary.

The supplemental "bathtubbing" analysis will be detailed in the WAC Compliance Plan and will be used to inform WAC/inventory limits which could apply to both radionuclides and non-radionuclide chemicals (including uranium being evaluated for its metal toxicity) anticipated in the projected waste inventory. The results of this supplemental modeling will be expressed in terms of the CERCLA risk range (i.e., 1×10^{-4} to 1×10^{-6}) and HI (i.e., HI $\leq$ 1). Results of the analysis will be summarized in a table in the WAC Compliance Plan to show how WAC for each relevant radionuclide (Table 2.5) and chemical are selected from candidate criteria, including ARARs, fish-based risk limits, water-based limits, etc. The chemicals will be described further in the WAC Compliance Plan and may include (but are not limited to) the following:

- Uranium as metal
- Mercury
- Lead
- Antimony
- Beryllium
- Chromium.

As cleanup activities progress, additional contaminants may be identified in waste streams for which WAC limits have not been developed. Procedures to develop supplementary WAC for such contaminants will be prescribed as part of the final WAC implementation guidelines (i.e., WAC Compliance Plan).

Waste Acceptance to Ensure Remedy Performance

Application of the final set of landfill inventory limits for waste acceptance will include a sum-of-fractions analysis, which considers the presence of multiple radionuclides to limit the total quantities of contaminants disposed in the landfill as a whole and thereby ensures that the RAOs and ARARs are met. The basis for WAC use and implementation will be detailed in a post-ROD, FFA primary document, the WAC Compliance Plan (with a schedule milestone in Appendix E of the FFA). The sum-of-fractions for the landfill inventory as a whole at closure, based on the landfill inventory limits, will not exceed 1 (unitless). The WAC Compliance Plan will specify how these analyses are completed and how they are applied to incoming waste lots throughout operation. This plan will develop details regarding implementation of the

WAC; roles and responsibilities of the generator, versus the disposal facility personnel, and the WAC Attainment Team; and how the sum-of-fractions analyses are to be completed and applied. The WAC Compliance Plan will also address how inventory limits could be modified, if necessary, based on newly available information. If a waste is proposed for disposal containing a radionuclide that had not been previously included in the modeling/WAC, a method for managing that situation will be outlined in the plan.

Based on the PA results and the EMDF projected radionuclide inventories, the CERCLA threshold criteria and RAOs for protection of human health and the environment are achieved for the IHI (Fig. 2.7) and RGW (Fig. 2.8) scenarios. The performance evaluation based on the estimated radionuclide inventory will be extended to consider the supplemental scenario analysis. Initially, the projected inventory is used to demonstrate the CERCLA risk range (10^{-6} to 10^{-4}) is achieved. The actual inventory, as it is realized, will be tracked throughout operations relative to inventory limits through the sum-of-fractions analyses. Maintaining the sum-of-fractions at or below 1 for the entire facility will ensure the CERCLA risk range is met at closure.

The WAC are only one line of defense for the EMDF; engineered features using natural materials, CERCLA monitoring, and corrective actions (if needed) also all contribute to maintaining protectiveness of the facility. DOE will maintain the EMDF, including active and passive institutional controls (Sect. 2.12.2.8), and will use monitoring and the CERCLA 5-year review process to ensure that the disposal facility is protective during operations and in perpetuity post-closure.

Additional Operational-based Constraints

As described above, in addition to the WAC requirements, operational-based constraints on the size, weight, dimensions and other physical-based requirements as well as Safety Basis requirements will be established to ensure waste can be safely received and disposed using available equipment and to provide daily protection to workers.

These constraints are in addition to the administrative and analytic WAC and are consistent with DOE Directives for the safe handling of LLW and operations of a LLW disposal facility. These additional constraints will not change the analytic or administrative WAC and will be contained in EMDF-specific operating plans and procedures maintained by the EMDF project. These physical and Safety Basis constraints are established by the following:

- DOE requirements for contractors to evaluate the adequacy of design and engineering and administrative controls that ensure safe operations (Safety Basis Requirements). Similar to the EMWMF, the EMDF will be managed and operated as a "Radiological facility" in accordance with DOE Standard *Hazard Categorization of DOE Nuclear Facilities* (DOE-STD-1027-2018, November 2018). The Safety Basis constraints will incorporate requirements for operating a radiological facility as detailed in DOE Standard 1027.
- Operational requirements associated with the types of waste to be received and the mechanical methods employed to dispose of the waste (Physical Waste Requirements).

Unlike the administrative and analytic WAC, operations-based constraints are not subject to approval by EPA or TDEC. (Note: operations-based constraints are not relied upon to demonstrate CERCLA protectiveness.). These Physical Waste Requirements and Safety Basis Requirements, which require extensive DOE-Headquarters review and approval, will be developed in detail in future operating plans and procedures.

Mercury Management Approach. The FFA parties have developed the following mercury management approach to be implemented for Bear Creek that can adjust effluent limits for mercury. This approach is a path forward on mercury disposal at the EMDF and is intended to be the basis of language for the ROD. EPA and TDEC concurrence on the final ROD reflects final agreement on the approach.

1) DOE's goal, in coordination with FFA parties, is to restore Bear Creek prior to the need to discharge wastewater from EMDF. Specifically, the goal is to restore Bear Creek from its status in Tennessee's CWA 303(d) report to attainment of water quality standards for mercury to meet the recreational use designation.

2) DOE shall provide treatment of landfill wastewater, as necessary, to meet an effluent limit based on achieving treatment to a concentration below 51 ng/L for mercury (but expressed as a mass-based limit not affected by variations in the flow volume of discharge water) and such other conditions as required by CWA regulations at 40 *CFR* 122.45 (d) and (e), to be included as ARARs and based on the type of discharge—continuous or non-continuous. This limit is the more stringent of a water-quality-based effluent limit and a technology-based effluent limit based on Best Professional Judgment, which is not a promulgated limit. The limit shall be met at the point of discharge without allowance of mixing or dilution or consideration of any available assimilative capacity in the creek. Regardless of which of the following conditions apply at the time EMDF commences operation, the limit remains the mass-based limit based on 51 ng/L.

3) Because of several years between the EMDF ROD and the completion of construction and commencement of operation of EMDF, the water quality of Bear Creek may improve. In its current condition, however, the state antidegradation rule, TDEC 0400-40-03-.06(2)(a), requiring *no additional loading* of a bioaccumulative pollutant in water with *unavailable parameters,* is included in the EMDF ROD as an ARAR. If before the EMDF is operational, Bear Creek is meeting the water quality standard for methylmercury (based on sampling data in fish tissue) by being consistently below the methylmercury fish tissue residue criterion (as defined in EPA-823-R-01-001, January 2001, *Water Quality Criterion for the Protection of Human Health: Methylmercury*), then this state antidegradation rule sub-paragraph requiring no additional loading will no longer be considered an ARAR for mercury discharges. In this case, the discharge of landfill wastewater from EMDF will be subject to the requirement to not "cause or contribute" to an exceedance of water quality standards per 40 *CFR* 122.4(i) and 122.44(d)(1).

4) DOE shall make efforts to restore Bear Creek to attain full compliance with recreational use designation, including conducting a Remedial Site Evaluation (RSE) (40 *CFR* 300.420) to evaluate mercury methylation in Bear Creek and conduct pilot or treatability studies as needed. The RSE will be scheduled in Appendix E of the FFA prior to approval of the EMDF ROD. Unless the conclusion in the RSE accepted by all parties is for no further action, the RSE shall lead to other milestones for removal or remedial actions, including developing the substantive equivalent to developing load allocations and waste load allocations under 40 *CFR* 130.7(c)(2) and 130.2(g)(h) and (i). These efforts will be conducted as part of the BCV Phase I ROD. These efforts will result in one of two scenarios addressed in paragraphs 5 and 6 below.

5) Bear Creek meets water quality standards before EMDF operations: If the creek improves to meet its designated recreational use as measured in fish tissue concentrations below the methylmercury fish tissue residue criterion (as defined in EPA-823-R-01-001, January 2001, *Water Quality Criterion for the Protection of Human Health: Methylmercury*) and satisfies the requirements of 40 *CFR* 130.7(b)(6)(iv), then the wastewater discharge limit for mercury may remain at 51 ng/L, expressed as a mass-based number regardless of flow volume in the discharge. The fish tissue concentrations are documented in the annual RER reports. The discharge also still must not "cause or contribute" to an exceedance of the water quality standards (consistent with 40 *CFR* 122.44(d)), considering available assimilative capacity for methylmercury. Fish tissue sampling will continue to be

performed to verify that *recreational* use attainment is maintained. To prevent the stream from becoming impaired for its designated recreational use again, any action(s) selected under paragraph 4 shall be fully implemented.

6) Bear Creek does not meet water quality standards before EMDF operations: If Bear Creek does not meet applicable water quality standards (the methylmercury fish tissue residue criterion as defined in EPA-823-R-01-001, January 2001, *Water Quality Criterion for the Protection of Human Health: Methylmercury*) at the time the landfill begins operations, the antidegradation rule will still apply, and DOE can only discharge subject to approval by EPA and TDEC of a schedule of actions showing the discharge is at a level that will not "cause or contribute" to further violation of the methylmercury standard. EPA and TDEC must review and approve DOE's demonstration based on the following criteria:

   a. As part of the BCV Phase 1 ROD, DOE will implement a schedule of actions selected and agreed to by the FFA parties under paragraph 4 above to reduce sources of methylmercury to satisfy substantive elements of 40 *CFR* 122.4(i) and bring the creek into compliance with applicable water quality standards. DOE will also re-evaluate the effectiveness of the actions and the rate of progress to consider additions and/or revisions, and any additional actions in or revisions to the schedule, once approved by all FFA parties, shall be placed as milestones in Appendix E; and

   b. All discharged wastewater from EMDF will be treated to meet an effluent limit of 51 ng/L. The limit can remain at 51 ng/L, expressed as a mass-based limit, or be adjusted down at DOE's discretion, allowing DOE the flexibility to attain the standard through the other actions in the BCV watershed to reduce methylmercury based on the earlier study and the re-evaluation required in this paragraph.

   c. The plan providing for reducing mercury loading and restoring the creek may be a phased approach using an enforceable CERCLA-compliance schedule. The approach may recognize non-point source reductions to offset the point source discharge at EMDF, following treatment or other measures, to permanently reduce loading and reduce the rate of mercury methylation on such an enforceable schedule.

7) Include 40 *CFR* 122.4(i) and the Tennessee antidegradation rule, 0400-40-03-.06(2)(a), as an ARAR in the EMDF ROD.

8) Revise the Mercury Management Approach portion of the EMDF ROD Sect. 2.12.2.3, Waste Acceptance Criteria, as shown below (included in this D2 version of the ROD):

   a. To the extent practicable, all recoverable elemental mercury will not be disposed in any Oak Ridge landfill and will eventually be shipped offsite, subject to availability of a disposition pathway, as specified in project-specific documentation.

   b. RCRA (D009) mercury characteristic hazardous waste is prohibited from onsite disposal.

9) The use of other potential design and/or operational approaches in the landfill that might further reduce or eliminate mercury mobility in disposed wastes will be evaluated.

10) Documenting attainment of water quality standards and maintaining compliance: The current program of fish tissue sampling shall continue to support the determination that the RAO to meet all water quality standards in the EMDF ROD related to wastewater discharges is maintained after the creek is restored.

PCB Management Approach. PCBs are not expected to be in treated wastewater, but the EMDF remedy includes discharge of treated landfill wastewater and is subject to the requirements of the state antidegradation rule, 0400-40-03-.06(2)(a) for bioaccumulative pollutants allowing no additional loading from a new discharge, and the requirement that no discharge can "cause or contribute" to a violation of

water quality standards, 40 *CFR* 122.4(i), for all pollutants. This includes PCBs as well as mercury. As required by 40 *CFR* 300.435, the remedial design must conform to the ROD, and all ARARs must be met during remedy implementation.

As the lead agency, DOE is required to ensure ARARs are met (or waived consistent with terms of any waivers). PCB levels in Bear Creek from EMWMF are currently below reported detection limits. Since DOE anticipates significantly less PCB disposal at EMDF than EMWMF, DOE does not anticipate additional loading of PCBs. DOE will continue PCB monitoring efforts, utilizing sufficiently sensitive analytical test methods approved under 40 *CFR* 136 that are capable of detecting and measuring the pollutants at, or below, the applicable water quality criteria limits. In the event PCBs are detected in EMDF effluent, a compliance program and schedule will be implemented.

2.12.2.4 Basis for discharge limits

Non-Radiological Discharge Limits

Surface water bodies in Tennessee are assigned use classifications by the Tennessee Water Quality Control Board. Tennessee surface water use classifications are listed in TDEC 0400-40-04. Bear Creek is classified by the state for Recreation, Fish and Aquatic Life, Livestock Watering and Wildlife, and Irrigation uses. Each of the use classifications has water quality standards set under TDEC 0400-40-03. These criteria, both numeric and narrative, are ARARs for effluent discharges to Bear Creek. The most stringent of the applicable use criteria are applicable in accordance with TDEC 0400-40-03-.02(5). How and where the specific discharge limits will be applied will be specified in a post-ROD primary document for this action with approval by the FFA parties. The key COCs in the landfill wastewater and their respective chemical (non-radiological) ambient water quality criteria (AWQC) have been identified, as summarized in Table 2.8. Narrative water quality standards are included in Appendix A, ARAR Table A.1. In addition to these AWQC, 40 *CFR* 445.11 effluent limits are ARARs.

As described in TDEC 0400-40-03-.05(8), an approved method is "sufficiently sensitive" when:

a) The method minimum level (ML) is at or below the level of the applicable water quality criterion or the effluent limit established for the measured pollutant or pollutant parameter; or

b) The method ML is above the applicable water quality criterion or the effluent limit established, but the amount of the pollutant or pollutant parameter actually measured is high enough that the method detects and quantifies the level of the pollutant or pollutant parameter; or

c) Demonstration is made showing that the method used has the lowest ML of the approved methods for the measured pollutant or pollutant parameter in the sample/matrix being analyzed. (Documentation supporting this demonstration is to be submitted with reported data and shall include narrative justification for why the method chosen is believed to have the lowest ML of all approved methods identified in 40 *CFR* 136 [2018]. The Director shall determine whether the submitted information demonstrates sufficient method sensitivity.)

When there is no analytical method that has been approved under 40 *CFR* 136 (2018) or required under 40 *CFR* Chapter I, subchapter N or O (2018), and a specific method is not otherwise required by the Director, the applicant may use any suitable method but shall provide a description of the method. When selecting a suitable method, factors such as a method's precision, accuracy, or resolution must be considered when assessing the performance of the method.

Table 2.8. Numeric AWQC that are chemical-specific ARARs for key COCs in EMDF Landfill Wastewater

Chemical	Fish and Aquatic Life [TDEC 0400-40-03-.03(3)]		Recreation[a,b] [TDEC 0400-40-03-.03(4)]
	Criterion maximum concentration (CMC) (µg/L or ppb)	Criterion continuous concentration (CCC) (µg/L or ppb)	Organisms only (µg/L or ppb)
Aldrin (c)	3.0		0.00050
Arsenic (c)			10.0
Arsenic (III)	340[c]	150[c]	
b-BHC (c)			0.17
Cadmium	1.8[d]	0.72[d]	
Chromium (III)	570[d]	74[d]	
Chromium (VI)	16[c]	11[c]	
Copper	13[d]	9.0[d]	
Cyanide	22	5.2	140
4,4'-DDT (b)(c)	1.1	0.001	0.0022
4,4'-DDE (b)(c)			0.0022
4,4'-DDD (b)(c)			0.0031
Dieldrin (b)(c)	0.24	0.056	0.00054
Lead	65[d]	2.5[d]	
Mercury (b)	1.4[c]	0.77[c]	0.051
Nickel	470[d]	52[d]	4600

Source: https://publications.tnsosfiles.com/rules/0400/0400-40/0400-40.htm

(b) = bioaccumulative parameter
(c) = carcinogenic parameter

[a]A 10^{-5} risk level is used for setting TDEC recreational criteria for all carcinogenic pollutants.
[b]All chemical data reported under this rule shall be generated using "sufficiently sensitive" analytical methods approved under 40 *CFR* 136 (2018) or required under 40 *CFR* Chapter I, subchapter N or O (2018), pursuant to TDEC 0400-40-03-.05(8).
[c]Criteria are expressed as dissolved.
[d]Criteria are expressed as dissolved and are a function of total hardness (mg/L). Criteria displayed correspond to a total hardness of 100 mg/L.

ARAR = applicable or relevant and appropriate requirement
AWQC = ambient water quality criteria
CCC = criterion continuous concentration
CFR = Code of Federal Regulations
CMC = criterion maximum concentration
COC = contaminant of concern
EMDF = Environmental Management Disposal Facility
TDEC = Tennessee Department of Environment and Conservation

Radiological In-Stream Water Quality Concentrations

The Dispute Resolution Decision regarding assignment of radiological discharge limits for landfill wastewater releases to the environment was delivered by the EPA Administrator on December 31, 2020. That resolution requires consideration of "*…site-specific information to evaluate exposure to radionuclides for the purpose of developing the PRGs for water discharged from CERCLA landfills to waterways at ORR to ensure that risk does not exceed the 10^{-5} level.*" That resolution decision established that the Tennessee and the EPA National Pollutant Discharge Elimination System (NPDES) regulations that pertain to water-quality based effluent limitations and the Tennessee Water Quality Standards regulations establishing designated uses and criteria to protect those uses are relevant and appropriate requirements to the discharge of radionuclides in wastewater from EMDF.

In the summary section of the Dispute Resolution Decision, it was stated "*Consideration of site-specific factors will require site-specific information, including conducting a fish study to assess radionuclides in fish tissue and other media in Bear Creek, and evaluate fish consumption, exposure and risk assessment*

data, to help inform the development of PRGs for radionuclides at this site." The results of the fish tissue studies and development of the PRGs are included in the *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation*, *Oak Ridge, Tennessee* (DOE 2022). Summary information was also included a fact sheet provided as part of the additional public outreach activities (Sect. 2.10.9).

The FFA Parties have developed the following approach for PRGs/cleanup levels for the EMDF. Twenty-one radionuclides which bioaccumulate and have the potential to be present in landfill wastewater at some time during the operational life of the EMDF have been identified as radionuclides of interest. A recreational fisher in the recreational use scenario was identified as the appropriate exposure scenario. For the 21 radionuclides of interest, fish tissue and instream water column PRGs/cleanup levels have been developed to be protective of recreational use (human health), specifically fish ingestion.

PRGs/cleanup levels have been established for the 21 radionuclides of interest, inclusive of relevant progeny, using EPA's PRG Calculator tool, based on a target of 10^{-5} ELCR, as specified in Tennessee's water quality criteria for recreational use. Exposure factors used to develop the PRGs/cleanup levels include:

- 17.5 g/day Fish Consumption Rate and 365 days/year Exposure Frequency (per EPA-approved methodology for deriving human health criteria)
- 26 years Exposure Duration (per CERCLA guidance and consistent with site-specific factors)
- Default Bioconcentration Factors used in EPA's PRG Calculator tool.

The 21 radionuclides of interest and corresponding fish tissue and instream water PRGs/cleanup levels are shown in Table 2.9. These values are included in the *Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR 2022), which is summarized in the *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation*, *Oak Ridge, Tennessee* (DOE 2022); the PRGs were available for public comment (Sect. 2.10.9).

Table 2.9. Instream surface water and fish tissue PRG/cleanup levels for EMDF

Radionuclide	Instream surface water PRG/cleanup level (pCi/L)	Fish tissue PRG/cleanup level (pCi/g of fish)
Am-241	1.88E+00	4.51E-01
C-14	7.53E-02	3.01E+01
Cl-36	2.89E+02	1.36E+01
Co-60	3.55E+01	2.70E+00
Cs-137	6.45E-01	1.61E+00
Eu-154	3.27E+01	4.25E+00
H-3	4.65E+05	4.18E+02
I-129	1.02E+01	3.06E-01
Np-237	2.34E+01	6.56E-01
Pu-238	1.69E-02	3.55E-01
Pu-239/240	1.65E-02	3.46E-01
Ra-226	5.34E-01	1.52E-02
Ra-228	1.05E+01	4.22E-02
Sr-90	4.79E+01	6.32E-01

Table 2.9. Instream surface water and fish tissue PRG/cleanup levels for EMDF (cont.)

Radionuclide	Instream surface water PRG/cleanup level (pCi/L)	Fish tissue PRG/cleanup level (pCi/g of fish)
Tc-99	1.00E+03	1.51E+01
Th-228	2.19E+01	1.42E-01
Th-230	8.42E+01	5.05E-01
Th-232	7.53E+01	4.52E-01
U-233/234	3.17E+02	5.59E-01
U-235/236	4.55E+02	6.01E-01
U-238	2.10E+02	4.99E-01

EMDF = Environmental Management Disposal Facility
PRG = preliminary remediation goal

Results from 2021 field studies in Bear Creek were evaluated to help set in-stream PRGs/cleanup levels for the EMDF to ensure protectiveness for a hypothetical recreational fisherman. Although these field studies showed limited availability of harvestable fish, in-stream PRGs/cleanup levels were based on TDEC default fish harvesting and consumption rates (applicable to the most productive fisheries in Tennessee) and default EPA radioisotope biological concentration factors (bounding factors for all sizes and types of fish). Fish tissue measurements taken during these field studies also showed that ongoing discharges into Bear Creek, including discharges from the existing EMWMF disposal facility since 2002, are protective of fish and a recreational fisher even at the Tennessee 17.5 g/day default fish consumption rates. Levels of radioactivity observed in Bear Creek fish tissue samples were either non-detectable, or at levels that are similar to uncontaminated background locations.

EMDF design information is not yet available, including details such as discharge point, discharge rate, assimilative capacity of the receiving surface water body, etc. As a result, prior to operation, a post-ROD FFA primary document (such as the Remedial Action Work Plan [RAWP]) will establish details of wastewater and/or receiving water sampling, fish tissue sampling, and other specifics of the monitoring and compliance program. This post-ROD, FFA primary document will also include development of effluent limits, which will be developed per the CWA methodology, analogous to how effluent limits are developed from the AWQC for non-radiological COCs. As needed, compliance criteria that correspond with the PRGs/cleanup levels may be documented in an Explanation of Significant Differences (ESD) for this ROD.

Outside of CERCLA, such details of discharge and related NPDES requirements are contained in the NPDES permit. CERCLA onsite remedial response actions must comply only with the substantive requirements of a regulation and not the administrative requirements to obtain federal, state, or local permits (CERCLA Section 121[e]). Under CERCLA, substantive requirements are identified in the ROD (with associated ARARs) and the details normally included in a permit are included in the CERCLA ROD and/or post-ROD document.

The selected remedy for the EMDF's landfill wastewater, defined as leachate and contaminated stormwater (i.e., contact water), for both radionuclides and non-radionuclides, is primary treatment of all wastewaters, with secondary treatment when required to meet cleanup goals. The primary wastewater treatment will be a flocculation and chemical precipitation process. Secondary wastewater treatment will be determined during the design phase and documented in a post-ROD FFA primary document. In the event that the selected remedy does not meet the identified protective goals for a pollutant, an ESD or ROD amendment will be used to modify the remedy, such as changing the treatment approach or changing operational methods, so that the identified protective goals are met. When the EMDF effluent limits are calculated, the limits will be made available for public comment through either an ESD or ROD amendment.

2.12.2.5 Description of EMDF operations

Operations at EMDF will include activities such as receiving waste, recordkeeping, unloading and placing waste into the disposal cells, compacting waste, covering waste, filling void spaces, providing radiological surveying of trucks, providing dust control, managing landfill wastewater and stormwater, and providing environmental monitoring.

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. DOE and its contractors implement a "waste disposal hierarchy" that initially evaluates a potential waste stream to see if all or part of it is eligible for reuse or recycling – eliminating it from requiring disposal. Waste remaining after that initial evaluation is characterized and profiled for disposal in an order from sanitary/industrial waste disposed on the Oak Ridge NPL Site, to onsite disposal of wastes in the EMWMF (or EMDF), to offsite disposal at another DOE site, to offsite commercial waste disposal.

Landfill wastewater from EMDF, defined as landfill leachate and contaminated stormwater (also referred to as contact water), will be collected in a series of tanks prior to treatment. Landfill wastewater from EMDF will be treated prior to discharge to ensure it is protective of recreational use (human health), specifically fish ingestion.

The selected remedy includes compliance with the CWA and associated citations as applicable requirements for non-radiological chemical constituents. The CWA typically controls the direct discharge of pollutants to surface waters through the NPDES program. Onsite discharges from a CERCLA site to surface waters must meet the substantive NPDES requirements, but need not obtain an NPDES permit nor comply with the administrative requirements of the permitting process. Application of the CWA will be consistent with how it is applied at non-CERCLA sites. The EMDF discharge criteria will be established for non-radiological chemical constituents based on the appropriate water quality criteria for Bear Creek designated uses as specified in TDEC 0400-40-03-.03(3), *General Water Quality Criteria, Criteria for Water Uses*.

Regarding discharge of radionuclides contained in landfill wastewater, the ROD includes TDEC 0400-20-11-.16(2) [10 *CFR* 61.41] and TDEC 0400-20-11-.16(4) [10 *CFR* 61.43]. These ARARs, developed by the NRC, provide and refer to dose limits for protecting the public. Radiological contaminants released to surface water are addressed by compliance with CWA and associated citations as relevant and appropriate requirements. Results from recent field studies in Bear Creek (DOE 2022) were evaluated to help set in-stream PRGs for the future EMDF to ensure protectiveness for a hypothetical recreational fisherman that are in compliance with the 10^{-5} risk specified in the Dispute Resolution Decision[11] and consistent with TDEC 0400-40-03-.03(4)(j) Footnote C, as determined based on site-specific exposure assumptions (defaults were used except the site-specific 26-years exposure duration based on EMDF operational life). As the EMDF design progresses, and as additional field studies are conducted, final discharge limits for relevant radionuclides will be developed and documented in a post-ROD FFA primary document (e.g., RAWP) with EPA and TDEC approval, taking into consideration technically justified site-specific information, including the discharge location, stream conditions at that location, and additional

[11] The Dispute Resolution Decision was signed by the EPA Administrator on December 31, 2020. It addressed the dispute among the EPA, TDEC, and DOE regarding the discharge to surface water of wastewaters containing radioactivity, generated during a response action under CERCLA on the ORR.

observed factors such as bioaccumulation of certain radionuclides within game fish in Bear Creek. Radionuclide discharge PRGs/cleanup levels are found in Sect. 2.12.2.4.

As part of the remedy, a wastewater treatment system will be provided adjacent to the EMDF facility. The system will be sized to accommodate the estimated wastewater volume to be treated and designed to remove contaminants anticipated in EMDF waste. The construction and operation of the wastewater treatment system for EMDF will be per ARARs included in Appendix A. As a best management practice, landfill wastewater generation will be minimized by keeping the number of cells open to the minimum required by operations and placing temporary precipitation/clean stormwater controls to divert clean stormwater out of the disposal cells.

2.12.2.6 Capping and support facility dismantlement

After completion of waste disposal, closure activities will include final capping (i.e., construction of the final cover system). A conceptual final cover system design will be part of the overall cell design prior to Phase 1 construction and eventually will be designed and constructed in compliance with ARARs included in Appendix A. Final cover system design details will be developed several years before closure. Closure of the facility will include continued landfill wastewater collection and treatment to the extent needed to protect human health and the environment and meet ARARs, cover system construction, and monitoring (closure and post-closure) per ARARs included in Appendix A.

Leachate collection, storage, and treatment systems will be decommissioned after rates of leachate generation diminish to levels that cannot be collected and treated cost effectively and that pose no threat to the environment. Storage, support, and treatment facilities will be removed and disposed of appropriately or plugged and abandoned in place, salvaging equipment and facilities to the extent practicable. The site will be restored to maximize beneficial reuse of the property.

2.12.2.7 Maintenance activities and environmental monitoring

Baseline groundwater conditions for a detection monitoring program must be documented before disposal facility operations begin. Results from at least four consecutive quarters of water quality sampling and laboratory analysis must be reported to establish baseline water quality to be used as a basis for future monitoring. Details concerning operational and post-closure monitoring, including criteria for determining the protectiveness of the remedy and any need to take action, will be specified in future post-ROD CERCLA documents, which are approved by the FFA parties. The requirements for monitoring and reporting groundwater, surface water, stormwater, landfill wastewater, and ambient air monitoring will be carried out as required in compliance with the ARARs included in Appendix A.

Surveillance and maintenance (S&M) and performance monitoring will be implemented during operation and after facility closure to ensure protectiveness. The remedial design and subsequent documentation based on as-built conditions will include facility-specific S&M and monitoring plans, including long-term S&M requirements and performance monitoring requirements. The plans will identify required monitoring, features to be inspected, inspection frequency, and performance requirements. Post-closure S&M and monitoring are required per the ARARs included in Appendix A.

S&M actions will be conducted to control erosion; repair cap settlement/subsidence; repair slope stability of run-on and runoff control systems, including any stormwater run-on diversion ditch and shallow groundwater interceptor trench; prevent burrowing animals; and prevent tree and other deep-rooted plant growth on the final cover and side slopes. S&M also will include maintenance of monitoring wells, fences, signs, access roads, survey benchmarks, and leachate collection, storage, and treatment systems as long as needed to ensure the integrity of the remedial action.

Landfill performance monitoring will be implemented per CERCLA (e.g., 5-year reviews) and the ARARs included in Appendix A.

2.12.2.8 Land use controls

DOE intends to retain ownership of the EMDF site in perpetuity. In the unlikely event that DOE transfers the EMDF site out of federal control, DOE will comply with the requirements of CERCLA Sect. 120(h)(3), as applicable. Land use objectives for this area will restrict use of the area to DOE-controlled industrial use and restrict access and use of groundwater except for monitoring purposes.

Over the last 20 years, DOE's mission requirements have changed. The EMDF will be located in Zone 2 which has the following performance objectives and land use (also see Table 2.1). The overall performance objective/cleanup goal of the ORR is to be protective of human health and the environment and removal from the NPL. The performance objectives/goals for Zone 2 are:

- Surface water – remedy will be fully protective of AWQC and water-quality values for surface water and fish tissue (for radionuclides) consistent with relevant Bear Creek state use classifications, including recreational use.
- Groundwater – remedy will protect conditions in groundwater to allow Zone 2 to achieve or maintain MCLs.
- Reduce risk from direct contact to create conditions compatible with future industrial use.

Since the purpose of the Onsite Disposal Alternative will result in the disposal of hazardous substances at the site at levels that do not allow for unrestricted use, LUCs will be implemented to prevent people without a defined purpose from access to the site. The integrity of the engineered cover will be monitored and maintained. The objectives of LUCs during operation and after closure include the following:

- Prevent unauthorized excavation into EMDF
- Restrict access to the EMDF site from unauthorized entry
- Maintain the integrity of features such as the monitoring network and final landfill cover
- Preclude alternate use (other than DOE-controlled industrial use) of the EMDF site or underlying groundwater.

The type and purpose of controls, implementation, and affected areas for all of the Onsite Disposal Alternatives are provided in Table 2.10. The LUCs will be maintained until the concentration of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure. LUCs (and plans for implementation and maintenance of the controls) will be specified in a CERCLA waste disposal LUCIP to be attached to the primary RDR for the EMDF, a primary document approved by EPA and TDEC. The BCV RAR CMP will also contain information regarding the LUCs and LUCIP for EMDF facility closure and final EMDF RAR.

Table 2.10. Land use controls for the selected remedy

	Type of control	Purposes of control	Implementation	Affected areas[a]
1.	Property record restrictions[b]	Restrict use of certain property by restricting soil and groundwater use in perpetuity	Drafted and implemented by DOE upon deeded land transfer	EMDF landfill and site
2.	Property record notices[c]	Provide information to the public about the existence and location of waste disposal areas and applicable restrictions in perpetuity	General notice of Land Use Restrictions recorded in Roane County Register of Deeds office upon approval of the decision document and/or completion of the remedial activity	EMDF landfill and site
3.	Excavation/penetration permit program	Until the concentrations of hazardous substances are at such levels to allow for UU/UE, unauthorized groundwater use prohibitions are in place until the final decision is made on groundwater and RAOs are achieved	Implemented by DOE and its contractors Initiated by permit request	EMDF landfill and site
4.	Access controls (e.g., signs, fences, gates, portals, etc.)	Control and restrict access to the public in perpetuity to maintain the property and engineered features	Maintained by federal government and its contractors	EMDF landfill and site

[a]Affected areas – Specific locations, as well as allowed and prohibited uses of the site, will be identified in the completion documents where hazardous waste has been left in place.

[b]Property record restrictions – Includes conditions and/or covenants that restrict or prohibit certain uses of real property and are recorded in deeds for the transfer of land to any non-federal agency along with original property acquisition records of DOE and its predecessor agencies.

[c]Property record notices – Refers to any informational document recorded that alerts anyone searching property records to important information about residual contamination/waste disposal areas on the property (TCA requirement).

DOE = U.S. Department of Energy
EMDF = Environmental Management Disposal Facility
RAO = remedial action objective
TCA = Tennessee Code Annotated
UU/UE = unlimited use/unrestricted exposure

As explained in the CERCLA waste LUCIP for EMWMF (DOE 2006):

> *The U.S. Department of Energy (DOE), through a memorandum of understanding (MOU) with the U.S. Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC) (DOE, EPA, and TDEC 1999), has agreed to comply with the Land Use Control Assurance Plan for the ORR (LUCAP; attachment to the MOU) whenever LUC, including institutional controls, are selected as part of a remedial action. The ORR LUCAP mandates that when a remedial action that includes LUC has been selected, a land use control implementation plan (LUCIP) will be developed as a component of the post-ROD documentation. This LUCIP establishes LUC implementation and maintenance requirements that are enforceable as part of the ROD.*

DOE is responsible for implementing, maintaining, reporting on, and enforcing the LUCs. Although DOE may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, DOE shall retain ultimate responsibility for remedy performance and integrity. Figure 2.6 illustrates the boundary of the LUCs for EMDF.

2.12.3 Cost Estimate for the Selected Remedy

Total present worth cost in the RI/FS for construction, operation, and closure of EMDF in CBCV is estimated at $902 million (Table 2.11). The detailed cost estimate for EMDF was presented in the RI/FS (DOE 2017a). The layout in the RI/FS included five cells and assumed a phased construction approach. Although the conceptual design in the ROD is slightly different (with four cells), the impacts on the cost estimate are minimal. Per EPA guidance, the RI/FS cost estimates were prepared with an accuracy of +50 percent to -30 percent (EPA 2000). The cost estimates were based on a facility layout that yielded an approximate landfill waste disposal capacity (i.e., air space volume) of 2.2 million cy. The RI/FS waste volume estimate includes a 25 percent volume contingency. Cost contingencies (22 percent for construction and 5 percent for operations) were assumed.

Table 2.11. Total estimated project costs

Cost element	Cost $ (FY 2012)	Cost $ (FY 2021)
CAPITAL COSTS		
Phase I includes Cells 1 and 2:		
Engineering	$22,598,980	$27,117,760
Site Development	$13,116,173	$15,738,818
Support Facilities	$19,354,977	$23,225,102
Construction of Cells	$72,500,471	$86,997,306
Phase II includes Cell 3:		
Engineering	$2,102,442	$2,522,836
Construction of Cells	$41,613,368	$49,934,171
Phase III includes Cell 4:		
Engineering	$2,102,442	$2,522,836
Construction of Cells	$32,766,352	$39,318,149
Final cap (for Dual Site includes both landfills):		
Engineering	$2,046,565	$2,455,786
Quality Assurance	$6,498,415	$7,797,806
Construction of Final Cap	$54,805,605	$65,764,262
TOTAL CAPITAL COST	**$269.5 M**	**$323 M**
OPERATIONS COSTS		
Base Operations	$266,218,662	$319,450,425
Leachate System Operations	$28,640,275	$34,367,042
Security Operations	$3,657,045	$4,388,290
OTHER COSTS		
Pre-Construction Costs (e.g., Characterization)	$10,463,741	$12,556,019
Perpetual Care Fee and Post-closure Care	$45,736,249	$54,881,443
Support Structure Demolition/Removal	$3,680,000	$4,415,835
Subtotal (Capital, Operations, Other)	$627.9 M	$753 M
Contingency (22% Capital, 5% Operations)	$72.2 M	$86 M
TOTAL (FY 2012 $) LIFE CYCLE COST	**$700.1 M**	
[Groundwater Field Demonstration estimated additional cost]		$22 M
TOTAL (FY 2021$) LIFE CYCLE COST		**$861 M**
PRESENT WORTH	**$537.2 M**	**$902 M**

FY = fiscal year
M = million

Capital costs consist of direct and indirect costs. Direct costs include design and construction (e.g., material, labor, and equipment), service equipment, buildings, and utilities. Indirect costs are markups for fixed-price construction to cover expenses incurred by the subcontractor.

Operations costs include waste handling and placement, facility maintenance, monitoring during onsite disposal operations, and costs for long-term monitoring and maintenance activities that will occur after

closure of EMDF. Present worth costs for the alternatives were calculated based on EPA guidance (EPA 2000) using a real discount rate of -0.3 percent according to the Office of Management and Budget (OMB) Circular No. A-94 (OMB 2020).

2.12.4 Expected Outcomes of the Selected Remedy

The RAOs will be met by implementing the selected remedy. The construction of EMDF at the CBCV Site 7c facilitates timely CERCLA remediation of the Oak Ridge NPL Site by providing a dedicated onsite disposal location that is protective of human health and the environment. The disposal of CERCLA waste in EMDF will protect human and ecological receptors. The design of EMDF will provide engineering controls to prevent adverse impacts to groundwater and surface water. Monitoring and maintenance of EMDF will be implemented to ensure the facility performs as designed over time and long-term impacts are minimized.

Protectiveness of human health and environment is demonstrated in accordance with CERCLA by the following: (1) protective site conditions (Sect. 2.5), (2) protective multi-layer liner and cover design (Sect. 2.12.2.1), (3) WAC that limit contamination in waste disposed (Sect. 2.12.2.3) and demonstration of protectiveness under the RGW and intruder scenarios (UCOR 2020), (4) ARARs that are followed for all aspects of the remedy (Appendix A) and guide waste acceptance (Sect. 2.12.2.3), and (5) protective operations, including protective discharge limits (Sect 2.12.2.4).

Implementation of the selected remedy may have some short-term impacts on the local environment due to construction of the facility. The relocation of some surface water drainage features will be necessary as the facility is constructed. The loss of habitat and some wetland areas also will occur during construction. Mitigation of wetland impacts will be implemented as required by ARARs (see Table A.2, page A-9); potential mitigation actions may include restoration, enhancement, preservation, creation of new wetlands, etc. Best Management Practices will be used to avoid impacts to wetlands and minimize unavoidable impacts as much as possible. Where impacts will be unavoidable, appropriate regulatory agencies will be contacted and discussions regarding mitigations efforts will be held. It is expected that various compensatory measures will be investigated. Post-ROD primary documents (e.g., Remedial Design Work Plan [RDWP] and/or RDR) will document mitigation efforts.

2.13 STATUTORY DETERMINATIONS

2.13.1 Overall Protection of Human Health and the Environment

As required by 40 *CFR* 430(f)(1)(ii)(A), the selected remedy is protective of human health and the environment. The construction of EMDF in CBCV will provide an engineered facility for the protective disposal of Oak Ridge NPL Site CERCLA waste, will be compliant with all ARARs upon completion, and supports the timely remediation of the Oak Ridge NPL Site. RAOs to protect water resources (surface water and groundwater) are provided, that in turn protect human health and the environment.

2.13.2 Compliance with ARARs

CERCLA Sect. 121(d) specifies that remedial actions for cleanup of hazardous substances must comply with promulgated requirements under federal or more stringent state environmental laws and regulations that are applicable or relevant and appropriate to the hazardous substances or specific circumstances at a site, or obtain a waiver under 40 *CFR* 300.430 (f)(1)(ii)(C). The identification of remedy-specific ARARs is part of the process to ensure the selected remedy is protective of human health and the environment. Federal promulgated requirements are used as ARARs unless there is a more stringent state requirement.

When identifying ARARs under a State program which has gained Federal authorization and is enforced in lieu of the federal program, the authorized provisions of the State statute or regulation are identified as an ARAR as it is regarded as the requirement that is in effect. In addition to ARARs, the lead and support agencies may, as appropriate, identify other advisories, criteria, or guidance to be considered for a particular release. The "to-be-considered" (referred to as TBC) category consists of advisories, criteria, or guidance that were developed by EPA, other federal agencies, or states that may be useful in developing CERCLA remedies (see 40 *CFR* 300.400[g][3]).

ARARs include federal and state environmental or facility siting laws/regulations designed to protect the environment and the public, but do not include occupational safety or worker radiation protection requirements. EPA requires compliance with the Occupational Safety and Health Administration (OSHA) standards under Sect. 300.150 of the NCP (40 *CFR* 300.150), independent of the ARARs process. The regulations promulgated by OSHA related to occupational safety will appear in and be implemented by the appropriate health and safety plans for this action.

To ensure CERCLA response actions are not delayed by administrative requirements, the NCP specifies that onsite remedial response actions need only comply with substantive requirements (CERCLA Sect. 121[e]). The term onsite means the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action. Substantive requirements pertain directly to actions or conditions at a site, while administrative requirements facilitate their implementation. EPA recognizes that certain administrative requirements (i.e., consultation with state agencies, reporting, etc.) are accomplished through the state involvement and public participation. These administrative requirements should also be observed if they are useful in determining cleanup standards at the site (59 *Federal Register* 47416).

By virtue of its location within the contiguous geographical boundaries of ORR, a single disposal facility will constitute a "suitable area in very close proximity to the contamination" in the case of areas of contamination on the Oak Ridge NPL Site. Accordingly, the disposal facility is considered "onsite" for the purposes of evaluating potential onsite disposal alternatives. The onsite disposal facility will accept CERCLA wastes meeting the facility-specific WAC from the Oak Ridge NPL Site. Wastes generated at other sites within the State of Tennessee where contamination can be directly related to the Oak Ridge NPL Site releases would require FFA party consideration and agreement (following the CERCLA process). No out-of-state waste will be accepted at the proposed disposal facility.

For landfill wastewater discharges to surface water, the EPA and Tennessee NPDES requirements, and the Tennessee Water Quality Standards listed in Appendix A, will be applicable requirements for chemical constituents. For the radiological component of the discharges, in accordance with the EPA Administrator's Dispute Resolution Decision, the CWA is included as an ARAR. The specified EPA and Tennessee NPDES requirements in 40 CFR 122, 40 CFR 125, and TDEC 0400-40-05; Tennessee Water Quality Standards in TDEC 0400-40-03; and two NRC-based TDEC regulations: TDEC 0400-20-11-.16(2) [10 *CFR* 61.41] and TDEC 0400-20-11-.16(4) [10 *CFR* 61.43], are listed in Appendix A as relevant and appropriate in accordance with the EPA Administrator's Dispute Resolution Decision. These ARARs are used along with site-specific parameters to develop water quality-based surface water and fish tissue values (PRGs) during operations that ensure protection of human health and the environment.

The ARARs are presented in Appendix A; Table A.1 includes chemical-specific ARARs, Table A.2 has location-specific ARARs, and Table A.3 contains action-specific ARARs. The tables specify the pre-requisite for each ARAR; that is, the condition(s) which must exist for the particular ARAR to be invoked. Additionally, in regards to the text within this CERCLA decision document, the absence of language to address a specific situation as an aspect of the remedy, 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.

2.13.2.1 Waiver to TSCA 40 *CFR* 761.75(b)(3)

DOE is seeking a TSCA waiver for two portions of a TSCA siting requirement under 40 *CFR* 761.75(b)(3) for the selected remedy, as allowed under TSCA 40 *CFR* 761.75(c)(4); the waivers are granted via approval of this ROD. Technical TSCA requirements for chemical waste landfills used for the disposal of PCBs and PCB items include 40 *CFR* 761.75(b)(3), relating to site hydrologic conditions, that states "*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*."

A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"...will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding PCB management and disposal practices on the ORR.

Equivalent or Superior Effectiveness of EMDF design
DOE meets several parts of this siting requirement, and justifies a waiver of the TSCA hydrologic conditions requirement regarding the hydraulic connection between the site and standing or flowing surface water and the 50-ft separation from the historical high water table on the basis that the EMDF will be at least as protective due to multiple design elements. Compliance with the RCRA Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the EPA determination that the remedy is protective of human health and the environment under CERCLA 121(d)(1).

The EMDF WAC prohibits disposal of liquids and states RCRA and TSCA waste packages "shall have no free liquids". The WAC prohibitions reduce the amount of PCBs in the landfill and minimizes the PCBs available for release.

The following design elements provide protectiveness exceeding that provided through the siting requirements (please note that several parts of the requirement are met, that is, floodplains, shorelands, and groundwater recharge areas are being avoided and that the site will have monitoring wells and leachate collection):

- A groundwater monitoring network around the EMDF compliant with RCRA requirements
- More stringent liner and leachate detection and collection requirements under RCRA
- Low permeability vadose zone geologic buffer material as committed to in this ROD.

Technical requirements for engineered features of chemical waste landfills defined in 40 *CFR* 761.75(b) include the following two main components:

- Four ft of in-place silt/clay soils or 3 ft of compacted silt/clay soil liner thickness with a permeability $\leq 1\times10^{-7}$ cm/sec

- Leachate collection system that can be a simple (single), compound (double), or suction lysimeter system. A synthetic membrane liner is used "if in the judgment of the Regional Administrator," the hydrologic or geologic conditions require such a liner to provide a permeability equivalent to the soils noted above (i.e., $\leq 1\times10^{-7}$ cm/sec).

The engineered features proposed for the EMDF liner include RCRA-required and other elements that exceed 40 *CFR* 761.75(b) requirements. The EMDF design will include the following:

- Liner system 5-ft thick that includes (in addition to 3 ft of clay with a permeability $\leq 1\times10^{-7}$ cm/sec) two impermeable high-density polyethylene liners that are (each) specified as at least 60-mil thickness for a total 120-mil thickness (TSCA requires only a single 30-mil liner, and then only if the clay permeability requirements cannot be met), a geosynthetic clay liner, and two leachate collection drainage layers with the lower being a leak detection layer
- Ten ft of low-permeability ($\leq 1\times10^{-5}$ cm/sec) vadose zone geologic buffer material as required by the ARAR, TDEC solid waste rule 0400-11-01-.04(4)(a)(2).

Application of the ARAR for a low conductivity geologic buffer and these more stringent liner requirements under RCRA results in a facility that meets or exceeds the TSCA requirements to mitigate potential releases to the environment.

The TSCA requirement for 50 ft of separation is not a performance standard in that it does not dictate a level of performance that is needed. It is intended to provide a layer of protection for separating groundwater from the waste but does not specify how that layer of protection must perform. For example, gravel and highly fractured rock can have a hydraulic conductivity of as low as 1×10^{-1} cm/sec, compared to a conductivity of up to 1×10^{-7} cm/sec for a clay liner. EMDF will have a RCRA-compliant double leachate collection/detection system overlying a 3-ft-thick clay liner, two layers of geomembranes, and a 10-ft geologic buffer composed of low conductivity material. These combined layers result in much less permeation of water than 50 ft of most natural materials in combination with TSCA requirements of 3 ft of compacted clay and a single leachate collection system. Using EPA's Seminar Publication on *Requirements for Hazardous Waste Landfill Design, Construction, and Closure* (EPA 1989), Fig. 1-3 illustrates a comparison of leakage rates through various liners comparing typical TSCA liners of only compacted 3 ft of soil to composite liners (clay and geomembrane) and shows that the composite liners have an 86,000 times lower leakage rate. Figure 1-4 illustrates that even with a small hole in the geomembrane liner, the leakage rate through a composite liner is still much lower than the compacted soil liner.

A more detailed comparison of RCRA and TSCA liner systems considers the required hydraulic conductivities of the various materials and resulting contaminant travel times to the water table. For example, for a TSCA system, which would include 3 ft of clay (conductivity of 1×10^{-7} cm/s) with the 50-ft separation assuming natural materials with a hydraulic conductivity of 1×10^{-6} cm/s, a travel time of 34 years for contaminant release to the water table is calculated. The EMDF RCRA design-based 5-ft engineered cell liner, incorporating two 60-mil flexible geomembranes (conductivity of approximately 1×10^{-12} cm/s – credit these geosynthetics with only a 200-year functioning service life); a ¼-in. thick geosynthetic clay layer (conductivity of 1×10^{-9} cm/s); 3 ft of clay (conductivity of 1×10^{-7} cm/s); and the 10-ft geologic buffer with a hydraulic conductivity of 1×10^{-5} cm/s results in an estimated time of 250 years for contaminant release to the water table, exceeding the TSCA requirements. Considering the properties of PCBs, that they are relatively immobile and tend to be particle-bound, and given the time of transport to the water table that ultimately allows for breakdown of the PCBs (half-lives of PCBs are less than 80 years and many forms are less than 30 years; in a 250-year time frame or over three half-lives, would allow for nearly complete breakdown of the contaminants), the EMDF design fulfills the requirement to demonstrate no unreasonable risk of injury to health or the environment.

The final landfill cover (an 11-ft-thick multi-layer system with lateral drainage and low permeability layers) significantly reduces infiltration of water through the waste, and along with the liner/geologic buffer materials, limits the potential for mobilization and exposure of PCBs and other waste constituents to the public and the environment. The sequence of engineered and in-situ materials proposed for the EMDF provides protection and redundancy well beyond the basic requirements for liners, leachate collection, and the 3- to 4-ft-thick soil liner specifications defined for PCB disposal in chemical waste landfills stipulated in 40 *CFR* 761.75(b). These engineered features that are part of the EMDF design (liner components and geologic buffer) demonstrate equivalent or superior protectiveness to that provided under the TSCA hydrogeologic requirements and limit the possibility of PCB releases that would present an "unreasonable risk of injury to health or the environment from PCBs".

The 1990 EPA *TSCA Landfill Inspection Guidance Manual* states in Sect. 4, "Historically, the 50-foot ground water rule and the plasticity index/liquid limit rules have been waived for some facilities in exchange for EPA-imposed compensatory requirements (such as increased liner thicknesses, etc.)." This is what is being proposed for EMDF.

The TSCA waiver is also being used for the portion of 40 *CFR* 761.75(b)(3) addressing the prohibition of a hydraulic connection between the site and standing or flowing surface water. Likewise, the requirement for no flowing or standing water at the surface is not a performance standard for a disposal facility. Like other siting criteria intended to either protect local habitat (wetlands), the disposal facility itself (faults), or the public (proximity to residents), this requirement is also intended to provide a layer of protection for separating water from the waste, a condition that only exists after the disposal facility is built. Water conditions on the surface of the site will change dramatically once the EMDF is constructed. The EMDF configuration controls surface water through collection and rerouting of drainage features and associated existing slopes. Diversion of upgradient surface water runoff is incorporated into the site design. As to the groundwater-to-surface water pathway, wastes will be separated from the groundwater through the engineered design of the EMDF with a 10-ft geologic buffer and multi-layer liner system with leachate collection, as discussed above. Following construction of the disposal facility, conditions will be such that surface water is well separated from the waste; thus, the objective of the requirement is met. Since all EMDF landfill wastewater will undergo treatment prior to release, the only contaminants reaching surface water from the site will be those treated to protective levels. Thus, risk to the public via contaminant transport by surface water will not present an unreasonable risk of injury to health or the environment from PCBs.

PCB Practices on the ORR

ORR facilities (ETTP, Y-12, and ORNL) manage TSCA-regulated materials, including PCBs. Because of the age of many ORR facilities and the varied uses for PCBs in gaskets, grease, building materials, and equipment, DOE self-disclosed unauthorized use of PCBs to EPA in the late 1980s. As a result, DOE ORR and EPA Region 4 consummated a major compliance agreement known as the "Oak Ridge Reservation Polychlorinated Biphenyl Federal Facilities Compliance Agreement" (referred to as the ORR-PCB-FFCA) (DOE 2012).

The ORR-PCB-FFCA provides a mechanism to address legacy PCB-use issues across the ORR. As a result of the compliance agreement, DOE and its contractor continue to notify EPA when additional unauthorized uses of PCBs, such as PCBs in paint, adhesives, electrical wiring, or floor tile, are identified. For CERCLA actions, this notification process is routinely accomplished under the CERCLA documentation for demolition and remedial actions. EPA is updated annually on the status of DOE actions with regard to management and disposition of PCBs covered under the ORR-PCB-FFCA during the annual ORR-PCB-FFCA meeting with EPA 4 and through three separate ORR site level PCB Annual Document Logs that are completed and maintained onsite. Continued PCB legacy waste generation, transportation, disposal, and storage at ORNL are regulated under EPA ID TN1890090003, at Y-12 under EPA ID TN3890090001, and at ETTP under EPA ID TN0890090004.

The WAC for EMDF do not allow for disposal of any PCB liquids. ORR waste management practices dictate that inactive electrical equipment such as transformers and capacitors containing PCBs that are taken out of use are drained of PCB liquids, and the drained liquids and carcasses are treated and disposed of off-site through commercial vendors authorized by EPA for PCB disposal. While the liquids are not allowed for disposal in the EMDF, depending on the type of equipment, the drained equipment may be disposed at EMDF in accordance with EPA's PCB disposal regulations. In many cases, the drained equipment accepted would also be acceptable in a municipal landfill. In addition, other PCB-containing equipment such as fluorescent light ballasts are systematically removed from buildings prior to demolition and disposed of through offsite commercial vendors. The ORR-PCB-FFCA addresses the requirements for management, removal, and disposal of PCB-impregnated gaskets and ductwork contaminated with PCBs. The majority of PCB sources are systematically removed from buildings during pre-demolition decommissioning work. Project-specific waste handling plans developed for building D&D and remedial actions under CERCLA (with review and approval by EPA and TDEC) include requirements to address PCB management and onsite disposal.

All PCB waste stream volumes generated under CERCLA and disposed at EMWMF are captured in the CERCLA documentation for each applicable Waste Lot; it is expected that similar procedures will continue in effect throughout operation of the EMDF. This information is given as evidence that the proposed facility will not present an unreasonable risk of injury to health or the environment from PCBs.

This waiver is approved through approval of this ROD. In the event of a post-ROD landfill design change that reduces the protectiveness stated above, DOE will summarize these changes and request EPA consider whether the initial ARAR waiver granted at the time of ROD signature remains valid or whether the design change warrants a reconsideration of an ARAR waiver.

2.13.2.2 Waiver to TSCA 40 *CFR* 761.75(b)(5)

Technical requirements for chemical waste landfills used for the disposal of PCBs and PCB items include this siting requirement regarding topography, "*The landfill site shall be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping."* The EMDF site in BCV is situated at the slope of Pine Ridge. The landfill in CBCV can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping, thus a waiver is being used. Under 40 *CFR* 761.75(c)(4) *Waivers,* "*An owner or operator of a chemical waste landfill may submit evidence to the Regional Administrator that operation of the landfill will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met. On the basis of such evidence and any other available information, the Regional Administrator may in his discretion find that one or more of the requirements of paragraph (b) of this section is not necessary to protect against such a risk and may waive the requirements in any approval for that landfill."* Evidence regarding the low levels of PCBs expected to be disposed in this landfill has been given in the previous justification (Sect. 2.13.2.1). Some additional information is provided below.

PCB Practices on the ORR

As a result of these in-place procedures on the ORR, as given in the previous waiver discussion and evidence section, disposal of PCB waste in the existing EMWMF has been limited to bulk PCB waste disposal (< 50 ppm) and has been confirmed in waste lot acceptance documents to date. It is expected that these procedures will continue in effect throughout operation of a future onsite disposal facility as well, thereby limiting the majority of onsite disposal of PCB waste to < 50 ppm. This information is given as evidence that the proposed facility will not present an unreasonable risk of injury to health or the environment from PCBs when the requirements 40 *CFR* 761.75(b)(5) of this section is not met.

Equivalent or Superior Effectiveness of EMDF Design

The intent of the siting criterion is to ensure long-term stability of the landfill by avoiding terrain that is prone to slope failure and intense runoff that could cause damaging erosion, landslides, or slumping. What exactly constitutes low, moderate, and high relief is not explicitly stated in the regulation and additional research did not provide a standard definition. Some slopes in the vicinity of the proposed landfill are steep. Regarding the EMDF site location, steep slopes are associated with two knolls in the center of the site. Construction on the site will completely remove these knolls, leveling the land within the footprint. The proposed footprint at CBCV extends only to the base of Pine Ridge, where a natural saddle sits between the proposed footprint and slopes of Pine Ridge.

Based on the general site descriptions within the RI/FS (DOE 2017a), there are no unstable ground areas subject to previous sliding that were identified. Stability is not only a function of slope angles, but also the materials in place and their properties. Additional field investigations were completed to support the design phase and results verify observations regarding material stability. Extensive geotechnical characterization studies were performed to provide data for final design and the calculations required to analyze static slope stability for the EMDF facility and will be documented in the facility's RDR.

The existing natural slopes of Pine Ridge along BCV have not shown any indications of past or future landslides or slumping (e.g., existing slides or slumps, areas with tilted or leaning trees, anomalous stormwater drainage patterns). Characterization efforts such as test pits, boreholes, well drilling logs, and corresponding laboratory testing have occurred at various locations down the valley and within the footprint and demonstrate the stability of the existing terrain.

Upon closure, the relatively impermeable landfill features (cover system) will promote stability by reducing recharge in the area, as saturated soils are a primary cause of landslides and slumping. The landfill has been configured to improve overall landfill stability and associated existing slope stability through buttressing effects and reducing erosional flow paths for surface water. Further, the EMDF configuration controls surface water through collection and rerouting drainage features that improve the overall stability of the landfill and associated existing slopes. Riprap armor and buttressing have been incorporated into the design to further mitigate the potential for erosion and promote long-term stability. Diversion of upgradient surface water runoff is incorporated in the site design, to further reduce erosion at the site.

Any new slopes constructed as part of any landfill will use standard allowable (constructed) slopes which will then be validated through modeling and calculations. Slope failure is always a key issue in the design of any large earth structure, regardless of existing terrain. Landfill design involves rigorous seismic analysis and slope stability calculations. As an example, the RDR for EMWMF provides examples of the types of slope stability modeling and calculations that will be performed to ensure long-term stability, while the report provides the quality assurance plans that are used to ensure that the landfill is constructed to the standards required to ensure long-term stability. The new facility will undergo this process as well as considering new seismic standards that have been implemented in recent years.

TSCA regulations do not explicitly identify seismic requirements; instead the siting requirement is given to promote the use of stable sites. However, explicit seismic requirements for the proposed landfill are derived from RCRA requirements (40 *CFR* 264.18[a][1]) and NRC siting requirements (TDEC 0400-20-11-.17[1][i]) and are included in the ARARs for this landfill; they will be met. Meeting these requirements further demonstrates the ability of this site to fulfill the intent of the TSCA regulation at 40 *CFR* 761.75(b)(5).

The above information is provided to demonstrate the EMDF design incorporates features that assure equivalent protectiveness to that provided by the TSCA site topography requirement.

This TSCA waiver is based on the ability of engineered features to fulfill the intent of the siting criteria regarding hydrologic and topographic features, and, therefore, does not result in undue hazard to public health and safety or property. The combined design and ORR PCB practices and expected waste disposal achieve a level of performance exceeding that specified in the requirements and provides a degree of protection of health, welfare, and the environment that is equal to or greater to that under the original TSCA requirements.

This waiver is approved through approval of this ROD. In the event of a post-ROD landfill design change that reduces the protectiveness stated above, DOE will summarize these changes and request EPA consider whether the initial ARAR waiver granted at the time of ROD signature remains valid or whether the design change warrants a reconsideration of an ARAR waiver.

2.13.2.3 Exemption to TDEC 0400-20-11-.17(1)(h)

TDEC requirement 0400-20-11-.17(1)(h), an NRC-based LLW disposal siting criterion, states "*The hydrogeologic unit used for disposal shall not discharge groundwater to the surface within the disposal site*." The following definitions are given:

- "*Hydrogeologic unit – any soil or rock unit or zone which by virtue of its porosity or permeability, or lack thereof, has a distinct influence on the storage or movement of groundwater.*
- *Disposal site – portion of a land disposal facility which is used for disposal of waste. It consists of disposal units and a buffer zone.*
  - *Disposal unit – discrete portion of the disposal site into which waste is placed for disposal.*
  - *Buffer zone – portion of the disposal site that is controlled by the licensee and that lies under the disposal units and between the disposal units and the boundary of the site.*"

NRC guidance (NRC 1986) states the rationale of this criterion: "*This requirement will result in a travel time for most dissolved radionuclides at least equal to the travel time of the groundwater from the disposal area to the site boundary. In addition, this requirement should provide sufficient space within the buffer zone to implement remedial measures, if needed, to control releases of radionuclides before discharge to the ground surface or migration from the disposal site.*"

The onsite location proposed for the EMDF does not consistently (e.g., based on seasonal precipitation) meet this criterion for the current (pre-construction) site hydrogeologic features. Varying degrees of groundwater discharge to the surface at this site, depending on seasonal rainfall contributions. Discharge of groundwater through seeps/springs/intermittent streams may range from zero discharge during dry seasons to continuous discharge during wet seasons. LLW land disposal facilities designed for this type of hydrogeologic setting rely on maintaining a sufficient thickness of unsaturated material between the waste and the water table to isolate the waste from groundwater, provide extended contaminant travel times, and ensure protection of human health and the environment. In addition, LLW land disposal facilities placed in this type of hydrogeologic setting must also rely on limiting acceptance of radionuclides and final inventories to further ensure the protection of human health and the environment.

The CBCV site (Site 7c) will require grading to create a level base for construction. A geologic buffer of either in-place soil, fill from cut areas, or purchased fill (all of which must meet specific low permeability requirements) is placed to ensure a minimum unsaturated material thickness of 10 ft above the seasonal high water table of the uppermost unconfined aquifer or the top of the formation of a confined aquifer (consistent with TDEC 0400-11-01-.04[4][a][2]). Above this geologic buffer, the liner system is installed. The liner system includes 3 ft of compacted clay, multiple geosynthetic layers, a 1-ft leachate collection drainage layer, and a final 1-ft protective material layer (5 ft total), above which the waste is placed

(consistent with RCRA requirements). The geosynthetic layers are low permeability materials that have been simulated in multiple independent tests to function for many centuries. These features will isolate the short-lived radionuclides so that decay occurs in place; therefore, they will minimize risk to human health or the environment. The geosynthetic materials ensure that leachate does not contaminate the underlying groundwater during the service life of the synthetic liner components. These features (geologic buffer and the liner), along with the material specifications they must meet (e.g., per RCRA), exceed design requirements specified in the TDEC NRC-based *Licensing Requirements for Land Disposal of Radioactive Waste* (TDEC 0400-20-11), which does not require any material, liner, or other engineered feature between the waste and the hydrogeologic unit used for disposal.

The preliminary design for the EMDF at the CBCV Site 7c incorporates a minimum 15-ft vadose (unsaturated) zone, comprised of the liner and geologic buffer, providing separation between the waste and seasonal high water table. In addition, in situ and structural fill materials incorporated to level the footprint provide additional vadose zone thickness beneath portions of the waste, greatly increasing depths to groundwater in those areas. Thus, vadose zone depths are minimally 15 ft, with maximum depths in isolated areas far exceeding that measurement. In the event that contaminants are released from the waste, the underlying vadose zone depth provides an extended travel time that would increase the travel time of groundwater from the disposal area to the site boundary as targeted by the siting criterion. The EMDF liner and buffer design, as noted under Sect 2.13.2.1, provides an estimated 250 years of travel time between the bottom of waste and the water table. This time is sufficient to allow for 8 half-lives for radioisotopes with half-lives up to 30 years, including strontium-90 and cesium-137, both radiological contaminants that are expected in the ORNL waste.

After closure of the landfill facility, the 11-ft final cover system, which also includes geosynthetic layers, ensures that recharge to the footprint is limited for hundreds and up to thousands of years, minimizing release of contaminants and further ensuring that the groundwater table remains subdued beneath the footprint. Local suppression of the water table by the engineered barriers (cover and liner systems) can also reduce the extent and frequency of groundwater discharge to the surface within the buffer zone. The adequacy of the EMDF design to lower water table elevations below the waste and reduce groundwater discharge to the surface in close proximity to the disposal unit will be tested prior to construction through a GWFD utilizing a temporary cover on the EMDF hydrogeologic unit (Maryville and Nolichucky Formations). The results of the GWFD will inform the final design and provide confidence that seasonal groundwater discharge near the disposal unit will not provide rapid pathways for release of contaminants to adjacent streams.

Limiting the acceptance of radionuclides during operations and limiting the final inventory of those contaminants allowed at closure of the facility will also provide a significant measure of protectiveness. Determination of these limits for the proposed site take into account site-specific conditions and consider failure scenarios and their outcomes, to ultimately set limits that ensure human and environmental protectiveness are met per RAOs. The outcome of the GWFD will inform the final facility design while also verifying protectiveness per the RAO. In addition, maintenance and monitoring of the leachate collection and leak detection systems, along with required groundwater monitoring, will provide indications of potential releases of radionuclides to groundwater and permit the implementation of remedial measures prior to discharge to the ground surface or migration from the disposal site if indicated.

In totality, the facility design's engineered features and radionuclide contaminant limits that will be enforced will ensure protection of groundwater above and beyond the NRC requirement's intended outcome. Given the specific nature of this CERCLA remedy, coupled with the substantive means by which the NRC-derived requirements are met or exceeded, the selected remedy utilizes the exemption to the siting criterion.

An exemption to the TDEC siting criterion is requested, as allowed under TDEC 0400-20-04-.08 (Division of Radiological Health General Provisions) whereby "*The Department may, upon application by any person or upon its own initiative, grant exemptions, variances, or exceptions from the requirements of these regulations which are not prohibited by statute and which will not result in undue hazard to public health and safety or property*." This exemption is requested based on (1) the ability of engineered features to fulfill the intent of the siting criterion, given the increased vadose zone thickness, travel times, and reduction of groundwater discharges to the surface within the buffer zone near the disposal unit; and (2) implementing limits on waste contaminant acceptance and accumulation to control future releases within acceptable bounds. The exemption therefore will not result in undue hazard to public health and safety or property.

The exemption to TDEC 0400-20-1.17(1)(h) is approved through approval of this ROD.

2.13.2.4 NEPA

NEPA is not an ARAR. However, throughout the EMDF CERCLA process, NEPA values are incorporated in accordance with the Secretarial Policy Statement on NEPA (DOE 1994).

2.13.3 Cost Effectiveness

This discussion explains how the selected remedy meets the statutory requirements for cost effectiveness. A cost-effective remedy is one where costs are proportional to its overall effectiveness. The overall effectiveness of a remedial alternative is determined by evaluating (1) short-term effectiveness; (2) long-term effectiveness and permanence; and (3) reduction in toxicity, mobility, or volume.

The selected remedy is cost effective. Total present worth costs (based on 2021 dollars) for construction, operation, and closure of EMDF in CBCV is $902 million. Although the costs of the project are significant, the remedy will ensure that the CERCLA waste generated by the cleanup of the ORR NPL Site is safely disposed. Although there are some short-term impacts to the environment from constructing EMDF, the impacts are less of a threat than the risks associated with transporting CERCLA waste long distances.

If the schedule for construction of EMDF or the Oak Ridge NPL Site CERCLA cleanup actions were to be delayed due to funding or other factors, the cost for the project would increase. Based on the most reasonable expectations for future Oak Ridge NPL Site CERCLA waste volumes requiring disposal, the selected remedy is the most cost-effective alternative and offers considerable economy-of-scale savings for future waste disposal when compared to the off-disposal alternative. Because of state equity issues and the uncertain future availability of commercial facilities, it also provides the assurance of future waste disposal capacity that offsite disposal cannot offer. Any interruption of future shipping schedules from the loss of disposal capacity under a large-scale offsite shipping and disposal campaign would result in significant additional costs associated with interim waste storage and procurement of alternate disposal facilities.

2.13.4 Use of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

The selected remedy represents the maximum extent to which permanent solutions can be used. Construction, operation, closure, and continued monitoring and maintenance of a disposal cell is the most permanent solution practicable for the disposal of CERCLA waste that will be generated from the cleanup of the Oak Ridge NPL Site. Of the remediation alternatives considered, it provides the best balance of trade-offs with respect to long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. Over the long term, this solution is expected to perform effectively and continue to be protective with minimal maintenance. Long-term institutional controls will be continued for an indefinite period to monitor and ensure the effectiveness of the remedy.

2.13.5 Preference for Treatment as a Principal Element

Remediation projects that will generate the CERCLA waste for disposal at EMDF will be responsible for ensuring the wastes meet the facility-specific WAC and will make any decisions regarding treatment of the waste. RCRA waste may be land disposed only if it meets treatment standards or alternative treatment standards (LDRs) for hazardous waste (40 *CFR* 268; TDEC 0400-12-01-.10) for toxic, ignitable, reactive, and incompatible waste. Hazardous waste may not be disposed of as free liquids and empty containers will be reduced in volume (e.g., shredded, compacted) or filled prior to disposal to reduce void spaces.

Treatment of landfill wastewater from EMDF, however, is a key component of the remedy and will reduce the toxicity of the wastewater and mobility of contaminants released from the waste.

2.13.6 CERCLA 5-Year Reviews

40 *CFR* 300.430(f)(4)(ii) requires 5-year reviews if the remedial action results in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow unlimited use and unrestricted exposure. 5-year reviews will be required for this remedial action and will begin during operations. DOE will maintain the EMDF, including active and passive institutional controls (Sect. 2.12.2.8), and will use monitoring and the CERCLA 5-year review process to ensure that the disposal facility is protective during operations and in perpetuity post-closure.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

Since the Proposed Plan was approved and released in September 2018, there have been no changes to the remedy. As part of the conceptual design process, a slight modification to the eastern boundary of the landfill was made to ensure sufficient separation between waste and groundwater immediately adjacent to D-10W, but this modification does not change any of the evaluation of alternatives, including demonstration of protectiveness or compliance with ARARs.

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.

The Dispute Resolution Decision regarding assignment of radiological discharge limits for landfill wastewater releases to the environment was delivered by the EPA Administrator on December 31, 2020. The FFA parties then developed water quality-based surface water and fish tissue values for radionuclides (PRGs), which are included in this ROD (Sect. 2.12.2.4). Additional ARARs were provided by EPA in an email from Peter Wright, Assistant Administrator, EPA Office of Land and Emergency Management to Jay Mullis, OREM and David Salyers, State of Tennessee on January 8, 2021. Additional ARARs were added following discussion and agreement among the FFA parties during development of this D2 ROD.

Several public comments on the Proposed Plan prompted additional consideration of cost and impacts of offsite waste disposal practices in particular. DOE evaluated two additional criteria, the production of greenhouse gases (impact to the environment as part of the short-term effectiveness criteria) and impacts to reindustrialization (an element of socioeconomic impacts through the NEPA criteria), and their impacts on offsite waste disposal feasibility. These three considerations are further explained in the following sections.

2.14.1 Offsite Costs

As a result of comments received during the Proposed Plan public comment period, DOE has re-evaluated the offsite disposal costs and impacts. Several comments were received suggesting that there is additional information about offsite disposal that should be considered, including a reduction in costs.

DOE explored the feasibility of cost reductions with offsite waste disposal facility operators. Revised estimates were made available that incorporated further reductions on transportation (by rail) combined with disposal. The re-evaluation of costs resulted in verification of the RI/FS costs, most especially in terms of relative cost of onsite versus offsite, that is, offsite disposal costs remained approximately double the onsite disposal costs. While the RI/FS estimate ratio (offsite to onsite) was on the high side of 2 to 1 (specifically 2.1 to 1), the re-evaluation reduced that ratio to 1.9 to 1. Both cost estimates were determined to be higher than the RI/FS estimates due to delays in a decision for waste disposal (resulting in significant estimate escalation).

2.14.2 Impacts to Reindustrialization

To support offsite disposal, a waste rail loading facility has been proposed for the former K-792 area at ETTP by Energy*Solutions*. This proposed alternative would have negative impacts to reindustrialization at ETTP and is inconsistent with future development goals of the site. The K-792 area is immediately adjacent to the former K-31/K-33 area at ETTP, which was transferred to the Community Reuse Organization of East Tennessee (CROET) in 2017. CROET also owns the K-762 area immediately south of K-792, which the rail spur passes through. The K-31/K-33 parcel is 185 acres in size and is actively marketed by the CROET and the City of Oak Ridge Industrial Development Board because of its high potential for development. It is a flat parcel and has ample infrastructure to support future reuse. In 2017, CROET developed a Revitalization Plan and the K-31/K-33 parcel was identified as the parcel best suited for advanced material manufacturing (e.g., carbon fiber) and the parcel where an anchor tenant for ETTP could be located. An adjacent radioactive waste handling facility would be inconsistent with the development goals for the parcel and a likely deterrent to potential candidates being recruited to the site. Additionally, CROET would have to agree since they own much of the property that would be needed to execute the proposed alternative.

If the K-792 area was used as the rail loading facility, the rail spur that would be used to move the material to the main rail line at Blair Road would require transporting waste on the rail line through the Poplar Creek area and then up the rail spur adjacent to Heritage Center Boulevard, which is adjacent to the K-25 area. The Poplar Creek area was identified in the Revitalization Plan as a Private Industry area with a campus feel. It would have integrated green space in order to create an attractive aesthetic that would be complimentary to the advanced material manufacturing that would be situated just across Poplar Creek (Fig. 2.9). Daily rail traffic would not be consistent with the desired aesthetic and environs envisioned for this area of ETTP and hauling of radioactive waste would likely be a deterrent to future tenants. The K-25 area is being developed as a National Historic Park as part of the Manhattan Project historic preservation area. A History Center has been constructed on the site. This area is adjacent to the rail spur that would transport waste from the K-792 area to the Blair Road main rail line. To the east of this same rail spur are parcels that were transferred to CROET in 2015 that have been sold to private developers. Again, daily hauling of radioactive waste is inconsistent with the development of the National Historic Park.

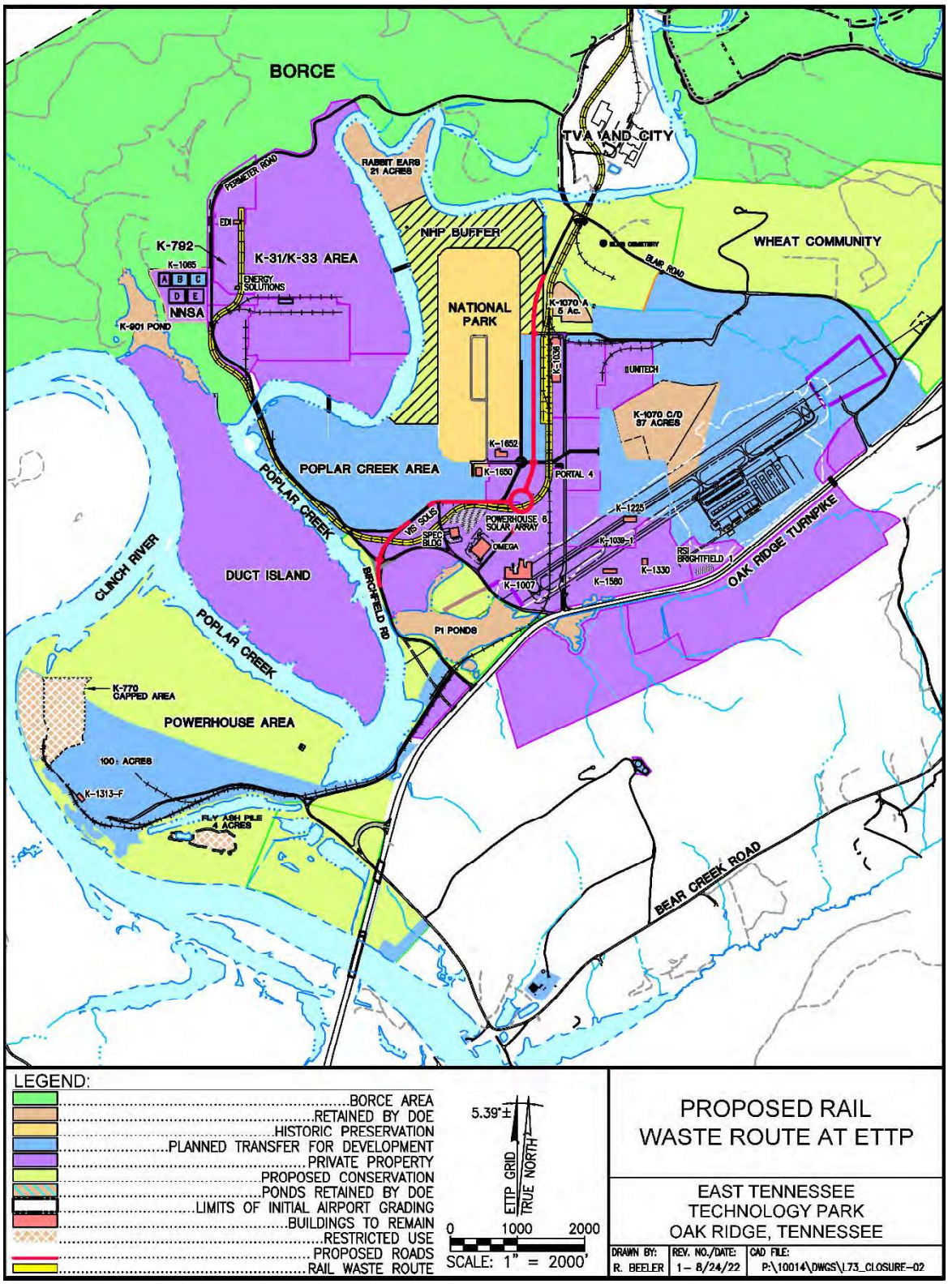

Fig. 2.9. Conceptual rail route at ETTP for offsite disposal alternative

A General Aviation Airport has been planned for ETTP and is in the final stages of Federal Aviation Administration approval. The proposed airport would require changes to the rail spurs at ETTP as well as the road network because the airport runway would bisect Heritage Center Boulevard and the adjacent rail spur, as shown in Fig. 2.9. The changes to the road network would be that the main entrance to ETTP would be at Birchfield Road instead of the current entrance at Heritage Center Boulevard. The new main road is shown on the figure in red, and it crosses over the rail line and is adjacent for a large section to the proposed rail hauling waste route. Daily rail traffic of any type would create a conflict with vehicle transportation, and hauling of radioactive waste in such close proximity to the public would be problematic. The bisection, due to the airport runway, of the rail spur along Heritage Center Boulevard would also cut off the rail spur that goes to the Powerhouse area from the main rail line. This change to the Powerhouse Rail spur would prevent use of the Bear Creek facility from connecting to the rail spur in the Powerhouse area, which would nullify connectivity to the Blair Road rail line without development of a new rail line connector.

The current rail spurs at ETTP that would be needed for future rail transportation of waste traverse through the heart of the ETTP site where they intersect. The spurs cross through and are adjacent to land parcels that have already been transferred out of DOE ownership and are planned for future development and are actively being marketed to attract future tenants. A Manhattan Project National Park is being developed adjacent to the main north-south rail line. DOE's current goal is to transfer major portions of ETTP out of DOE ownership and for it to be beneficially reused. The creation of a waste handling facility is inconsistent with this goal and a deterrent to future beneficial reuse of the site.

Development of a transportation route to bring waste from ORNL and Y-12 to the K-792 area is also problematic. If the airport is developed, it would impact Haul Road and it would have to be re-routed to continue operations. Also, for waste transportation to be considered out of commerce and avoid the additional costs and resources required to comply with U.S. Department of Transportation requirements, transportation must occur on site, that is within the contiguous (i.e., touching, unbroken, continuous) boundaries of a DOE site or facility to which public access is controlled or restricted (DOE Order 460.1D). There is not a pathway to the K-792 area that does not cross privately owned property, and as more property is transferred to CROET, this problem will increase.

2.14.3 Greenhouse Gases

Greenhouse gas emissions associated with the offsite transportation of waste generated have been estimated for Option 2 for the Offsite Disposal Alternative. Under this option, future CERCLA waste would be transported offsite for disposal at approved disposal facilities. All non-classified waste would be shipped by rail to a western commercial facility in Clive, Utah, and all classified LLW would be shipped by truck to the NNSS in Nye County, Nevada. Because the onsite alternatives and the offsite alternatives are considered to both require construction, operation, and short-distance hauling/handling in Oak Ridge (either to the EMDF or to a trans-loading facility), only the emissions associated with the long-distance hauling of waste is calculated as that is the notable difference between onsite and offsite disposal.

The distance from Oak Ridge to the western commercial facility is approximately 2290 miles and to the NNSS about 2056 miles. The estimated quantity of non-classified waste to be transported by rail is approximately 1,860,000 tons (18,600 gondolas each with 100 tons of material) over the life of the project (22 years). The estimated amount of classified LLW to be transported by truck over the life of the project is approximately 34,164 tons (1898 intermodal containers each with approximately 36,000 lb of material).

The weight of material and mileage is multiplied to obtain the ton-miles by rail and by truck to calculate the emissions. For the waste shipped by rail to the western commercial facility, 2290 miles and 1,860,000 tons equals 4,259,400,000 ton-miles. For the waste shipped by truck to the NNSS, 2056 miles and 34,164 tons equals 70,241,184 ton-miles.

EPA's Center for Corporate Climate Leadership provides regularly updated emission factors for greenhouse gas reporting. The most recent version of the Emission Factors Hub (March 2018) includes emission factors for product transport which were used to calculate the greenhouse gas emissions associated with this waste transportation as provided in Table 2.12 (EPA 2018).

Table 2.12. Greenhouse gas emission factors

Vehicle type	CO_2 factor (kg/unit)	CH_4 factor (g/unit)	N_2O factor (g/unit)	Units
Medium- and heavy-duty truck	0.202	0.002	0.0015	ton-mile
Rail	0.023	0.0018	0.0006	ton-mile

Source: EPA's Center for Climate Leadership Emission Factors Hub Table 9 Upstream Transportation and Distribution and Downstream Transportation and Distribution

EPA = U.S. Department of Energy

Typically, greenhouse gas emissions are reported in units of carbon dioxide equivalent (CO_2e). Methane (CH_4) and nitrous oxide (N_2O) emissions are converted to CO_2e by multiplying by their global warming potential (GWP). The GWPs used in these calculations are from the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (IPCC 2007) and consistent with the EPA's Emission Factors Hub (March 2018) as provided in Table 2.13. The estimated emissions for rail transportation to the western commercial facility and truck transportation to the NNSS are included in Table 2.14.

Table 2.13. Greenhouse gas global warming potential

Greenhouse gas	100-year GWP
CH_4	25
N_2O	298

Source: IPCC 2007.

GWP = global warming potential
IPCC = Intergovernmental Panel on Climate Change

Table 2.14. Greenhouse gas emissions for offsite disposal

Transportation type	CO_2e Emissions (metric tons)
Rail	98,919
Truck	14,224
Total	**113,143**

CO_2e = carbon dioxide equivalent

The total estimated emissions associated with transportation of the CERCLA waste offsite from the Oak Ridge NPL Site under Option 2 is 113,143 metric tons CO_2e over the life of the project. This is equivalent to approximately 24,022 passenger vehicles driven for 1 year or 13,548 homes' energy use for 1 year (EPA 2019).

2.14.4 Groundwater Field Demonstration

As per agreement with the FFA parties, a GWFD will be performed post-ROD to determine the seasonal high water table that will control the final design elevation of the geologic buffer in the knoll area. The GWFD scope will be detailed and finalized in a post-ROD RDWP, a primary document that requires approval by all three parties before implementation of the demonstration. This GWFD will provide

additional characterization information, and while not itself a change to the remedy, has the potential to affect the final design of the facility. Results of the field study will be incorporated into the RDR, which will present the final landfill design, and is also a primary document that requires approval by the FFA parties before landfill construction. The approved RDR will serve as the basis for a landfill design that will meet the RAO to maintain a 15-ft separation between the bottom of emplaced wastes and the seasonal high water table of the uppermost unconfined aquifer, which includes 5 ft of liner system and 10 ft of geologic buffer consistent with TDEC 0400-11-01-.04(4)(a)(2).

If the results of the groundwater study or demonstration as implemented and approved by the FFA parties indicate earthen fill materials must be imported to elevate areas of the site to comply with the RAO for minimum separation of wastes and groundwater, these requirements will be incorporated into final facility RDWP and RDR/RAWP and approved by EPA and TDEC before implementation. Mechanically stabilized earth walls will be evaluated as a design option if groundwater measurements indicate that elevating the facility is necessary. If the RAO cannot be achieved by design, then there will be no approval of onsite waste disposal under this ROD and the selected remedy shall be modified.

Existing piezometers will be supplemented with additional piezometers that will be installed as part of the GWFD in the study area of interest. Groundwater levels will be measured in all piezometers during two wet seasons (December through March or April). The study area will be modified to mimic the constructed landfill by installing a temporary liner to shed rainwater that would otherwise infiltrate into the ground and directing stormwater around the knoll to limit lateral groundwater recharge. Evaluation of water levels measured during the study will be used to support base elevations for the final landfill design.

Significant elements of the GWFD and subsequent evaluation will be specified in the post-ROD RDWP and will include:

- Determination of the areal extent of the study area, sized to sufficiently mimic anticipated, constructed landfill cells.
- Use of existing piezometers to collect groundwater elevation data for evaluation to determine the seasonal high water table.
- Installation of additional piezometers as needed in the study area, to provide sufficient groundwater elevation data so that interpretation of data is minimal.
- Clearing of the study area, and excavation as needed to provide for constructability, to remove material to help protect the temporary liner and to ensure worker safety.
- Installation of a temporary liner system over the study area, similar to the enhanced cover at the existing EMWMF, to shed rain water and reduce infiltration into the ground.
- Excavation as necessary to ensure stormflow drains from the demonstration area toward the tributaries; an upgradient trench will be necessary to facilitate movement of water around the study area.
- Engineered features may be necessary to improve construction conditions in the study area.
- Evaluation of the seasonal high water table of the uppermost aquifer, defined as the potentiometric surface based on the 80th percentile of water levels in the month with the maximum monthly median during the evaluation period (this may be thought of as the wettest month, where *wettest* refers to highest groundwater level and not necessarily the month with the most precipitation).
- Duration will include two wet seasons; after the first wet season, final design will begin based on the available data, and data collection will continue in the second wet season to refine the design, if needed.

- Adjustment to the evaluation results. If deemed necessary due to a demonstration period that is not representative of historical rainfall (significantly wetter or drier), an adjustment may be warranted. The determination of the method used to calculate the adjustments will be completed by an FFA triparty technical team. The adjustment process will include comparison of rainfall amount, duration, and frequency to historical measurements, and responses measured in surrounding piezometers to historical groundwater information. The representative criteria and adjustment method will be determined by the FFA triparty technical team.
- Evaluations will use linear interpolation between piezometers.

An EMDF-specific sampling and analysis plan will be developed post-ROD and will include the approach for monitoring the water levels post-construction to demonstrate continued compliance with the RAO.

2.14.5 Summary

The re-examined offsite disposal costs are still approximately double the onsite disposal costs. Either the economic benefits from reindustrializing ETTP cannot be realized, or, considerable costs would need to be added to the lower potential offsite disposal costs to avoid impacting ETTP. Additionally, there would be an increase in greenhouse gas emissions from transporting the waste across the country. This additional analysis of offsite disposal as a result of public comments did not modify DOE's selection of a disposal remedy.

There is a process under CERCLA for making changes to a selected remedy post-ROD. The CERCLA procedural requirements for making post-ROD changes are determined by whether the change constitutes an insignificant, significant, or fundamental change to the remedy. Each of these three categories of post-ROD changes has different documentation requirements: (1) a memorandum or note to the post-ROD file for an insignificant or minor change, (2) an ESD for a significant change, and (3) a ROD amendment for a fundamental change. In accordance with Sect. 300.435(c)(2) of the NCP, public notice of either a significant or fundamental change will be given and, if a fundamental change is proposed, a public comment period and opportunity for a public hearing also will be afforded before any ROD amendment is adopted.

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PART 3. RESPONSIVENESS SUMMARY

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RESPONSIVENESS SUMMARY

This responsiveness summary was prepared in accordance with the requirements of Section 117(b) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended. The purpose of this responsiveness summary is to summarize and respond to public comments on the Proposed Plan (2018a).

The U.S. Department of Energy's (DOE's) Oak Ridge Office of Environmental Management (OREM) is committed to conducting all of the robust communication efforts listed in its Environmental Management Disposal Facility (EMDF) Community Outreach Plan (DOE 2016), which was approved by the U.S. Environmental Protection Agency (EPA) and State of Tennessee. The following outreach commitments to ensure full public awareness about this important project were met in addition to responding to comments received during the public comment period which is the topic of this section of the Record of Decision (ROD).

- Large-scale outreach about the project began in 2015. City and county officials received tours and briefings. OREM hosted community meetings, and there was substantial media outreach on the topic. OREM also proactively reached out to numerous community groups to provide presentations about EMDF. These are all provided in more detail in the EMDF Community Outreach Plan.
- The CERCLA public comment periods are required to be provided for a minimum of 30 days, and are expanded based on public interest. OREM's public comment period for the Proposed Plan was 120 days (September 10, 2018 – January 9, 2019) to ensure all interested parties had time to review and provide comments on the document. Two extensions were granted while the original comment period was set at 45 days.
- OREM extended invitations to City of Oak Ridge and Roane County leadership as well as all members of Oak Ridge's City Council to receive briefings and tours related to the project. Several city council members participated in these personalized tours over the last few years to receive more information about the project.
- OREM and United Cleanup Oak Ridge LLC (UCOR) leadership has submitted multiple op-eds to the local newspapers over the last few years to provide more insight about the project. OREM also created and shared videos to help promote public understanding about the project.
- Two public information sessions were held at different Oak Ridge locations to increase availability for anyone seeking more information on the project (September 13 and October 2, 2018). Participants were able to obtain valuable information from posters, fact sheets, and speaking with all of the project managers associated with EMDF. Federal and contractor personnel were able to answer any questions from the attendees directly, share project timelines, and inform them of the opportunities and methods to share their input.
- As a follow-up from the information sessions, OREM provided personalized tours to the Environmental Quality Advisory Board and Tennessee Citizens for Wilderness Planning during the public comment period in the Fall of 2018.
- DOE participated in a third information session that was hosted by the Sierra Club at the Tennessee Department of Conservation and Environment (TDEC) office on October 11, 2018.
- DOE hosted a formal public meeting about the project and the Proposed Plan on November 7, 2018. The meeting was publicized in all of the local newspapers, on social media, and by mailing reminders to all 15,000 households in Oak Ridge.

- EMDF was the topic at the Oak Ridge Site Specific Advisory Board's (SSAB's) board meeting on November 11, 2018, which included a tour of the site the following week. This public meeting provided another opportunity for the community to learn about the project, ask questions, and share opinions during the official public comment period. Also, the board received a tour later that month as a follow-up to their briefing on the subject, which had a TDEC representative present.
- OREM attended the Oak Ridge City Council session on November 27, 2018, and the Anderson County Commission session on December 17, 2018, to answer questions about the EMDF project.

3.1 SUMMARY OF PROPOSED PLAN COMMENTS AND RESPONSES

The National Oil and Hazardous Substances Pollution Contingency Plan (i.e., the NCP) 40 *Code of Federal Regulations (CFR)* 300.430(f)(3)(i)(C) states: "Provide a reasonable opportunity, not less than 30 calendar days, for submission of written and oral comments on the proposed plan and the supporting analysis and information located in the information repository, including the [Remedial Investigations/Feasibility Study] RI/FS. Upon timely request, the lead agency will extend the public comment period by a minimum of 30 additional days."

The EMDF Proposed Plan was issued for public comment on September 10, 2018, and the review period was completed on January 9, 2019, for a total review period of 120 days after two extensions. Public input is an important consideration in the selection of the final remedy. The Proposed Plan included DOE's proposed remedial action based on all the regulatory requirements and the science available to the government, along with initial community input. All alternatives must be protective and comply with applicable or relevant and appropriate requirements (ARARs) or have a basis for a waiver/exemption. The criteria that must be balanced when making a remedy selection are: Long-term Effectiveness and Permanence; Reduction of Toxicity, Mobility, or Volume through Treatment; Short-term Effectiveness; Implementability; and Cost.

This Responsiveness Summary presents DOE's responses to comments received from the public review and comment period. DOE received comments from 194 individual commenters via several methods: email, comment cards submitted directly to DOE representatives, comment cards turned in at public meetings, speakers asking questions at the public meeting, and correspondence sent via U.S. Postal Service.

The breakdown of the comments received showed a majority of the commenters were in favor of the preferred remedy, onsite disposal in Central Bear Creek Valley (CBCV).

In addition to individuals and citizens who submitted comments in favor of the preferred alternative, formal written support was received from the Roane County Commission (Host County), the Knoxville Building and Construction Trades Council, and the Atomic Trades and Labor Council. The SSAB had documented earlier support for the EMDF. Consistent through the supportive comments were the following topics:

- Onsite disposal is safe, secure, protective, and offers timely disposal of waste.
- There is an economic benefit to the area through jobs.
- Availability of onsite disposal capability allows for timely and cost-effective remediation of the Oak Ridge National Priorities List (NPL) Site.
- The existing Environmental Management Waste Management Facility (EMWMF) has successfully disposed of waste safely and compliantly.

DOE believes that an onsite disposal facility provides a long-term secure facility that will safely contain the waste. The use of engineered features such as a double liner and leachate collection system, a multi-liner cover, limitations on the level of contamination that can be placed in the facility, and commitments to long-term maintenance and monitoring of the facility will provide long-term protection of human health and the environment.

A recent study shows that the economic benefits from the additional jobs associated with constructing, operating, and maintaining a disposal facility will add to the economic health of the surrounding communities. A cost-effective disposal option ensures that remediation efforts can continue, also providing hundreds of remediation jobs to the Oak Ridge community. DOE understands the community's concerns with losing jobs should the remediation and construction dollars that could stay in Oak Ridge go instead to western facilities and the railroads.

A cost-effective disposal option provides more funds that can be spent on remediation instead of waste disposal, a factor very important to the community and to DOE. Remediation efforts will have real human and environmental health benefits to the local community, as well as support its economic health.

The existing disposal facility, the EMWMF, has been operating safely for 20 years. Numerous outside assessments have been conducted of the facility operations by DOE-Headquarters, outside technical experts, and the regulatory agencies with no significant findings. Lessons have been learned over the years, and these lessons in design and operation will be applied to any new onsite disposal facility.

Concerns about or opposition to the preferred remedy were received from the Oak Ridge Environmental Quality Advisory Board, the Southern Environmental Law Center, the Tennessee Chapter of the Sierra Club, the Advocates for the Oak Ridge Reservation, and individual citizens. While many of the remaining commenters were clearly against onsite disposal, some of the commenters were requesting more information, wanted input into what could be placed in an onsite disposal facility, or preferred another onsite alternative. Many of the comments addressed the following concerns:

- Opportunity to review and comment on the waste acceptance criteria (WAC) prior to issuing with the ROD
- Concerns with mercury-contaminated waste
- Need for waivers for regulatory compliance
- Oak Ridge's underlying geology and rainfall
- Overestimation of offsite disposal cost and risk
- Impact of hazardous waste disposal site in Oak Ridge on home values and attracting people/businesses to Oak Ridge.

DOE addressed these concerns as follows:

WAC – RI/FSs for disposal facilities sometimes contain placeholder WAC, as was done for EMDF. The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as applicable or relevant and appropriate requirements (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from

disposal. Experience with cleanup projects on the Oak Ridge Reservation (ORR) indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils), and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, Federal Facility Agreement (FFA) parties-approved primary document, the WAC Compliance Plan.

Concerns with mercury-contaminated waste – DOE will meet all regulatory requirements pertaining to mercury treatment and onsite disposal of waste. In addition, the FFA parties have agreed to limitations on mercury waste disposal; Resource Conservation and Recovery Act of 1976 (RCRA) mercury hazardous (D0009) waste is prohibited from disposal. The regulatory compliant design, operation, and closure of the onsite disposal facility, coupled with DOE's compliance with all regulatory requirements concerning mercury and agreements reached with the FFA parties, will help to ensure that the new disposal facility is protective of human health and the environment over the long term. For West End Mercury Area remediation projects with EMDF-bound waste streams, DOE will take all practical measures to remove mercury before waste generation and send that mercury offsite to treatment/storage/disposal facilities.

Need for waivers – Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

A Toxic Substances Control Act of 1976 (TSCA) waiver for two parts of TSCA 40 *CFR* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

- 40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the ORR. Compliance with the RCRA Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the EPA determination that the remedy is protective of human health and the environment.

- 40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley (BCV) is situated at the slope of Pine Ridge. The landfill in CBCV can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.

An exemption to TDEC 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

Geology and rainfall – One of the criteria for site selection is the avoidance of karst features. The RI/FS and Proposed Plan both clearly state that there are no karst features in the geology underlying any of the waste footprints being evaluated for EMDF, based on historical characterization of BCV. To further validate this understanding, DOE conducted additional geologic investigations at the CBCV site. The resultant validation information is presented in two Phase I Site Characterization Technical Memoranda provided in the Administrative Record.

East Tennessee has annual rainfall varying from 38–77 in. per year as measured at the Y-12 National Security Complex (Y-12) over the last 30 years, with an average of 54 in. per year. The 2019 and 2020 annual rainfall amounts were both high, approximately 70 and 71 in., respectively. According to the original Feasibility Study conducted in BCV (DOE 1997), approximately 50 percent of the precipitation exits through evapotranspiration (evaporation or use by vegetation) with the highest rate when the vegetation is growing. Of the precipitation remaining after evapotranspiration, 80 percent of the flow exits the valley through surface water flow. Very little of the rain enters the groundwater. There are multiple engineering features that can be used to control water flow. These features, such as interim covers, diversions trenches, and sedimentation basins, have been used successfully to divert rainwater during operations at the existing disposal facilities on the Oak Ridge NPL Site as well as at other disposal facility locations. Rainwater that contacts the waste will be collected and treated. When the facility is closed, a final cover will be installed that will prevent rainwater from entering the waste.

The landfill siting and design reduce concerns from climate change and provide resiliency to potential increase in rainfall and flood events through the following measures:

- Located outside the 100-year floodplain and on Pine Ridge, away from and at a greater elevation than Bear Creek. Waste elevation is approximately 60 ft higher than Bear Creek elevation in this area.
- Landfill does not cross one of the northern tributaries. Tributary immediately west of the landfill will be armored and widened to improve run-off. Tributary immediately east of the landfill will be diverted into an adjacent tributary. Culverts beneath the existing Haul Road will be oversized to improve drainage from the area and eliminate ponding.
- Upgradient diversion ditch is considerably oversized – greater than 100-year storm event.

Additional considerations will be part of the post-ROD final design.

Offsite disposal costs and transportation risks – The selection of DOE's preferred alternative was based in part on the increased transportation risks associated with the offsite shipment of waste. The evaluation of transportation risks as presented in the RI/FS and summarized in the Proposed Plan were based on the latest techniques using DOE actuarial statistics. The safety of DOE's waste shipment program is an extremely high priority and DOE strives to make every shipment safe, but both trucks and trains must interact with the public over which DOE has no control. When the volume of waste and the distance required for disposal for the offsite alternative are considered, the statistical evaluation shows a significant increase in fatalities and injuries resulting from accidents. Again, DOE will strive to make every shipment safely, but the projected accident statistics associated with offsite disposal are a significant concern.

In response to public comments received, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal, and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the evaluation of the offsite disposal costs.

Socioeconomic impact – DOE can find no evidence that expansion of disposal capacity would have negative consequences on property values or economic development in Oak Ridge. To the contrary, jobs associated with construction and operation of the facility, and the acceleration of cleanup enabled by onsite disposal and subsequent opportunities that it would present to Y-12 and Oak Ridge National Laboratory, are expected to benefit both the economy and perception issues associated with environmental conditions in Oak Ridge.

There were also numerous individuals or groups that submitted comments on a range of related topics, including:

- Requests for additional detailed technical information
- Request for additional time for the comment period (was granted)
- Request for compensation from DOE to the City of Oak Ridge
- Two proposals from offsite disposal facilities to work with Oak Ridge to take the low-level (radioactive) waste (LLW) that would likely be disposed in the EMDF.

Upon receipt of all the public comments, DOE evaluated these comments to determine if there was new or differing information, if errors were found, or if there was an alternate perspective that caused the technical evaluation to be modified or changed the balance of pros and cons associated with the proposed remedy. Each of the comments received on the Proposed Plan was considered as to its potential implications to the ROD. The comments received provided valuable input on the proposed remedial action.

Based on the evaluation of the comments received, DOE has taken the following steps, which are documented in Part 2 of the ROD:

Further evaluation of the transportation impacts associated with Offsite Disposal Alternative – As a result of public comments received on the Proposed Plan, DOE performed additional evaluation of the transportation impacts associated with the shipment of Oak Ridge CERCLA waste to offsite disposal locations. Although not required by CERCLA, DOE quantified the generation of greenhouse gas (GHG) emissions associated with the shipment of waste to offsite disposal sites. If the Offsite Disposal Alternative would have been selected, GHG emissions would have been significantly greater than the Onsite Disposal Alternative.

Further evaluation of the impacts of the Offsite Disposal Alternative on future industrial development at the Oak Ridge Site – As discussed in the Proposed Plan, the Offsite Disposal Alternative would require a trans-load facility on the Oak Ridge NPL Site to transfer waste to rail cars. Based on this evaluation, DOE has determined that use of the existing trans-load facility at the East Tennessee Technology Park (ETTP) for the transfer of radiological waste could have a negative impact on the plans for reindustrialization of ETTP. A trans-load facility located elsewhere on the Oak Ridge Site would increase the costs of offsite disposal through installation of new rail spurs and haul roads along with the loading facility.

Further evaluation of the costs of the Offsite Disposal Alternative – In response to public comments, DOE evaluated recent offsite transportation and disposal costs and determined that Offsite Disposal costs presented in the Proposed Plan are reasonable and generally consistent with the EPA-recommended cost range of +50 percent to -30 percent. See Sect. 2.14 in this ROD that further discusses the Offsite Disposal costs. One example of recent disposal costs was just below the range for the CERCLA cost estimate in the Proposed Plan assuming a trans-load facility at ETTP is used, but still significantly higher than the Onsite Disposal Alternative. If a new trans-load facility and spurs are required, costs will be higher but will remain

consistent with the RI/FS estimates for offsite disposal using the EPA-recommended cost range of +50 percent to -30 percent.

Since the Proposed Plan was issued, the WAC have been generated and the analytic WAC and the administrative WAC have been documented in the ROD. The WAC will control the amount and type of waste that can be placed in the EMDF. For chemicals, the WAC relies on RCRA disposal requirements which control the disposal of hazardous waste across the country. Mercury hazardous waste that is characteristically hazardous per RCRA (D009 waste) will not be disposed of in the EMDF. Specific analytic WAC were developed for radionuclides. DOE has also completed the Performance Assessment and Composite Analysis, which demonstrate attainment of the long-term performance objectives of EMDF as a DOE LLW landfill. The demonstration of attainment of the long-term performance objectives of the EMDF under DOE Orders has led DOE-Headquarters to issue a preliminary Disposal Authorization Statement, which allows for the construction of a radiological disposal facility.

While many of the comments present information or opinion with which reasonable people may disagree, DOE believes that the information, analysis, objectives, and decisions made to this point support the need for additional CERCLA onsite disposal on the Oak Ridge NPL Site that can be safely and compliantly implemented. These responses provide information relative to opinions where additional information would help the reader understand the basis of the selected remedy.

DOE appreciates the public input provided during the evaluation of this remedial action alternative. The selected remedial action contained in this ROD will provide a permanent and safe alternative for the disposal of CERCLA waste generated at the Oak Ridge NPL Site.

PROPOSED PLAN INDIVIDUAL COMMENTS

Note: The comments have been presented below exactly as received, including all typographical and grammatical errors.

Comment: 1: Comment from County Commission for Roane County, Tennessee

Resolution No. 10-18-23

A resolution supporting the U.S. Department of Energy construction and operation of a new, engineered onsite disposal facility known as the Environmental Management Disposal Facility (EMDF) in Central Bear Creek Valley near Y-12

WHEREAS, the United States Department of Energy (DOE) has had a significant impact on the local cities, counties, and region by providing viable employment opportunities for multiple generations of families in East Tennessee, and provided an invaluable service to our great Nation during World War II and the Cold War; and

WHEREAS, two of the three DOE Oak Ridge facilities are located in Roane County and have contributed extensively to both the local economy and livability by improving the standard of living; and

WHEREAS, Y-12 and the Oak Ridge National Laboratory (ORNL) continue to be vital to our national security; and

WHEREAS, the historic cleanup of the East Tennessee Technology Park (ETTP) has enhanced Oak Ridge's safety and provided the community with land to attract private industry and expand the area tax base; and

WHEREAS, this unprecedented cleanup was made possible because of the current onsite disposal facility known as the Environmental Management Waste management Facility (EMWMF); and

WHEREAS, EMWMF has enabled DOE and the American taxpayer to avoid almost $1 billion in additional disposal waste management costs so that additional efforts could be directed toward removing existing hazards and reducing environmental risk; and

WHEREAS, EMWMF is expected to reach capacity within the next five to ten years while additional disposal space will be necessary to efficiently and safely achieve cleanup as DOE shifts its mission to the removal of excess contaminated facilities at ORNL; and

WHEREAS, construction of a new onsite disposal facility known as the Environmental Management Disposal Facility (EMDF) in Central Bear Creek Valley near Y-12 will be critical in the near-term for the continuation of large-scale cleanup efforts planned across the Oak Ridge Reservation, including removal of 75-year old aging excess contaminated and deteriorating buildings at ORNL and Y-12; and

WHEREAS, EMDF will be situated in Roane County; and

WHEREAS, EMDF will be built to the highest engineering standards incorporating appropriate safeguards to protect the public and the environment; and

WHEREAS, DOE has a proven record of safety operating the existing landfill during the past sixteen years adhering to the strictest regulatory standards governing Waste Acceptance Criteria; and;

WHEREAS, the wastes which will be placed in EMDF will be comprised of building debris and minimally contaminated soil while elemental mercury will be disposed offsite; and

WHEREAS, construction of EMDF is crucial to completion of DOE's cleanup mission in a timely manner;

WHEREAS, Roane County, Anderson County, Knox County, Loudon County and other adjacent counties and cities have been working in and around the nuclear activities at Oak Ridge for decades and have the employee workforce and skill set necessary to help DOE complete the cleanup mission;

NOW, THEREFORE, BE IT RESOLVED that the Roane County Commission supports DOE's efforts to construct the new onsite disposal facility known as the Environmental Management Disposal Facility (EMDF) in Central Bear Creek Valley near Y-12 in Oak Ridge, Roane County, Tennessee.

BE IT FURTHER RESOLVED that a copy of this resolution be transmitted to our state and federal legislators asking for their support of this project.

UPON MOTION of Commissioner Moore, seconded by Commissioner Gann, the following Commissioners voted yes: Bell, Berry, Bowers, Brashears, East, Ellis, Gann, Hester, Hickman, Hooks, Meadows, Moore, White, and Wilson. (14)

The following Commissioners voted No: -0-

The following Commissioners Passed: -0-

THEREUPON the County Chairman announced to the Commission that said resolution had received a constitutional majority and ordered same spread of record.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. As the host county of the Environmental Management Disposal Facility (EMDF), DOE appreciates your support of the preferred remedy. EMDF will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 2: Comment from Robert A. Morris, P.E.

I attended the public meeting on the EMDF on November 7 at the New Hope Center and I have reviewed various sources of information about the project. I believe the preferred location in Bear Creek Valley is the best solution to the low level waste issue on the Oak Ridge Reservation. Disposing of the waste onsite once all of the TDEC and DOE reviews have been completed and approved is the best solution for the environment and provides the optimal economic impact for the Oak Ridge community. My professional opinion as a civil engineer with over 40 years of experience in construction and land development is that constructing the EMDF in the Bear Creek Valley is the best solution. On a personal note, I live in Knox County just across the Clinch River from the DOE Reservation and within 3 miles of the EMDF site. My home utilizes groundwater via a well for drinking water as do a larger number of my neighbors in Gallaher Bend. I believe the EMDF design adequately addresses the requirements to prevent groundwater contamination.

Thank you for considering my comments as you finalize the review of the EMDF project.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will

consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 3: Comment from Chris Purdy

Yes. I agree. It keeps job's in East TN.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 4: Comment from Mike Hawn

I am for the landfield.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated

from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 5: Comment from T. Shadden

I'm okay for a landfill.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 6: Comment from Scotty Hendrickson

I am ok with the land fill.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 7: Comment from Douglas McMurdy

We need the land fill for growth in O.R. We have the technology to treat mother earth eco friendly; and checks owr contingency plans through owr andminastrative controlls. Let build us a new cell.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA

40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 8: Comment from Ken Rueter, President and Chief Executive Officer of UCOR

As a resident of Oak Ridge, I am submitting my comments on the Proposed Plan for providing additional onsite disposal capacity for waste generated from the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) cleanup at the Oak Ridge Reservation (ORR).

In short, I support this Proposed Plan and concur on the plan to construct the engineered landfill in the Bear Creek Valley area of the ORR – it is not just needed, it is essential for cleanup to enable mission critical work at Y-12 and ORNL.

We have had significant success with on-site disposal supporting cleanup at ORR. DOE's experience with the existing landfill over nearly two decades has shown that the new facility can be operated safely and compliantly. Strict regulatory criteria govern the types of waste that are disposed of onsite. The wastes are mostly comprised of building and other debris, containing minimal contamination. In fact, approximately 95 percent of the volume of cleanup waste on the Oak Ridge Reservation has gone to the Environmental Management Waste Management Facility and other smaller onsite disposal facilities with the remaining, more contaminated waste being disposed of offsite.

Today, safe operation and continuous regulatory monitoring are the guiding principles of our landfill operations. Like the existing landfill, the new one will be built to the highest engineering standards incorporating appropriate safeguards to protect the public and the environment.

Exacting design criteria go the extra mile to incorporate safeguards that ensure safety for at least 1,000 years. Federal and state regulators would provide weekly monitoring of the disposal facility, including hundreds of samples used to analyze the surrounding air, groundwater, and surface waters.

As we continue to support DOE in preparing for the remaining large-scale cleanup work at ORNL and Y-12, we recognize that our work is critical to enabling vital ongoing and future missions at the world-class research and production facilities in Oak Ridge. At the same time, we are protecting the environment and reducing risks to residents across the region, all the while, benefitting local jobs and the economy.

In contract, if we have to dispose of the waste offsite, we are presented with many challenges. Offsite disposal would require transporting waste to ETTP and offloading it to prepare and load it for offsite transportation, which would present risks associated with double handling of waste. Risk assessments for offsite disposal conclude that 2.5 fatalities and four injuries could occur if waste is shipped offsite by rail. Twenty-six fatalities could occur due to vehicle emissions plus seven fatalities due to vehicle accidents along with 124 injuries if shipped offsite by truck.

According to the cost estimates included in the proposed plan, offsite disposal is approximately 100 percent more costly than disposing of the waste onsite. In addition to being less safe, offsite disposal can also lead to losing local jobs associated with constructing and operating an onsite facility, resulting in an adverse impact to our local economy. These jobs will move to other areas of the country.

My family and I live, work and play in Oak Ridge. As an avid cyclist, I treasure my job of cleaning up and safeguarding this community's beautiful environment while ensuring its sustainability. For this reason I

wholeheartedly endorse moving forward with the proposed Environmental Management Disposal Facility, which would be constructed and operated beyond UCOR's contract as the ORR cleanup contractor.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 9: Comment from John Asberry

We need this land-fill close to the work were doing. This keeps this waste off the publit roads.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is

invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 10: Comment from Mikle Lay

Its silly to ship out an it cost money an a lot of job here locally.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 11: Comment from Kim Conrad

I am for building the landfill in East Tennessee.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies

with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 12: Comment from Randy Daugherty

If the landfill is enviromentally funded it only helps the community not hurt it.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 13: Comment from Ben Organek

Keep's job here. Environmentaly frendly.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will

consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 14: Comment from anonymous

I agree with have a new landfill. We need the work to say local. Landfield helps the community grow its been working up to now. Don't change it. It's environmental funded so it's a win-win.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 15: Comment from Vaughn Daniels

Yes. Landfill are needed.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a

robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 16: Comment from John Powell (from November 7, 2018 public meeting)

So my name is John Powell, and I am a resident of East Tennessee, also employed at Oak Ridge National Laboratory. To be clear, I'm not associated with the cleanup program at Oak Ridge National Lab. I'm associated with the scientific side of the house.

As most people here know, Oak Ridge National Lab, for 75 years almost to the day, has been one of this country's leading scientific institutions. There's a lot of important scientific work that goes on there and needs to continue to go on there, and the laboratory's future does depend on having an effective and an efficient environmental cleanup program.

As, Dave, as you've said, a lot of progress has been made in Oak Ridge cleaning up some of the reservation, certainly K-25, but much work remains to be done in the cleanup program at ORNL. We have almost 100 buildings, maybe more than 100 structures, that are still existence at the laboratory that are surplus to the science need, and they need to be demolished. Not only are these buildings in the way of new science facilities to do new missions, but many of them do have hazards. The buildings need to be demolished in a safe and efficient way, and the waste from that demolition needs to be managed in a safe and efficient way. And some of that waste would be suitable for onsite disposal in a properly engineered and designed landfill.

So I've been working in Oak Ridge for almost 35 years. I've worked at all three of the sites. I understand the magnitude of the cleanup program that has to still go on. But I also have worked with DOE for 35 years, and I understand that cleanup dollars have to be spent efficiently. If we're going to spend $800 million to ship the waste across the country, that means a lot less cleanup will happen. And that is not in, certainly, the Oak Ridge National Laboratory's best interest. We need to make sure the dollars are spent wisely, while properly assuring safety and protection of the environment.

So with that in mind, my comment is that I support a properly engineered and designed landfill here in Oak Ridge to support the cleanup program and help ensure the scientific mission of the laboratory can go on for at least another 75 years. Thank you.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 17: Comment from Larry Shephard

I feel that having the land fill here at Oak Ridge is just good economic sense for the local community and workers. We should not sacrifice jobs for our local people and ship our waste out of state.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and

state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 18: Comment from Randall Worthington

Saves money and creates jobs. A++

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 19: Comment from Bobby Russell

I believe we need to build the new landfill to keep from shipping all the way across the U.S. for the cost of shipping.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies

with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 20: Comment from Nathan W. Thomas

I am for a new landfill to keep government money coming in and being spent in East Tennessee!

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 21: Comment from Walter Hitson

I am for keeping the landfill here in Oak Ridge, TN.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will

consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 22: Comment from Jeremy Wilson

It would be good if they built it here! It keeps jobs here!

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 23: Comment from Jesse Buchanan

I am for putting the new landfill in Oak Ridge, TN. We can keep the money in East Tennessee. More work for Tennesseeans.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a

robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 24: Comment from John C. Roberts

For the land field.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 25: Comment from Sonya Johnson

I am submitting my comments on the Proposed Plan for providing additional onsite disposal capacity for waste generated from the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) cleanup at the Oak Ridge Reservation (ORR).

The construction of the engineered landfill in the Bear Creek Valley area of the ORR is essential for cleanup to enable mission-critical work at the Y-12 National Security Complex and Oak Ridge National Laboratory (ORNL). The availability of onsite disposal is important to completing cleanup in a timely and cost-effective manner. The cleanup of Y-12 and ORNL will be magnitudes larger than cleanup of ETTP, generating a massive amount of waste. If waste has to be shipped offsite for disposal, cleanup costs will increase substantially. Not only will we, as taxpayers, have to pay for transporting the waste across the country, we will also have to pay the monumental cost of disposal at another facility. Offsite disposal will also extend Oak Ridge's cleanup timeline.

Onsite disposal supported DOE's success in cleaning up ORR and facilitated the achievement of Vision 2016, demolition of the five massive gaseous diffusion buildings at ETTP. DOE's experience with the existing landfill over almost two decades has shown that onsite disposal facilities can be operated safely and compliantly. Strict regulatory criteria govern the types of waste that are disposed of onsite. The majority of the cleanup waste on the Oak Ridge Reservation has gone to the Environmental Management Waste Management Facility and other smaller onsite disposal facilities, with the remaining, more contaminated waste being disposed of offsite.

Safe operation and continuous regulatory monitoring are essential to landfill operations, and based on past performance, I am certain the new landfill will be built to the highest engineering standards, incorporating appropriate safeguards to protect the public and the environment.

As DOE prepares to address the remaining large-scale cleanup work at ORNL and Y-12, onsite disposal is critical to enabling vital ongoing and future missions at the world-class research and production facilities in Oak Ridge.

If DOE is forced to dispose of the waste offsite, they would be presented with many risks and challenges. Offsite disposal would require transporting waste to ETTP and offloading it to prepare and load it for offsite transportation, which would present risks associated with double handling of waste.

In addition to being less safe, offsite disposal eliminates local jobs associated with constructing and operating an onsite facility, adversely impacting our local economy.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a

remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 26: Comment from Emelia Harrison

I'm for the landfill to keep jobs here. It's not like you'll see this from public roads anyway.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 27: Comment from Billy "Devin" Brackett

I support the new landfill and would think it would be good for keeping jobs here.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision

(ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 28: Comment from Grant Andrews

For land field.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 29: Comment from Greg Doughty

You need to make sure you do your job and keep the land fill on Oak Ridge Reservation. This is jobs for our community. We don't need to support other. Build the new landfill here.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental

Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 30: Comment from Robert Martin

If shiped to Nevada it will cost local jobs and hurt local areas economy, plus slow down production of D+D.

Need to know more about water treatment plan!

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

All management of wastewater will be carried out in compliance with agreed-upon regulatory discharge requirements. Discharge limits are set in compliance with applicable or relevant and appropriate requirements and will be met throughout the operation of the EMDF. DOE will treat landfill wastewater to remove contaminants that exceed regulatory discharge limits.

Comment 31: Comment from Brian Williams

I am for the new land fill because it supples jobs for local people and helps with money cost.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 32: Comment from Dana Hudson

I have worked for a number of years, in and around the Oak Ridge Reservation. As a Safety and Health Representative., from the early 1980s till present. The workforce at the Oak Ridge Reservation is very knowledgeable and trained in the treatment and disposal of various types of hazardous waste. This from the segregation to the packaging and lastly in the transportation and disposal. The haul road (not a public road) is already here and in place to provide transportation to a new land fill. The employees that work the transportation end have the required training for this task and carry out their the work activities in a very personal way (take pride in their work kind of way). This eliminates the need for trucking packaged materials across the country through other states and risking the chance of an incident on public-use roads. The new landfill will be constructed with the latest high tech design, by employees who are versed in this type of construction and also operated by trained/knowledgeable employees, this in order to protect human health and the environment.

With all the above I have stated, It is my opinion and my family's opinion the choice for a new landfill within the Oak Ridge Reservation is a no brainer.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 33: Comment from Mildred Russell

Part 1: I'm for the landfill onsite at ETTP. I understand that the runoff is collected and monitored for public release. But I also feel that people at the ETTP should have the chance for employment with the landfill here on site.

Part 2: I support the landfill in Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption

to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 34: Comment from Angela Bunch

A new landfield needs to be built and to keep jobs in the community.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 35: Comment from Eddie Seeber

Yes. Keep our jobs in East TN so yes on landfill. The old one is full and it is more economic to keep it here with well trained employees.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a

remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 36: Comment from Phillip Creasman

Build the new landfield here, keep jobs here, allready .gov land that's just sitting here, no one wants, save taxpayers money. Transporting waste across country is hazardous, costly, and dumb when we have a place here for it.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 37: Comment from Jeff Jeffers

Sounds good. More jobs for East Tennessee.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will

primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 38: Comment from Suede Duncan

I am for the landfill to be built. Keep food in our famalies mouth here in east Tennessee.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 39: Comment from Rose Shirks

I am for building the landfill in East Tennessee.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 40: Comment from Sherry Browder

I'd like to provide a comment in support of the EMDF. Yes, I work for UCOR, but more importantly, I've been an employee in the Environmental Restoration related area in Oak Ridge since 1989. While I wish that there was never a need to EVER have to construct a disposal facility of any kind, let alone a landfill, I understand and support the need to construct EMDF.

I feel confident that it will be designed, constructed, and operated in an environmentally compliant and safe manner.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a

remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 41: Comment from Doyte Hay

I am for the cell. I think it is better to build the cell here rather than shipping out west. That would cost a lot more to ship the debris out west. That would take money from the work force here at UCOR. Lets build the cell here and keep the savings here.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 42: Comment from Kevin Will

I say yes for the landfill. It's would be keeping jobs for East Tenn.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will

primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD. The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 43: Comment from Liz Marcotte

I am for having a new landfill in the Oak Ridge reservation. Experienced individuals to work it, keeps members of the community employed.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 44: Comment from Rex Thompson

Bring it.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 45: Comment from Randell Blalock

Keeps job’s and environmentaly friendly.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption

to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 46: Comment from Daniel Macias

I agree that a new CERCLA landfill is needed in Oak Ridge to maintain cleanup activities progressing past ETTP cleanup. Construction and safe, compliant operation of a new landfill represents the most cost effective approach for disposal of cleanup waste from the ORR and is in the best interest of the citizens of Oak Ridge and East Tennessee.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 47: Comment from Todd Phillips

I support EMDF. Onsite disposal is critical to timely and cost effective environmental cleanup. EMWMF has been critical to cleanup success at ETTP. This model should be used as cleanup work moves to ORNL and Y-12.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with

contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 48: Comment from Pam Garrett

Leave the jobs here where they belong. Keep us all working.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 49: Comment from Darin Davis

I support.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a

robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 50: Comment from Daniel McKinney

Support.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 51: Comment from Benny Noe

Taxes are high enough. Lets support the Oak Ridge landfill. Keep jobs in Oak Ridge, TN.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 52: Comment from Michael Hodgson

I am in support of the new landfill due to understanding the waste stream and how the waste is segregated. The most hazardous waste is sent west.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA

40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 53: Comment from Carrie Wolfe

Based on my experience working at ETTP, I recognize the importance of a safe, compliant, onsite disposal facility. I am in favor of the landfill to support future cleanup work.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 54: Comment from Derrick Jeffers

I am for the land fill remaining in Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the

National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 55: Comment from Bobbie Williams

I am for the landfield to be here in Oak Ridge. Keep our jobs here.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 56: Comment from Kesler Young

I support the landfill to be here in Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and

Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 57: Comment from Tyler Chumley

A landfill in Tennessee is great because it creates jobs and enhances cleanup at multiple sites in the area.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 58: Comment from Mark Hughett

I believe the land fill should be approved. It will help create more jobs for East Tenn.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental

Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 59: Comment from Samantha Dolynchuk

Given my work experience @ UCOR, I'm a proponent of EMDF as an onsite disposal option for future waste generated during future cleanup of DOE's Oakridge footprint.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 60: Comment from Kimberly Jackson

I believe we need to keep it local. I support the landfill in Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 61: Comment from Cindy Humphrey

I support landfill.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption

to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 62: Comment from Matthew Grizzle

I support the landfill in Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 63: Comment from Veronica Adkisson

I support the landfield to be in Oak Ridge Tennessee.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with

applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 64: Comment from Michael Mills

I support the proposed plan based on my experience at ETTP.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 65: Comment from Leo Sain

As a resident of Oak Ridge and former Oak Ridge cleanup executive with extensive experience, I am submitting my comments on the Proposed Plan for providing additional onsite disposal capacity for waste generated from the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) cleanup at the Oak Ridge Reservation (ORR).

The construction of the engineered landfill in the Bear Creek Valley area of the ORR is essential for cleanup to enable mission-critical work at the Y-12 National Security Complex and Oak Ridge National Laboratory (ORNL). The availability of onsite disposal is important to completing cleanup in a timely and cost-effective manner. The cleanup of Y-12 and ORNL will be magnitudes larger than cleanup of ETTP, generating a massive amount of waste. If waste has to be shipped offsite for disposal, cleanup costs will increase substantially. Not only will we, as taxpayers, have to pay for transporting the waste across the

country, we will also have to pay the monumental cost of disposal at another facility. Offsite disposal will also extend Oak Ridge's cleanup timeline.

Onsite disposal supported DOE's success in cleaning up ORR and facilitated the achievement of Vision 2016, demolition of the five massive gaseous diffusion buildings at ETTP. DOE's experience with the existing landfill over almost two decades has shown that onsite disposal facilities can be operated safely and compliantly. Strict regulatory criteria govern the types of waste that are disposed of onsite. The majority of the cleanup waste on the Oak Ridge Reservation has gone to the Environmental Management Waste Management Facility and other smaller onsite disposal facilities, with the remaining, more contaminated waste being disposed of offsite.

Safe operation and continuous regulatory monitoring are essential to landfill operations, and based on past performance, I am certain the new landfill will be built to the highest engineering standards, incorporating appropriate safeguards to protect the public and the environment.

As DOE prepares to address the remaining large-scale cleanup work at ORNL and Y-12, onsite disposal is critical to enabling vital ongoing and future missions at the world-class research and production facilities in Oak Ridge.

If DOE is forced to dispose of the waste offsite, they would be presented with many risks and challenges. Offsite disposal would require transporting waste to ETTP and offloading it to prepare and load it for offsite transportation, which would present risks associated with double handling of waste.

In addition to being less safe, offsite disposal eliminates local jobs associated with constructing and operating an onsite facility, adversely impacting our local economy.

Oak Ridge is my home. I love this community and wholeheartedly endorse moving forward with the proposed Environmental Management Disposal Facility for continued protection of its beautiful environment.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and

state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 66: Comment from Shawn Wright

Keep the work local. Reduces the risk of off-site contamination and helps the local economy. Increased shipping costs will reduce the available funding for labor and will result in a reduction of work force.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 67: Comment from Kasey Griffis

I support landfill in Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies

with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 68: Comment from Travis

I support the landfill in Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 69: Comment from Susan Woody

I support the landfield to be here in Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will

consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 70: Comment from Corey Edmonds

Keep it local. I support the landfill to be in Tennessee.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 71: Comment from Zachary Ward

I support the new proposed landfill here in Oak Ridge in hope of many years of more work.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated

from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 72: Comment from Travis Lamb

Waste will accumulate whether its in TN or another state. The positive to keeping here is longer work for the local.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 73: Comment from Caleb Parrott

I support the Oak Ridge landfill. Local work and tax dollars put to good use, not wasting tax money on shipping to Nevada or elswhere.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 74: Comment from Richard Burroughs

I live in Oak Ridge and am in support of the waste disposal landfill to be located on-site at the Y-12 facility. The arguments presented by local government officials, their contractors and advisory boards, against this landfill do not dissuade me from believing that the proposed plan as presented is the best solution for moving forward with the remediation and reutilization of the facility.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies

with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 75: Comment from Joseph Henry

For new landfill in Oak Ridge more jobs for the area.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 76: Comment from Gerald Mullins

Yes I agree. Need to keep clean up going strong.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will

consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 77: Comment from Ernie Bradshaw

I am for it. I worked @ the plants for 18 years need to keep job in East TN Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 78: Comment from Gabe Lowe

I think it would be best for us to have our own landfill for cost efficincey which would mean more jobs for the locals.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a

robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 79: Comment from Sammy E. Hickman

I think this is good for local economy and keeping worker in this working and building growth. I have worked around the Oak Ridge plants since 1977. Ways of disposal of waste, safety, work scope has changed. I believe this would be a safe site for disposal.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 80: Comment from Scott Harrison

I'm for the new land field. It creates jobs, saves money. I've worked in the waste field for over 20 years. We protect the envirment while all D&D work is going on.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 81: Comment from Douglas W. Turner

These comments are supplied in response to the Proposed Plan for the Disposal of Oak Ridge Reservation CERCLA Waste dated September 2018. I strongly agree with the proposed plan to proceed with the Onsite Disposal Alternative located in Bear Creek Valley. I believe the current EMWMF has worked well to accelerate the cleanup of the ORR and eliminate deteriorating facilities and equipment that are no longer needed, and to prevent hazardous metals and chemicals from spreading in our environment. For example, the great progress in taking down the old K-25 building and other large buildings at the ETTP would not have been possible without the EMWMF, plus there are many other old DOE facilities in Oak Ridge awaiting demolition and cleanup. The design features and the waste acceptance criteria (WAC) are crucial to the proposed plan, and have worked well for the current EMWMF. Most of my professional career in environmental cleanup was associated with working to find ways to package and ship high hazard waste like transuranics, remote-handled low level waste and spent nuclear fuel to off site disposal and storage facilities. Only the CERCLA waste that met the EMWMF WAC could be disposed there. The high cost associated with packaging and shipping building debris to off site disposal facilities rather than sending CERCLA waste that meets the WAC to an on site disposal facility slows the progress of environmental cleanup and restoration. There is only a finite amount of funding available for environmental cleanup and restoration, and the available funding must be used most efficiently. I strongly favor proceeding with the EMDF project and selecting the best site(s) in Bear Creek Valley to construct the on site disposal cells needed to continue the Oak Ridge cleanup progress. The on site disposal cell for acceptable CERCLA waste has worked effectively to help accelerate OR environmental cleanup and restoration, and it is clear to me

that proceeding with the proposed plan to develop and utilize the EMDF will allow continued progress on environmental cleanup and restoration in Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 82: Comment from John Harness

I am for the new landfill to keep jobs and money in the area.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is

invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 83: Comment from Anna Bray

I support it.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 84: Comment from Justin Crouch

Keep in Oakridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies

with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 85: Comment from Sam Matthews

I think it would be good to builded the landfill at Y-12. I will cost less money to put it here.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 86: Comment from James Nuckols

I am favor of the landfill site in Oak Ridge. Economic reasons, safety concerns, environmental impacts will all be addressed and I personally feel comforable all concerns will be addressed.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with

contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 87: Comment from John E. Mrochek, PhD

I am a retired ORNL scientist who has lived in Oak Ridge for 45 years (currently in Knoxville). I strongly favor landfill disposal of radioactive waste. I shudder to think of the road hazards faced by the motoring public if such wastes are transported over the nation's road system! It is unthinkable to even think of exposing the motoring public to the increased dangers that this traffic would bring their travel!

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 88: Comment from Franklin Jones

I am for the new landfill to keep jobs and money in the area.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 89: Comment from James Hardigree

I agree to have a new waste site in East Tennessee.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption

to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 90: Comment from Jesse Alvis

I approve of proposed landfield.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 91: Comment from Deandre Stinson

I think it will be a great idea because anything could happen from here to Nevada and it wouldn't be good when we can keep it homebound and keep it controlled.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a

remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 92: Comment from Casey Hill

I support.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 93: Comment from Nathaniel Bertram

I've saw the stuff thats here. I'm okay with low level stuff being disposed of here. I'd prefer it to be here to create more jobs.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and

Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 94: Comment from John Kubarewicz

I am a retired engineer who has lived in Oak Ridge for close to 30 years. Until last spring I worked in the DOE Environmental Cleanup program and am very familiar with groundwater conditions, waste disposal and the rigor of the evaluations performed on cleanup alternatives. I strongly support onsite landfill disposal of high volume low level contaminated wastes and offsite disposal of low volume highly contaminated wastes as the best alternative to minimize risks to human health and the environment and cost effectively utilize limited cleanup funding. I am convinced that the proposed site and conceptual design will provide long term protection to the public and environment. As a homeowner I have no concerns about negative impacts on Oak Ridge or home values and believe that others that have raised this concern do not understand that the proposed disposal is a fraction of what has already been disposed in burial grounds on the Oak Ridge Reservation.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and

state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 95: Comment from William C. Qualls IV

Keep landfills for D.O.E. in Tennessee. It's our waste and we and D.O.E. know how to dispose of it properly. Off site disposal means higher costs for public and job loss for our area.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 96: Comment from Adam Walden

I do think it's good to build a land field/Help with job's.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies

with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 97: Comment from David Thomas

I support, due to cost, due to less chances of contamination. Between demo site and landfill.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 98: Comment from Pam Duncan

I think this landfield would be an asset to this community. I have worked for DOE contractors for the past 16 yrs. and they are very concerned with our enviroment. They will take all the necessary steps to keep our enviroment clean.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision

(ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 99: Comment from Gregory Brown

If we don't it will take away a lot of jobs. And we been doing it this way for years.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 100: Comment from Charlie Woody, President Knoxville Building & Construction Trades

The Knoxville Building & Construction Trades Council is pleased to submit its comments regarding the Environmental Management Disposal Facility (EMDF) proposed for construction on the Department of Energy's Oak Ridge Reservation.

EMDF is an essential component of continued successful cleanup of the Oak Ridge Reservation. The current Environmental Management Waste Management Facility (EMWMF), which recently opened its final disposal cell, will reach capacity before cleanup of the Reservation can be completed. Without the availability of dedicated haul roads and secure on-site disposal, DOE would be forced to send hundreds of millions of pounds of waste to repositories across the country, increasing costs and slowing cleanup.

Based on the impressive record of safe and responsible cleanup of the Reservation to date – including the 16-year safe and secure operational history of the existing Environmental Management Waste Management Facility (EMWMF) – there should be little question that EMDF can be built and operated without concerns about worker and public safety or threats to the environment.

The alternative to EMDF is shipping the low-level waste across country for off-site disposal. In addition to being less safe and more costly, offsite disposal would also threaten local jobs associated with constructing and operating an onsite facility, resulting in an adverse impact to our local economy. These jobs will move to other areas of the country.

Finally, our union stands ready to provide the highly qualified workers needed to construct the new disposal facility in a safe and timely manner that meets all DOE and regulatory requirements. The jobs that will be created in building the EMDF are important to our members and to the region as a whole.

The Knoxville Building & Construction Trades Council wishes to go on record with its wholehearted support for construction and operation of the new EMDF facility. We are firmly convinced it is in the best interests of the DOE cleanup program, the local economy, community safety and the environment and, importantly, the American taxpayer.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 101: Comment from Chuck Bertram

I think it is a great idea. It would open more jobs for everyone in the area.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 102: Comment from John Wrapp

With over 37 years of experience in the Department of Energy cleanup arena, I strongly support construction and operation of the proposed Environmental Management Disposal Facility (EMDF) on the Oak Ridge Reservation. Most recently, I have been the Waste Disposition Manager for UCOR responsible for dispositioning all waste generated from the cleanup of the East Tennessee Technology Park. As you are aware, this project has been extremely successful. This success, in large part, is due to the on-site disposal capabilities we currently have. Without onsite disposal capabilities, the continued cleanup success of the Oak Ridge Reservation is greatly jeopardized. Without onsite disposal capabilities, you lose control of your destiny. The risk of sending all the cleanup waste offsite is significant. Whether it's the risk assessment that concluded there would be numerous fatalities due to the extensive transportation involved or resistance from the Stakeholders involved with offsite disposal, the risks are significant. There are many considerations that need to be considered when determining whether the ~2M yd3 of waste anticipated to be generated from the Oak Ridge cleanup should be disposed of onsite or offsite. With my experience, those considerations clearly favor onsite disposal. Placing the waste in an engineered onsite disposal facility that is protective of human health and the environment is the right decision for all Stakeholders involved.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will

primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 103: Comment from Michelle Bertram

I think we should open a new local waste facility for oppurtunity of more jobs.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 104: Comment from Tom Williams

I support the land fill for the help of jobs in Oak Ridge and believe they place in the ground in a safe manner.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 105: Comment from Mike Thompson, President Atomic Trades & Labor Council

The Atomic Trades and Labor Council (ATLC) is pleased to submit its views concerning the proposed Environmental Management Disposal Facility (EMDF).

Simply put, the Department of Energy's (DOE) approach to future disposal of low-level waste from the Oak Ridge Reservation cleanup program boils down to a choice between on-site or off-site disposal locations. The fact is a combination of the two approaches is needed to ensure safe, timely and compliant cleanup continues.

DOE's experience with the existing onsite Environmental Management Waste Management Facility (EMWMF) over nearly two decades has proven beyond doubt that this kind of facility can be operated safely and compliantly. As EMWMF nears its capacity, we fully support construction and operation of the proposed Environmental Management Disposal Facility (EMDF).

During its years of operation, EMWMF has operated safely and without incident and in full compliance with all applicable environmental regulations. As part of a cohesive "waste factory" approach, EMWMF has been a catalyst in a streamlined system that includes dedicated haul roads and thousands of safe shipments of demolition waste from the largest cleanup effort ever undertaken in the DOE complex.

This approach has ensured safe and secure waste disposal, saved money compared to offsite disposal options, created and maintained local jobs, and provided an efficient resource to support timely cleanup of the East Tennessee Technology Park.

We recognize and support the fact that some wastes require offsite disposal because they do not meet the criteria for onsite disposal. In fact, using EMWMF as an example, approximately 95 percent of the volume of waste associated with cleanup to date has gone into EMWMF, with five percent of the volume being disposed of offsite. Only 15 percent of the radioactive curie content has been disposed of at EMWMF while 85 percent of the radioactivity has been disposed of off site. That proportionate ratio offers the best of all worlds and creates a win/win situation for DOE and the local community.

While some offsite disposal is needed and preferable, dependence on offsite disposal alone increases the possibility of significant impacts to the success, cost and timeliness of the overall DOE cleanup mission. According to some estimates, without adequate onsite disposal, the price of cleanup goes up -- perhaps double. Offsite disposal slows the pace of cleanup, increasing costs associated with ongoing surveillance and maintenance programs and other related activities.

Finally, onsite storage creates more jobs that benefit the local economy. From design and engineering to disposal cell construction to two decades of operation and years more of post-disposal care, many hundreds of well-paying local jobs will result. Members of the ATLC are highly qualified to fill many of these positions, both in construction and operation of the new facility. This welcome boost to local employment can play an important part in the future well-being of our families and the region as a whole.

The Atomic Trades and Labor Council strongly endorses construction and operation of the proposed Environmental Management Disposal Facility.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 106: Comment from Jason Schmidt

My family recently relocated to Oak Ridge for a variety of reasons with full knowledge of our proximity to contamination. I have noticed in my short time here that the vast majority of workers and management of the affected sites (Y-12, ORNL, and ETTP) do not live in Oak Ridge. I support the DOE proposed landfill,

and I humbly ask that you share with your colleagues and superiors my sincerest desire to see more of their families living in Oak Ridge supporting our schools, our city, our parks, and our people in general. Your commitment toward such action will build my confidence in the DOE commitment to safety for the proposed land fill.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 107: Comment from Kelley Smith:

I agree with DOE's assessment that more landfill space is urgently needed, but am concerned with the higher risk of highly-water mobile contaminants like mercury getting out of the landfill and into populated areas at the preferred location. Also, it isn't clear what the landfill accept exactly since DOE won't be finalizing the waste acceptance criteria till after a landfill location is selected-does not seem like a good idea to approve a landfill until we know what waste it will accept. Last, the document notes that waivers would be required because the preferred location does not meet a number federal laws and/or EPA and TDEC rules/regs. How is a site that needs extensive waivers better than sites out west that are already approved, operating, and have enough space for all of the waste; are more public health and environmentally protective; and are more likely to be less expensive over the long-term?

Off-site disposal seems like the most public health protective and cost-effective way to proceed, especially for the radioactive waste and the waste full of hazardous compounds that have a high chance of being mobilized when exposed to water.

Detailed Comments:

- Why is CERCLA being used for a new landfill site when the site is an uncontaminated "greenfield" and when EPA's website states that all new landfills are regulated by RCRA: https://www.epa.gov/landfills/basic-information-about-landfills?

Response: The identification of permanent solutions for the onsite and offsite disposition of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste has always been a fundamental part of the CERCLA process. CERCLA actions are not complete without all waste that has been generated having a disposal decision. The CERCLA process has been used to support decisions for many disposal facilities across the United States, some on previously disturbed sites and others on "greenfield" sites, including many disposal sites at CERCLA facilities (e.g., Oak Ridge, Hanford, and the Fernald and Portsmouth sites in Ohio). In many of these cases, a program-level evaluation of disposal needs has been conducted under CERCLA and a final decision on disposal to apply to CERCLA actions made. Agreements reached under the CERCLA framework are enforced by the state and U.S. Environmental Protection Agency (EPA).

- DOE has not included a contingency plan in the event that the preferred site is not accepted by TDEC and EPA as a landfill site. What is the contingency plan if the site doesn't get the numerous waivers from TDEC and EPA to proceed?

  Response: The Remedial Investigation/Feasibility Study (RI/FS) includes the evaluation of multiple locations for the construction of the Environmental Management Disposal Facility (EMDF) under the Onsite Disposal Alternative. The evaluation in the RI/FS was prepared consistent with CERCLA guidance. The Federal Facility Agreement (FFA) parties have agreed that the preferred alternative presents a protective remedy and therefore has been selected.

- What will the waste acceptance criteria for this site be? It doesn't seem appropriate to decide on a landfill site before it is known what waste will be accepted at the location.

  Response: RI/FSs for disposal facilities sometimes contain placeholder waste acceptance criteria, as was done for EMDF. The Proposed Plan then includes general information on the components of the waste acceptance criteria (WAC). This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this Record of Decision (ROD). Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as applicable or relevant and appropriate requirements (ARARs) (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation (ORR) indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

- Why would the plan state that it is "compliant with all federal and state requirements" when it also states that the preferred site would require waivers from those same laws and regs? Also, why hasn't DOE gotten waivers in advance of making a final decision or even submitting this proposed location?

Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

A Toxic Substances Control Act of 1976 (TSCA) waiver for two parts of TSCA 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

- **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the ORR. Compliance with the Resource Conservation and Recovery Act of 1976 (RCRA) Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the EPA determination that the remedy is protective of human health and the environment.**

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.**

An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

- The Land is currently designated for unrestricted use in the future. Will DOE be requesting a change of the future land use designation at the preferred site?

Response: Based on strong state preferences related to site hydrology, the FFA parties have agreed to the Central Bear Creek Valley site for the waste disposal facility. The U.S. Department of Energy (DOE) has indicated in the Proposed Plan that the land use around and including the Central Bear Creek Valley site would have to be changed to industrial use from that designated in the Bear Creek Valley ROD (consistent with the recommendation of the End Use Working Group). This ROD changes the land use designation for Central Bear Creek Valley as part of this remedy selection. The land use recommendations from the End Use Working Group and eventually documented in the Bear Creek Valley ROD were identified solely to set remediation levels across the valley. There was never any expectation that the land in Bear Creek Valley would be released by DOE for use by others. The land was always intended to be a buffer between DOE activities and the public and to provide future opportunities for DOE use.

- The DOE reservation currently comprises a large amount of Oak Ridge's territory and current projections suggest that the population of the East TN region (which includes Anderson County and Oak Ridge) is expected to grow by as much as 34% http://www.etindex.org/demographics/population/population-projections. Have the costs of permanently removing an undisturbed area that is slated for unrestricted use in the future been taken into account (like lost tax revenue, other associated economic gains, or just the value of keeping untouched clean land-ecosystem services)?

  Response: Neither CERCLA nor National Environmental Policy Act of 1969 values require that the cost analysis performed in the evaluation of a proposed remedial action consider the value of lost ecosystems services or impacted natural resources. The cost evaluation is required to focus specifically on the costs associated with the implementation of the remedy. Impacts on ecological resources are considered in other evaluations contained in the RI/FS and Proposed Plan, such as short-term effectiveness, long-term effectiveness and permanence, and long-term commitment of resources, but generally do not include any type of monetary value. Each of these topics have been appropriately addressed in CERCLA documentation prepared to support a final decision on the disposal of Oak Ridge National Priorities List (NPL) Site CERCLA waste.

  The Natural Resources Damage Assessment (NRDA) provisions of CERCLA do consider issues such as the value of lost ecosystem services or impacted natural resources, but this is a separate regulatory process from the evaluation of a proposed remedy under CERCLA. The NRDA provisions of CERCLA are generally addressed at or near the conclusion of a remedial action to address the loss of natural resource services that occurred before and during the implementation of the remedial action. Impacts caused directly from the implementation of a remedial action are excluded from NRDA evaluations. There was never any expectation that the land in Bear Creek Valley would be released by DOE for use by others. The land was always intended to be a buffer between DOE activities and the public and to provide future opportunities for DOE use.

- UCOR staff have verbally told community members (including me) that the preferred site would need to be remediated sometime in the future and that those future costs alone would make the on-site disposal plan more expensive over the long term than off-site disposal out west. Why are those likely expected long-term costs not accounted for in the plan?

  Response: DOE does not believe any future remediation of the site after closure of the disposal facility will be required. The onsite disposal estimate includes the cost of surveillance and maintenance of the facility for 100 years post-closure. Past 100 years following closure, DOE is responsible for any incurred costs for onsite as well as offsite disposal facilities.

- What are DOE's plans to ensure that the underdrains won't clog? If they do clog, are there plans in place that would allow easy access to repair them?

  Response: Although considered in the evaluation of the alternatives in the RI/FS, DOE's selected remedy has no reliance on permanent underdrains to intercept the groundwater table.

- The building materials are likely laden with mercury and other highly mobile hazardous materials, the proposed landfill is not more than 50 feet above the high water mark for the water table as EPA/TDEC laws/regs require, and research suggests that landfill covers similar to what is proposed are likely to fail in the long term. How does this provide the lowest environmental and public health risk to exposure to hazardous and radioactive waste?

Response: DOE will meet all regulatory requirements pertaining to mercury treatment and onsite disposal of waste, including RCRA requirements that dictate WAC for mercury. The regulatory compliant design, operation, and closure of the onsite disposal facility, coupled with DOE's compliance with all regulatory requirements concerning mercury, will help to ensure that the new disposal facility is protective of human health and the environment over the long term. For West End Mercury Area remediation projects with EMDF-bound waste streams, DOE will take all practical measures to remove mercury before waste generation and send that mercury offsite to treatment/storage/disposal facilities.

- The plan seems to suggest that the landfill might accept new waste in addition to legacy waste and it should be made clear. Also, would any waste from outside of the DOE reservation be deposited in the landfill?

  Response: The scope of this action is to provide for the final disposal of only CERCLA waste that will be generated from the cleanup efforts planned for the Oak Ridge NPL Site. The scope of this decision excludes waste that is not generated at the Oak Ridge NPL Site or not generated from nearby sites containing contamination resulting from Oak Ridge NPL Site activities.

- DOE applies cost savings tied to expected processing efficiency gains because of the volume of waste that will be processed and stored at the preferred site. Why are similar savings not applied to off-site disposal since the waste will still need to be loaded on a truck and driven to a landfill? Seems fair to apply similar cost savings to the off-site disposal options. Also, why are volume guarantee cost-savings estimates for the off-site options not provided.

  Response: In response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the recent evaluation of the offsite disposal costs.

- I am pretty sure that DOE has a very good transportation record for safely moving hazardous waste. I am not aware of any lives lost related to the transportation dangerous waste for DOE. Why was that data not used for the transportation risk assessment section of the document?

  Response: Transportation Risks – Selection of the DOE preferred alternative was based, in part, on the increased transportation risks associated with the offsite shipment of waste for disposal. The evaluation of transportation risks as presented in the RI/FS and summarized in the Proposed Plan were based on the latest techniques using up-to-date actuarial statistics. The safety of the DOE waste shipment program is an extremely high priority for DOE and every effort is made to make every shipment safe, but both trucks and trains must interact with the public over which DOE has no control. When the volume of waste and the distance required for disposal are evaluated, the statistical evaluation projects a significant increase in fatalities and injuries resulting from transportation accidents. Again, DOE will strive to make every shipment safely, but the potential for accidents resulting in injuries and fatalities associated with offsite disposal are a significant concern.

Comment 108: Comment from Nanette King:

I was born, raised, and now reside in Oak Ridge, Tennessee. We are proud of becoming a national park. National parks are to be kept clean for public enjoyment.

Waste was naively dumped at the Y12 site during the Manhattan Project. As teenagers, my friends and I discovered soiled jumpsuits from Y12 in dumpsters on Warehouse Road. I remember when our creeks were dredged for mercury.

We have suffered enough. As Oak Ridge continues to grow in population, it is imperative that we leave pristine forests and land unsoiled. Our children, adults, and fauna require it.

In the past radioactive waste has been transported to areas of low or zero population. I implore you to continue this trend.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Although forested land will be used for disposal, upon closure much of that land can be returned to nature, with natural local grasses grown on the cover of the facility and land not used for disposal can be returned to forested land.

Comment 109: Comment from Mike Guth:

I strongly oppose having yet another waste site in Oak Ridge. Learn from the hurricane in North Carolina dredging up fly ash waste.

Response: The U.S. Department of Energy thanks you for your participation in the public comment process. Fly ash disposal is typically located near major water bodies, which are an integral part of the coal-fired power plants. The site selected for the Environmental Management

Disposal Facility (EMDF) is nowhere near a major water body and will not be subject to flooding by Bear Creek as experienced from the recent hurricane in North Carolina. The site is well above the 500-year flood plain of a minor creek. The EMDF design will include appropriate engineered drainage controls to control all water during construction, operation, and closure.

Comment 110: Comment from Marilyn Burgess:

It is the height of stupidity to build a hazardous waste landfill near the city where our geography is not conducive to containment. Porous limestone and the amount of rainfall and flooding means our city will be dealing with more contamination. Having analyzed groundwater with a pH < 2 out of the ground, with oil layer on top, and heavy metals is bad and not something we need more of.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. One of the criteria for site selection is the avoidance of karst features. The Remedial Investigation/Feasibility Study and Proposed Plan both clearly state that there are no karst features in the geology underlying any of the waste footprints being evaluated for the Environmental Management Disposal Facility, based on historical characterization of Bear Creek Valley. To further validate this understanding, DOE conducted additional geologic investigations at the proposed Central Bear Creek Valley site. The resultant validation information is presented in the Phase I Site Characterization Technical Memorandum provided in the Administrative Record.

East Tennessee has annual rainfall varying from 38-77 in. per year as measured at the Y-12 National Security Complex over the last 30 years with an average of 54 in. per year. According to the original Feasibility Study conducted in Bear Creek Valley (DOE 1997), approximately 50 percent of the precipitation exits through evapotranspiration (evaporation or use by vegetation) with the highest rate when the vegetation is growing. Of the precipitation remaining after evapotranspiration, 80 percent of the flow exits the valley through surface water flow. Very little of the rain enters the groundwater. There are multiple engineering features that can be used to control water flow. These features such as interim covers, diversions trenches, and sedimentation basins have been used successfully to divert rainwater during operations at the existing disposal facilities on the Oak Ridge National Priorities List Site as well as at other disposal facility locations. Rainwater that contacts the waste will be collected and treated. When the facility is closed, a final cover will be installed that will prevent rainwater from entering the waste.

Comment 111: Comment from Rebecca Halperin:

I'm in opposition of new landfill @ Y-12. I'm very concerned about the watershed and high potential for downstream contamination.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered

facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 112: Comment from Kathleen Vinson

Part 1: I've heard nothing but objections to this "plan" and I wonder 1) why is there such resistance to including the community and getting their agreement? 2) why is it seeming to be this difficult to draft a plan that would adequately solve this disposal problem? 3) why does it seem to be the conclusion that this direction will only serve to make the problem of toxic waste disposal in OR even worse?

Part 2: I am a native daughter of Oak Ridge, TN and I have returned after a few decades away to live here in my childhood home full time. Since returning, I have noticed some things have changed and others have not.

One of the biggest things I observe that has NOT changed is the lack of inclusion shown by the DOE (formerly AEC) for the citizens, economy, government and quality of life of the town of their creation, Oak Ridge, TN.

When I heard City Manager, Mark Watson say at a public meeting that, "Oak Ridge is not at the table to shape the destiny of our city.", I know that this has been a persistent problem for this town and the people who attempt to elevate this town to be a place where people want to live and prosper.

The proposed Environmental Management Disposal Facility (EMDF) is such an example of the manner with which the Federal Government Agency that really owns Oak Ridge goes about their business. They do what they want and, may or may not, inform the City of their actions. There is certainly no opportunity for the City to participate with this Agency.

There never has been and from the looks of it, never will be.

I am encouraged that the citizens of Oak Ridge and surrounding counties, Anderson and Roane, are insisting that this Agency listen to their concerns and give a real and relative response.

To that end, my comment is this—

This proposed landfill is another example of management decisions that are made to shortcut and shortchange the necessary operations required to adequately operate an international level nuclear facility. If the parties concerned want to have and continue to have said nuclear facility in the legacy system of Oak Ridge, there is a minimum standard of compliance with the handling and disposal of all levels of nuclear material that must be met to maintain a standard of habitability here.

To build this landfill, these minimum standards are not being met. It has been stated the reason for building this landfill is to save money on the disposal of the building materials that are demolished at Y-12.

It has been shown in numerous ways that cutting these kinds of corners does not ever result in the overall cost savings that are anticipated.

In other words, you get what you pay for. If you go on the cheap, you will get an inferior result.

This has been one of the biggest mistakes made in the years following the end of the Project. Oak Ridge has always been on the cheap end of the equation. No one ever thinks the City of Oak Ridge is worth the time, care, and expense to do something right.

Therefore, my comment is against this landfill. Oak Ridge deserves better. It's about time the citizens of Oak Ridge demand their owners, The Magicians of Atomic Science, give them what they deserve, which is a decent, clean, non-contaminated, well-run city for us all to live in.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE has made extensive effort to ensure meaningful community involvement throughout this nearly decade-long process of selecting a remedy for final disposition of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste at the Oak Ridge National Priorities List (NPL) Site consistent with the U.S. Environmental Protection Agency and Tennessee Department of Environment and Conservation-approved Environmental Management Disposal Facility (EMDF) Community Outreach Plan. Large-scale outreach began in 2015 and has continued to the present. City and county officials received tours and briefings. The Oak Ridge Office of Environmental Management (OREM) hosted numerous community meetings, and there was substantial media outreach on the topic. OREM also proactively reached out to numerous community groups to provide presentations about EMDF. DOE released the Proposed Plan to the City of Oak Ridge before the start of the formal public comment period. In addition to providing notices to the paper, every household in Oak Ridge received a flyer requesting input to the public comment process. The original comment period was 45 days but was extended to 120 days at the request of the public. DOE has made every effort to ensure there has been meaningful public input and will look for opportunities for future public involvement as the project proceeds.

EMDF will be a permanent CERCLA waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge NPL Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-

20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 113: Comment from Larry Gustafson

Part 1: The current site system has been in operation for 15 years with a few problems. The new site system has been modified from the first system, so, the new system has not been proved to be what is needed for the new site and cannot be proved so. One mistake in design, and there will be mistakes & failures over time, not just 15 years but for 100s of years. And the ones paying the price are downstream of the site. This is not acceptable. Do not put the cleanup dump on the Oak Ridge Reservation. Take the reservation waste out west. The cost is worth it. Lives are at stake.

Part 2 (from November 7, 2018 public meeting): My name is Larry Gustafson. I'm a retired aerospace and automotive engineer and I represent myself and my family and Oak Ridge, not by any responsibility given to me, but I love my neighbor. My neighbors are also downstream. And none of my relatives are downstream, but I care and love those people downstream. You are going to have accidents.

And, by the way, thank you very much for putting on this gathering. I appreciate that very much. I didn't know anything about this until I got something in the mail, and I do appreciate that.

My question is along the line of this particular site you currently have, how long has that been in existence? 15 years? Has any other site identical to that been in existence anywhere in the country or in the world? Just one little question I had first, please.

DOE Representative: There are facilities that have been around longer than that. There are facilities in Missouri and Ohio and out West with a roughly similar design that have been longer – in place for 10 to 20 years longer. Of course there are disposal facilities that have been around for a long as people have been disposing of garbage, but these more modern designs came into play beginning in the 1960s and 70s.

Larry Gustafson: Okay, and the new one you're planning on is an improvement on the old one, correct?

DOE Representative: It's more similar to it than different. The preferred site would allow us to avoid, or at least minimize, the use of any underdrains to convey groundwater out from underneath the site. But in terms of the basic design, dikes, leachate collection, liners, impermeable cap, that would all be pretty similar. There have been some lessons learned from the last facility, and we want to always take advantage of what we learned to do better the next time around. But it's pretty similar to that facility.

Larry Gustafson: Lessons learned is a result of lack of perfection in the previous design. And that means someone downstream wants perfection, and I expect perfection, and there's no way anybody is going to have perfection in whatever you're planning. It is not a negative against you. Don't get me wrong, please. I'm not attacking. But it is not going to work. In the end, there are going to be mistakes. There are going to be people downstream with their health and the environment being damaged in ways we have no idea because science can't even determine what that is today. So if it's 15 years or 60 years, that's not 1,000 years, that's not 2,000 years. We have no idea how to predict what a failure here is going to do to someone downstream, and I mean in time also. So I would have to say right now, based on some of the comments – I'm assuming all these comments that have been generated by these wonderful people, great knowledge, far beyond what I have for this kind of environment, I think I would never support anything that's being done anywhere near Oak Ridge.

And the one comment about an earthquake, yeah, I had the same question. Other comments that were brought up in here, I've got the same questions from the beginning of this conversation here. I cannot support going on with this thing. You'd have to be too perfect in order – nobody expects anyone to be perfect, but you have to be that in order to guarantee the health of the environment and especially the people downstream. Thank you very much. I appreciate your listening.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

There is no evidence of active seismically capable faults in the vicinity of the site selected for the EMDF in Central Bear Creek Valley. Any new confinement berms or slopes constructed as part of the EMDF will use standard allowable slopes which will then be validated through modeling and slope stability analyses allowing adequate safety factors during detailed design.

Please see the response above provided verbally by the DOE representative in the November 7, 2018 public meeting.

Comment 114: Comment from David Olsen

Part 1: I am a retired nuclear physicist from ORNL, live in the city of Oak Ridge, was a manager in the SNS Project, and want to express my concerns over the proposed UCOR DOE on-site disposal facility in Bear Creek Valley in Oak Ridge. I strongly believe that this project is seriously flawed and should not go forward. I have three main objections.

First and foremost is the ground water concern. Unfortunately, the water table in Bear Creek Valley is surprisingly not very deep. This fact by itself negates the proposed project. Instead it is proposed to change the requirements and regulations to allow the project to go forward. In particular to build under CERLA brown field regulations and even then the facility requires wavers. The project requires a barrier just above the water table and indefinite monitoring with backup pumps etc. in case of flooding. It is just plain silly and risky to build this in such a very wet environment requiring active and indefinite surveillance. If it

cannot be built under green field regulations with no wavers, then it is DOEs duty not to proceed and further endanger the ground water of the citizens of East Tennessee. Furthermore, it is hard to understand why DOE would contaminate an uncontaminated green field site on the Oak Ridge Reservation.

Second, according to UCOR much of the waste is uncontaminated. Perhaps UCOR could do a better job separating the waste into that which is contaminated and that which is not contaminated. The uncontaminated waste could then be disposed reducing costs in normal construction waste facilities and the contaminated waste shipped by rail to a much dryer, deeper and unpopulated site out west.

Third, the cost difference of about one billion dollars between this facility and shipping the waste out west seem to me to be a manufactured number by UCOR to justify its construction of this facility in Oak Ridge. In particular:

(1) Two million cubic yards of material require 20,000 rail cars over a period of ten years or 40 trains of 50 cars each year. How does this cost one billion dollars? In either case, the waste must be initially loaded and transported in trucks. Do the costs fairly compare apples to apples? After talking to UCOR representatives at public meetings I personally believe not.

Response: In response to the comment on the groundwater, the U.S. Department of Energy (DOE) will be conducting further field studies prior to construction of the facility to demonstrate the water table will stay 15 ft below the bottom of waste.

Regarding the comment about uncontaminated waste, all efforts are made to segregate waste at the cleanup project site. Uncontaminated waste is properly disposed of in solid waste landfills.

Regarding offsite costs, in response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) cost range of +50/-30 percent accuracy. Section 2.14 of the Record of Decision (ROD) contains more information about the recent evaluation of the offsite disposal costs.

(2) Another justification is the danger of shipping waste across many states and the need to minimize the associated regulatory risk. At the same time, the plan requires 10% of the more toxic waste to be shipped out west through the same states. The regulatory risk exists with or without shipping all the waste out west. If 10% of the more toxic waste is to be shipped out west, then the simplest solution is for all the waste to be shipped to a dryer and less populated site out west.

Response: The regulatory risk that DOE addressed in the Remedial Investigation/Feasibility Study Report and Proposed Plan was regarding reliability of offsite disposal locations. Reliance on offsite disposal facilities introduces an element of uncertainty into the continued availability of offsite disposal during the anticipated operational period. Offsite disposal introduces risks of interruptions caused by events outside the control of DOE. Because CERCLA waste generation on the Oak Ridge National Priorities List Site is projected to continue for roughly three decades, onsite disposal would provide greater certainty that sufficient disposal capacity is actually available at the time the wastes are generated.

(3) During the two public meetings I attended, it was my impression that the cost of different options was not fairly costed, but costed to justify the project. I strongly suggest that an independent institution, not UCOR or beholding to UCOR or DOE, review and certify a cost comparison.

Response: In response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the recent evaluation of the offsite disposal costs.

It seems DOE is not following the very basic principle of reducing risk to help insure a successful project, and could easily end up with an environmental mess of its own making.

Part 2 (from November 7, 2018 public meeting): My name is David Olson and I have a simple question. You spoke that 10 percent of the waste that you are generating is high-level waste. So my question is: Where does that high-level waste go, and how does it get there? And it represents about one-tenth of the waste you are generating?

DOE Representative: If I said 10 percent is high-level waste, I misspoke. About 10 percent of the waste is waste that we project won't meet – (microphone handed to DOE Representative). Thanks…I'll start over again. About 10 percent of the waste from tearing down the buildings and digging up the dirt is project to be waste that won't meet waste acceptance criteria. So it's not legally high-level waste, but it's more contaminated than our rules would allow to be onsite, the disposal. That material will be generally disposed of offsite; much of it in Utah, some of it at DOE facilities out in Nevada. But it will generally be shipped away.

Mr. Olsen: So it goes there by train?

DOE Representative: It will go by truck and train.

Mr. Olsen: So 10 percent of the waste you are generating ultimately goes out west by truck or train?

DOE Representative: That's approximately the experience we've had cleaning up ETTP, and it's what we project for Oak Ridge National Lab and Y-12 also.

Mr. Olson: Thank you

Response: Please see the responses above provided verbally by the DOE representative during the public meeting.

Comment 115: Comment from Cordelia Lyons

Part 1: The decision on the EMDF should be carefully considered and not rushed. This waste facility has the potential to severely affect ground and water quality for centuries. Extend the EMDF Comment period.

Part 2: The preferred solution is to ship the waste by rail to a less environmentally sensitive location - for example an area in the western US with an extremely low water table away from population centers.

Choosing a solution before all ground water impact testing is complete (per David Adler) just screams that a decision has already been made regardless of environmental impact.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE received and granted two separate requests to extend the original comment period – one by another 45 days and the second by an additional 30 days. Therefore, the comment period was for 120 days.

The Environmental Management Disposal Facility will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List Site activities. Groundwater testing has been performed (see this Record of Decision [ROD], Sect. 2.5.2). A future study is planned that will provide additional information for the design to ensure the 15-ft separation between waste and water table can be provided. The CERCLA process includes analyzing and comparing all posed alternatives against nine criteria. In this case, the onsite alternative was demonstrated to be the best solution under these criteria (see this ROD, Sect. 2.10, where that comparison is made and details are provided that explain why onsite disposal is preferable to offsite disposal).

Comment 116: Comment from Cindy Kendrick

As a former Oak Ridge resident and someone who enjoys recreation downstream of Oak Ridge, I find the proposed EMDF objectionable. Our area, with its ample rainfall and high water table is inappropriate for long-term disposal of radioactive and hazardous wastes. I believe that deployable engineering and administrative measures are inadequate to overcome the risks of our humid environment and that shipment to an appropriate off-site disposal facility in an arid, sparsely populated area is an affordable and lower-risk alternative.

Thank you for the opportunity to comment.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 117: Comment from Virginia Dale

Part 1 (from November 7, 2018 public meeting): Thank you for the opportunity to make some comments. My name is Virginia Dale. I am an environmental scientist. I am also chair of Advocates for the Oak Ridge Reservation, which is a 20-year-old organization that was established by the citizens to protect the reservation for diverse reasons – scientific research, economic development, history, education, recreation. We want this community to thrive and we want it to be better. And we know DOE is doing a good job, as best they can we hope, to protect the environment; however, we have grave concerns about this plan. We think it's a bad document and it's a bad plan, frankly.

This was set up under CERCLA to have this dump site, and as we understand it after checking with some attorneys, CERCLA cannot have a new job set up under a prior organization without – with a prior plan, the prior CERCLA effort, without going through a whole new process. This would set a new precedent for CERCLA, and all the lawyers in the United States should be concerned about new precedents when they occur.

It's been clearly made evident that dry is better, but here we are in East Tennessee, 54 inches of rain, a karst environment. This is not the ideal place to put this material. I do agree with that. We think that the waste sites out west that are asking for material should be having the opportunity to take more of the material. They would provide jobs in trucking and train and they would create a better economic environment for Tennessee.

I am trying to sell a house in Oak Ridge and one of the people that came through recently asked me a whole lot of questions about wastes that are here. They did not buy in Oak Ridge. They moved to Crossville instead. As we understand it, there has been mismanagement of the existing dump that filled up too fast. It took material that was misclassified and it took material that was not designated for this type of waste dump that's there. So we have no confidence that the future site, if it is put in place, would be managed properly.

TDEC has made clear that it wants further time to evaluate the site. Less than a year is not typical practice for this kind of activity, and yet they have less than a year of data available. Twenty years ago ACOR was part of a land-use plan that was put in place to help plan for things like the existing dump, and a plan was made, and this site was set aside as greenfield. Now, contrary to that plan that a number of stakeholders in this community were a part of, that is not happening.

We will put these comments in writing, but we ask you not to sacrifice East Tennessee or this part of the – of our national government and resources for what could be a resource for the waste to go out west and to keep people in East Tennessee valuing this beautiful environment. As a person who's grown up in Tennessee, I love being here, and I wish more people would realize what a great place it is and that we can take care and be responsible for those problems that were created 75 years ago. Thank you for your efforts.

Part 2: I am writing on behalf of Advocates for the Oak Ridge Reservation (AFORR), a locally based nonprofit organization supporting the preservation of the natural resources of the DOE Oak Ridge Reservation for the long-term benefit of DOE, the local community, and national and international interests.

AFORR appreciates the hard work of DOE, the Tennessee Department of Environment and Conservation (TDEC), and U.S. Environmental Protection Agency on the subject planning process under CERCLA.

AFORR does not support establishment of new disposal facility on the Oak Ridge Reservation (the Onsite Disposal Alternative) for the following reasons:

1. DOE's preferred site in Central Bear Creek Valley (CBCV) and the West Bear Creek Valley (WBCV) option would add to the inventory of contaminated land by putting waste in a clean area that is a greenfield.

   Response: The U.S. Department of Energy (DOE) believes that multiple sites in Bear Creek Valley can support construction of a protective landfill for wastes planned for onsite disposal. Protectiveness will be assured through a combination of facility engineering, restrictions on waste acceptance, and long-term monitoring and maintenance. The site selected in the Central Bear Creek Valley for the Environmental Management Disposal Facility (EMDF) provides a controlled location within the Oak Ridge National Priorities List Site and is located in an area that is not being considered for reindustrialization or reuse. The Central Bear Creek Valley Site is in the same valley as the existing Environmental Management Waste Management Facility (EMWMF), along with several other Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) areas in the Bear Creek Valley. The site allows waste to be placed between two tributaries and offers hydrologic separation from Pine Ridge. The slope of the Central Bear Creek Valley Site is not as steep as other sites considered, thereby minimizing the need for surface water diversion. Based upon strong State preferences related to site hydrology, the Federal Facility Agreement (FFA) parties have agreed to use of the Central Bear Creek Valley site. From the alternatives within Bear Creek Valley considered for locating the EMDF, DOE considered brown field sites first, but ultimately the Central Bear Creek Valley site provided the most beneficial attributes in total over those other sites.

2. We believe that DOE would not be seeking a new landfill, at least not this soon, if the space in the existing EMWMF had been managed properly. In particular, if waste had been characterized before disposal to determine the best disposal path, much less waste would have been placed there.

   Response: All waste was characterized before disposal. DOE works to continuously improve its efforts involving the cleanup mission at the Oak Ridge Reservation (ORR) through lessons learned. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the EMWMF, provided characterization allows this path. The waste disposal hierarchy will also be applied for EMDF waste disposal.

3. Based on available characterization data (noting that there is not yet enough hydrologic characterization of the CBCV site to support a decision), none of the candidate sites is suitable hydrologically. The presence of abundant surface and subsurface water would require significant engineering effort to manage, both through the operating period and after closure, relying on diversion structures, gravel drains, pipes, liners, and caps, that can be expected to fail in the long term, with life expectancy only of decades.

   Response: DOE disagrees. A full set of characterization data are available and support that the disposal facility can be safely engineered to be protective long into the future. Natural, existing features are relied on to maintain surface water flows away from the waste; the facility is constructed in large part above grade. Drainage features are designed with graded filtration to ensure longevity. The cap and liner systems have natural components (such as clay and rock) that maintain their properties for thousands of years. Life expectancy of synthetic liners are in the many hundreds of years, but even with failure of those components, demonstrations indicate the facility remains protective of human health and the environment.

4. Proximity to residential areas would exclude these sites from consideration if the EMDF were being sited as a new radioactive waste disposal facility.

   Response: No applicable or relevant and appropriate requirement (ARARs) regulating the proximity of residents to the disposal facility need to be waived.

5. The proposal to establish a landfill on a clean site and call it a "remedial action" is a misapplication of the CERCLA statute. This landfill could not be built if it had to comply with the normal environmental regulations for landfills – even for ordinary municipal landfills. The landfill only becomes possible if DOE can use the special legal rules for CERCLA remedial actions to obtain exemptions from procedural requirements and to seek waivers of some substantive requirements. The special legal provisions of CERCLA were intended to facilitate rapid action to remove wastes from contaminated areas, not to allow establishment of new waste sites that operate for decades without being subject to regulatory oversight (for example, the ability of a regulatory authority to require modifications or stop operations when serious issues arise).

   Response: The identification of permanent solutions for the onsite and offsite disposition of CERCLA waste has always been a fundamental part of the CERCLA process. CERCLA actions are not complete without all waste that has been generated having a disposal decision. The CERCLA process has been used to support decisions for many disposal facilities across the United States, some on previously disturbed sites and others on "greenfield" sites, including many disposal sites at CERCLA facilities (e.g., Oak Ridge, Hanford, and the Fernald and Portsmouth sites in Ohio). In many of these cases, a program-level evaluation of disposal needs has been conducted under CERCLA and a final decision on disposal to apply to all CERCLA actions made. Agreements reached under the CERCLA framework are enforced by the state and U.S. Environmental Protection Agency (EPA).

Additionally, we note that DOE has not provided sufficient information on some significant aspects of the analysis of alternatives to allow informed comment by the public. Accordingly, AFORR asks that the public comment period be extended to allow time for DOE to provide information on the following topics and give the public time to review and comment on the new information:

Response: With submittal of the D1 Record of Decision (ROD), the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is within the D2 ROD.

1. Details of waste acceptance criteria and requirements for waste characterization prior to acceptance.

   Response: Remedial Investigations/Feasibility Studies (RI/FSs) for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for EMDF. The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the ORR indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based

on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA-party approved primary document, the WAC Compliance Plan.

2. Full details of the comparative analysis of costs for the Onsite and Offsite alternatives.

   Response: In response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the recent evaluation of the offsite disposal costs.

3. The specific waivers of regulatory requirements that would be requested for each of the Onsite options and the rationale for each requested waiver.

   Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

   A Toxic Substances Control Act of 1976 (TSCA) waiver for two parts of TSCA 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

   - **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the ORR. Compliance with the Resource Conservation and Recovery Act of 1976 (RCRA) Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the EPA determination that the remedy is protective of human health and the environment.**

   - **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.**

An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

4. Treatment technologies that have been evaluated or are planned to (1) reduce waste volume in the disposal facility and (2) immobilize any mercury waste prior to disposal.

Response: Decisions on waste volume reduction or mercury treatment are the responsibility of the generating project and associated decision documents. The EMDF will have WAC that specify what waste is allowed and in what form. The projects must comply with the WAC but for waste that does not meet the WAC, the projects can further treat the waste if in compliance with EMDF requirements or send the waste to an alternative disposal location. With regard to mercury hazardous waste (RCRA D009 code), that waste is prohibited from disposal in EMDF.

AFORR further notes that the lack of a site-wide environmental impact statement (EIS) for the entire Oak Ridge Reservation (as required by DOE rule 10 CFR Part 1021 and implemented at every other major DOE site) has contributed to the proposed plan's failure to effectively address the long-term land-use implications of onsite disposal. DOE needs to initiate a site-wide EIS, with full public input as required under the National Environmental Policy Act (NEPA).

Response: An Environmental Impact Statement is a document conducted under the National Environmental Policy Act of 1969 (NEPA). DOE decided years ago that the RI/FS under CERCLA augmented with NEPA values is the preferred documentation for making environmental cleanup decisions as the two types of documents are very similar and serve the same purpose (DOE 1994). The RI/FS documents the consideration of long-term impacts of onsite disposal, as does this ROD (see Sect. 2.10.3).

If the objections of the community are not considered and the landfill is built, then AFORR asks for compensation to the people of east Tennessee, to include:

1. Making permanent the conservation protection of the Three Bend Scenic and Wildlife Management Refuge Area, as was promised when it was established, and providing similar permanent protection for the old growth forest tract and other sensitive areas on the Reservation. Permanent protection should be accompanied by increased public access to these areas and increased compensation to the other agencies managing these lands.
2. Federal cash payments to the City of Oak Ridge sufficient to compensate for the financial burdens (such as costs incurred when city staff interact with DOE on various matters) to city government resulting from the city being the host to multiple ongoing DOE and NNSA activities.

Thank you for the opportunity to comment on this matter. AFORR looks forward to seeing additional information made available on the issues listed above, as well as other questions that have been raised by others in the community, before the opportunity ends for public comment on this important matter.

Response: DOE thanks you for your participation in the public comment process. DOE received and granted two separate requests to extend the original comment period – one by another 45 days and the second by an additional 30 days. Therefore, the comment period was for 120 days.

CERCLA provides some funding authorities for municipal governments to provide technical assistance support for CERCLA activities in their jurisdictions; these funding mechanisms are administered by the EPA through the Brownfields Grant funding program. DOE provides technically supported community participation in the CERCLA decision making process through the Site Specific Advisory Boards (SSABs), and the Oak Ridge SSAB has provided independent advice and recommendations on the preferred alternative. The Oak Ridge SSAB Recommendation 240 supported additional onsite disposal capacity on the ORR, with a number of recommendations that continue to strongly influence DOE's decision making to this day. The State of Tennessee provides funding to the Oak Ridge Reservation Communities Alliance, an organization of regional municipal governments who receive information and provide feedback on environmental cleanup activities on the ORR. Finally, DOE provides funding to the Energy Communities Alliance, a national organization of local governments adjacent to or impacted by DOE activities, who have shared information and policy positions regarding DOE's preferred alternative.

Comment 118: Comment from Ellen Smith

Part 1 (from November 7, 2018 public meeting): I'm Ellen Smith. I'm a resident of Oak Ridge and a member of the Oak Ridge City Council and a professional environmental scientist now retired from Oak Ridge National Laboratory. I have academic background in hydrogeology and professional experience in landfill siting and design and other aspects of radioactive hazardous waste management.

It seems to me that this particular proposed landfill represents a breach of some of the trust, mainly the Department of Energy in the Oak Ridge community. We in Oak Ridge are well aware that the amazing and important work that was done here over the years left a complex legacy of waste and contamination that needs to be managed. In spite of the difficulties of managing waste in this environment, we do understand that much of the legacy material here will remain in the ground where it is forever. Needs to. And the federal government will need to be permanently responsible for that material. We also understood that the federal government accepted legal and moral responsibility for environmental remediation here, but cleaning up the legacy as much as possible and preventing the future spread of contamination.

Back in the 1990s, community members who had studied the situation here agreed that a sensible way to manage a lot of the lower hazardous waste material used during cleanup would be to consolidate it and contain it within an area of the Oak Ridge Reservation that was already permanently dedicated to waste management due to its past history. That agreement, as we've heard tonight, led to creation of the EMWMF, which was – which people expected was going to serve all of the needs of future cleanup.

Now, 20 years later, basically, language in the DOE proposed plan seems to try to imply that the new proposed landfill is a result of that earlier agreement, but as I see it, it isn't. First, this landfill is outside the bounds of areas that were already dedicated to waste management, to the clean area, we heard tonight. Establishing this landfill will increase the area dedicated to waste management by not only the 70 acres the landfill will occupy, but a much larger area of unknown size that surrounds it.

And as has been mentioned, and something that I emphasize, the landfill is being proposed not as a landfill, but as a Superfund cleanup action. As a cleanup action, it's not required to comply with the normal environmental regulations that would apply if a new landfill was being sited for any other purpose. The landfill, as currently proposed, is one that could not be built if it had to comply with normal environmental laws and regulations. It wouldn't be suitable as a nonhazardous use of the landfill without various waivers that are being requested to waive regulations related to groundwater and modify water quality criteria among other things. And it wouldn't – a normal landfill wouldn't be allowed to operate for several decades,

after it was initially approved without continuing regulatory oversight, which this landfill would not have. That's a procedural requirement that a Superfund action is not required to comply with.

DOE probably wouldn't be seeking a new landfill this soon if space in the existing one had been use responsibly. As others have suggested, waste was not characterized adequately before disposal, so a good fraction of what was disposed in the EMWMF probably was clean, and possibly could have been managed at other sites, preserving some of the waste for the higher hazardous material that the EMWMF was designed for. The fact that DOE won't tell us yet what the waste acceptance criteria for this landfill would be – that is, what would go into it – is consideration that limits potential public confidence in DOE's decision.

Another concern that I think is a breach of trust is that this landfill would introduce contaminants into the watershed at Bear Creek that aren't currently part of the contaminant burden in that particular watershed. Specifically, there would be a significant amount of mercury. We don't know if that mercury would be treated before it would go into the landfill, and a number of radionuclides, numerous radionuclides, that exist at ORNL but are not found at the Y-12 facility, and thus would require a significant new level of monitoring and management, if they're introduced at the Bear Creek watershed.

There are also some serious technical issues in this proposal. The diversion structures, the gravel drains, the pipes, the liners, the caps that are all part of the sophisticated design to manage water in and around this proposed landfill unfortunately can pretty well be expected to fail at some time over the long term. Collectively, their life expectancy is probably decades, not centuries, and certainly not perpetuity. This landfill isn't something that DOE can walk away from after it's depleted. There's a long-term requirement for stewardship and continual maintenance.

The waste sites that we're discussing in the western states, those three sites – I include the one in West Texas on that list – have the capacity to accept this kind of material, are permitted, licensed, and so forth, to accept it, are far more physically suitable to management of this kind of waste, they're in places where nobody lives, and there's such very, very little rain, and it happens that under federal law those sites are going to become the legal responsibility of the Department of Energy after they're filled up. So DOE is responsible for them already, leading to the question of why would we want to create a new waste site if you're already responsible for those others which are going to be easier to manage in the long term than this site here in East Tennessee. [Comment stopped based on time constraint; continued as shown below.]

Continuation of Comment from Ellen Smith: I wanted to conclude that Oak Ridge was promised a cleanup back when the Environmental Management program started up. We weren't promised a new waste site on clean land. That's what we're looking at right now. That's not good for the – that's not good for the environment. It's not good for the community, as Mr. Watson has pointed out. We have significant negatives that result from the public's perception that this community is welcoming a new waste site when in fact many have very little say in this particular decision. We have the opportunity to talk to you tonight, but we don't have any veto power over what you're proposing.

I wish that we could get this material handled in – if it's going to be handled here, it should be handled in a previously contaminated area. We shouldn't be trashing clean property and the city's – the community's needs for assistance in dealing with the burdens of dealing with the opportunity costs, in particular, that we receive as a DOE host community need to be given better consideration.

Additional comment during November 7, 2018 public meeting: I have a question and a comment for people here. I'll start with a comment for folks here. Just a point of information. The location of this facility is not adjacent to the Tuskegee Drive area that was mentioned. It's actually across the ridge from the Country Club Estate subdivision of Oak Ridge. And in connection with that, I'm aware that the Country Club

Estate's situation was mentioned in discussions with the DOE Site-specific Advisory Board, and SSAB members recommended that the subdivision have some sort of community outreach as a part of the process of reviewing the proposed plan. So I'm wondering if that's happened to date or if that still needs to be scheduled?

DOE Representative: I'm unaware of a specific outreach we've made to Country Club Estates yet, but we certainly can do that, making sure they're aware of the proposal and if they have any special insight or thoughts on how we should proceed.

Part 2: Thank you for the opportunity to comment on the subject document. My comments are provided from the perspectives of a resident of Oak Ridge, a member of the City Council, and a professional environmental scientist (now retired from Oak Ridge National Laboratory). I have an academic background in geology and hydrology, and I have professional experience with landfill siting and design (both at ORNL and in prior employment), as well other aspects of radioactive and hazardous waste management.

The Department of Energy and the Oak Ridge community have long enjoyed a special relationship that I see as extremely valuable to both parties. Unfortunately, it seems to me that the proposed EMDF represents a breach of the long-standing trust between the Department of Energy and the Oak Ridge community.

Oak Ridge is well aware that the amazing and important work that has been done here over the decades has left a complex legacy of waste and contamination needing to be managed. The Oak Ridge environment is a problematic setting for management of highly hazardous waste. This is not a place anyone would have deliberately chosen to locate a landfill for radioactive or hazardous waste. This environment has high rainfall; an exceptionally complex combination of geologic and hydrology that that is still poorly understood; and close proximity to water supplies, human populations, and rich ecological systems. We have waste here because critically important work was performed here for the benefit of the nation, not because it's a good place to put waste. The challenges of the local environment notwithstanding, we do understand that there is much legacy material already buried here that will need to remain in the ground where it is, where the federal government is responsible for it in perpetuity. We also understood that the federal government accepted legal and moral responsibility for environmental remediation – for cleaning up the legacy to the extent possible and for preventing future spread of contamination. As described below, this proposal violates that understanding.

Misapplication of CERCLA statute. The proposed siting, construction, and operation of the EMDF disposal cell as a CERCLA remedial action is a misapplication of the CERCLA statute. The CERCLA statute was designed to help get waste sites cleaned up quickly, not to create new waste site on clean land and deposit waste in it over a 20-year period. It's clearly advantageous to DOE to treat the EMDF as a Superfund cleanup action, not a landfill, because this allows DOE to bypass the normal procedural requirements of environmental laws and regulations for landfills (such as the National Environmental Policy Act and the requirements for licensing and inspections by regulatory agencies that could shut the project down if it were in violation), it shields DOE from legal challenges to the decision to build it, and it allows DOE to request and possibly obtain waivers from the substantive environmental requirements that would normally apply. It appears to me that the EMDF could not be built if it had to comply with normal environmental laws and regulations. The proposed site would not even be suitable for a nonhazardous municipal landfill without the waivers that are being requested and that would be justified by the fiction that this landfill is a cleanup action. Additionally, a normal landfill would not be allowed to operate for decades without continuing regulatory oversight (by regulatory agencies with real authority – for example to order an operator to suspend operations), but that's what can happen with the proposed EMDF.

DOE has cited other DOE sites as precedents for this action, referring (apparently) to the Fernald site in Ohio and the Weldon Spring site in Missouri. At those sites, DOE demolished a production complex that

had not operated for many years and consolidated all of the waste in a single disposal cell on the property. Those were one-time actions that could be addressed in a single decision. In contrast, here we are considering the continuing operation of a landfill over a period of decades, with construction of multiple disposal cells that would receive waste from many specific demolition and cleanup projects. That kind of activity requires many decisions throughout the landfill's operating life and normally would be subject to ongoing regulatory oversight over the years; it's not a single action that can be addressed in a single decision up-front.

Response: The identification of permanent solutions for the onsite and offsite disposition of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste has always been a fundamental part of the CERCLA process. CERCLA actions are not complete without all waste that has been generated having a disposal decision. The CERCLA process has been used to support decisions for many disposal facilities across the United States, some on previously disturbed sites and others on "greenfield" sites, including many disposal sites at CERCLA facilities (e.g., Oak Ridge, Hanford, and the Fernald and Portsmouth sites in Ohio). In many of these cases, a program-level evaluation of disposal needs has been conducted under CERCLA and a final decision on disposal to apply to CERCLA actions made. Agreements reached under the CERCLA framework are enforced by the state and U.S. Environmental Protection Agency.

Land use implications of Central Bear Creek Valley (CBCV) site. Back in the 1990s, community members who participated in the End Use Working Group for the Oak Ridge Reservation worked in partnership with DOE, studied the situation, and agreed that a sensible way to manage some of the lower-hazard waste material produced during cleanup was to consolidate and contain it within an area of the Oak Ridge Reservation that is already permanently dedicated to waste containment due to its past history. That agreement led to creation of the existing EMWMF landfill, which people expected would serve all of the needs of future cleanup. Language in the Proposed Plan seems to imply that this new proposed landfill is somehow a result of that agreement, but it isn't. The Central Bear Creek Valley site that DOE currently prefers for the EMDF (also the West Bear Creek Valley site identified as an alternative candidate) is outside the bounds of areas that are already dedicated to waste management. Its establishment would increase the inventory of contaminated land on the DOE Oak Ridge Reservation by the 70 acres of the landfill plus associated surrounding areas required as environmental or security buffers, and would permanently prevent other land uses on those areas.

Response: Based on strong state preferences related to site hydrology, the Federal Facility Agreement (FFA) parties have agreed to the Central Bear Creek Valley site for the waste disposal facility. The U.S. Department of Energy (DOE) has indicated in the Proposed Plan that the land use around and including the Central Bear Creek Valley site would have to be changed to industrial use from that designated in the Bear Creek Valley Record of Decision (ROD) (consistent with the recommendation of the End Use Working Group). This ROD changes the land use designation for Central Bear Creek Valley as part of this remedy selection. The land use recommendations from the End Use Working Group and eventually documented in the Bear Creek Valley ROD were identified solely to set remediation levels across the valley. There was never any expectation that the land in Bear Creek Valley would be released by DOE for use by others. The land was always intended to be a buffer between DOE activities and the public and to provide future opportunities for DOE use.

Past failure to conserve landfill space diminishes our trust. DOE would not be seeking a new landfill, at least not this soon, if the space in the EMWMF had been used responsibly. If waste had been characterized before disposal, a good fraction of what was placed in the EMWMF would have been found to be clean, and would not have needed to go there.

Response: DOE does not agree that the capacity of the Environmental Management Waste Management Facility (EMWMF) has been wasted or that operations at EMWMF have been mismanaged. Since EMWMF began operations in 2002, about 200,000 waste shipments have been made safely to the facility and approximately 80 percent of the landfill capacity has been used to date. DOE has sanctioned independent reviews or audits of the EMWMF operations from experts in the construction and operation of disposal facilities, DOE-Headquarters, and the environmental regulatory agencies. Results of the independent reviews have identified no immediate concerns with the performance of the facility and have confirmed that operations are being conducted following all applicable or relevant and appropriate requirements (ARARs). DOE works to continuously improve its efforts involving the cleanup mission at the Oak Ridge Reservation (ORR) through lessons learned. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the EMWMF, provided characterization allows this path. The waste disposal hierarchy will also be applied for the Environmental Management Disposal Facility (EMDF) waste disposal.

Refusal to give critically important information to the community and regulators. There are several components to this issue:

1. **Waste Acceptance Criteria (WAC).** The public should not be asked to provide input on its acceptance of this major undertaking without explicit information on the waste types that would be placed in the facility. DOE has refused to disclose the proposed WAC for the EMDF, nor to give the state and EPA regulators the WAC data they need to evaluate the long-term risk of the disposal facility, until a record of decision (ROD) is ready to be issued. This does not support public confidence and it deprives the public and regulators of the ability to provide truly informed opinions during the public comment process on the proposed plan. This community is too sophisticated to accept that assurances like "no high-level waste" and "only lightly contaminated material" are protective. We deserve details – to include technical information on how any mercury waste would be immobilized prior to disposal.

   Response: Remedial Investigations/Feasibility Studies (RI/FSs) for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for the EMDF. The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the ORR indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

With submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allowed for additional public comment that is addressed within the D2 ROD.

2. **Insufficient hydrologic investigations at CBCV.** There is less than one year's monitoring data for the CBCV site that DOE prefers. Even one year's data is not normally sufficient for understanding the hydrologic conditions at a site. No decision on site suitability should be made with the minimal data available now, and the public's one opportunity to weigh in on the decision should come after data are available, not before.

   Response: There are hundreds of wells in Bear Creek Valley with decades of data. This extensive data set was used to support conclusions in the RI/FS. During preparation of the Proposed Plan, DOE began more site-specific characterization efforts at the request of the other FFA parties. The additional site characterization for Central Bear Creek Valley evaluating geologic and hydrogeologic conditions was conducted in two phases. The first phase, with the referenced eight well pairs (16 wells) monitored for over a year as well as monitoring results from other existing wells in Bear Creek Valley to supplement the general understanding of the site, was used to support identification of a preferred location in the Proposed Plan and the selection of the location in this ROD. Analysis of the first phase data confirmed DOE's understanding of the site. Since then, additional data from 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization was collected to support the design. The design, as it progresses, will be modified as needed to consider the new data. Technical Memoranda presenting the results of the initial evaluation can be found in the Administrative Record.

3. **Lack of details for cost comparisons between onsite and offsite disposal alternatives.** It appears that DOE's preference for onsite vs. offsite disposal is based almost entirely on cost (it's cheaper to ask Oak Ridge and Tennessee to accept the long-term burden of a new waste site in an unsuitable area than it is to send waste to a more suitable location), but the details of DOE's cost comparisons have not been made available for scrutiny – and there are local people with relevant expertise who think the cost differential has been greatly exaggerated. The community needs to be able to evaluate the cost analysis before any decision is made.

   Response: In response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the recent evaluation of the offsite disposal costs.

Site-related technical concerns. There are multiple serious technical issues with the sites and the proposal that make this landfill a long-term liability.

1. **Site unsuitability.** Available data indicate that all of DOE's candidate sites for onsite disposal present major hydrologic challenges, in the form of surface streams (particularly at the East Bear Creek Valley site) and very near-surface groundwater in a hydrogeologically complex setting characterized by springs, seeps, and upwelling flow (I recall seeing that one of the monitoring wells installed at ECBV was a flowing well). DOE contends that the technical issues of the sites all can be overcome by engineering. However, experience at the existing EMWMF has indicated that it's difficult to anticipate all hydrologic issues and there can be serious problems that aren't anticipated. Even if it were possible to design diversion structures, subsurface drains and cutoff walls, underdrains, etc., guaranteed to fully

accommodate all of the water that might try to enter the proposed facility, the diversion structures, gravel drains, pipes, liners, and caps, installed to manage water in and around this proposed landfill can be expected to fail in the long term. Their collective life expectancy is decades, not centuries, and certainly not perpetuity. This landfill is not something that DOE can walk away from after it's filled. It will be long-term burden on the federal government and the community.

Response: DOE believes that multiple sites in Bear Creek Valley can support construction of a protective landfill for wastes planned for onsite disposal. Protectiveness will be assured through a combination of facility engineering, restrictions on waste acceptance, and long-term monitoring and maintenance. The site selected in the Central Bear Creek Valley for the EMDF provides a controlled location within the Oak Ridge National Priorities List (NPL) Site and is located in an area that is not being considered for reindustrialization or reuse. The Central Bear Creek Valley Site is in the same valley as the existing EMWMF, along with several other CERCLA areas in the Bear Creek Valley. The site allows waste to be placed between two tributaries and offers hydrologic separation from Pine Ridge. The slope of the Central Bear Creek Valley Site is not as steep as other sites considered, thereby minimizing the need for surface water diversion. Based upon strong State preferences related to site hydrology, the FFA parties have agreed to use of the Central Bear Creek Valley site. From the alternatives within Bear Creek Valley considered for locating the EMDF, DOE considered brown field sites first, but ultimately the Central Bear Creek Valley site provided the most beneficial attributes in total over those other sites.

The facility is designed and will be built with natural materials and to take advantage of existing geological features to ensure longevity. Natural, existing features are relied on to maintain surface water flows away from the waste; the facility is constructed in large part above grade. Drainage features are designed with graded filtration to ensure longevity. The cap and liner systems have natural components (such as clay and rock) that maintain their properties for thousands of years. Life expectancy of synthetic liners are in the many hundreds of years, but even with failure of those components, demonstrations indicate the facility remains protective of human health and the environment.

2. **Mercury.** It's expected that this landfill would receive mercury waste, and it's not apparent that this waste would be appropriately stabilized before disposal.

   Response: Disposal of any waste would have to meet all ARARs, including the Resource Conservation and Recovery Act of 1976's (RCRA's) land disposal restrictions. In the Administrative WAC, as agreed by the FFA parties, hazardous mercury (D009 under RCRA) waste is prohibited from disposal in the EMDF.

3. **Long-term consequences of introducing new contaminants into Bear Creek watershed.** Because this landfill would receive waste from ORNL and is expected to receive mercury waste from Y-12, it would introduce contaminants into the watershed of Bear Creek that aren't part of the contaminant burden in that watershed. Mercury at the Y-12 site is in the watershed of East Fork Poplar Creek, not Bear Creek, and history of work at the ORNL site in Bethel Valley has involved pretty much every radionuclide on the periodic table, most of which were never found at the Y-12 facility. Adding new contaminants into the Bear Creek watershed will add to the monitoring and stewardship burden facing DOE and the community into the long-term future.

   Response: Mercury contamination is a national and global concern due to atmospheric deposition of mercury from non-DOE sources, and fish advisories due to mercury are found in all 50 states. Evaluation of mercury in surface water and fish in Bear Creek are already

required. Historic disposal practices have already occurred across facility boundaries. Through the WAC and other protective measures, impacts to current or hypothetical future members of the public will not exceed the CERCLA risks of 10^{-4} to 10^{-6} excess cancer risk level or hazard index of 1. As well, protection of surface and groundwater is maintained through ARAR compliance. The ROD has been updated consistent with the FFA parties' agreed-upon mercury management approach (Sect. 2.12.2.3). Mercury hazardous waste (RCRA D009 code) expected to result from the cleanup at the Y-12 National Security Complex (Y-12) is prohibited from disposal in EMDF. From these points, DOE disagrees that the presence of EMDF would result in contamination in Bear Creek Valley as depicted in this comment.

Offsite Alternatives. Other better options exist in the form of the commercial disposal sites in western states (Utah, west Texas, and Nevada) that are licensed for these wastes, have capacity to accept them, and are in dry settings that are far more physically suitable for waste management. The usual guidance on siting disposal facilities for radioactive waste is to keep them far away from residential areas. That's not a luxury we have in East Tennessee (the CBCV and EBCV sites are both less than a mile from Oak Ridge residential neighborhoods across the ridge, and people downstream in Roane County get their drinking water from streams affected by runoff from waste sites on the Oak Ridge Reservation), but the three western sites are very remote from human populations. Additionally, DOE is required by law to assume financial and management responsibility for these western sites after they are shut down, so there's a benefit from using them for this DOE waste and avoiding the long-term costs of dealing with an additional newly created waste site here in Oak Ridge.

Preference for Offsite Alternative. If the three Bear Creek Valley sites are the best candidates that can be identified locally, offsite disposal (at one of the three approved sites in very arid locations in western states) is clearly a better alternative.

Response to DOE Objections to Offsite Alternative. I have listened to DOE's assertions that the main reasons for preferring onsite disposal are not cost, and I have responses to the assertions I've heard:

1. One argument I've heard is that the primary reason is not cost, but rather that onsite disposal is more protective of health and environment in the short term, thus meeting the CERCLA balancing criterion of short-term effectiveness. I don't happen to believe that this is a reason; rather, it's an excuse. Additionally, I don't think the argument is valid. DOE asserts that transport to a western site is not protective because people could die from ordinary traffic collisions during transport. This is based on the assumption that long-distance transport be done by truck, when it's acknowledged that it would be by rail, which entails a far lower potential for traffic collisions. Additionally, I submit that the very low number of potential traffic accidents predicted even for truck transport would not be a factor in ordinary decision-making about these two alternatives – the accident rate would be deemed negligible. It's likely that there are more highway deaths from traffic accidents due to people ordering basic necessities (like cat food and toilet paper) from Amazon, but I've yet to hear a suggestion that people should stop buying goods from Amazon due to the public safety threats resulting from traffic accidents involving the extra trucks needed to carry people's special shipments of these goods.
2. It's asserted that reliance on an offsite facility would make DOE vulnerable to possible decisions by other states and localities to suspend authorizations for shipments of Oak Ridge wastes to those facilities. I submit that the existence of three sites in three different parts of the west greatly reduces the "risk" associated with such decisions. Additionally, I note with chagrin that DOE places so much significance on the hypothetical future objections of some unidentified state or local government somewhere else in the nation, while proposing an action here in Oak Ridge over which the local government and citizens would have absolutely no authority, now or in the future.

Thank you for this opportunity to comment. I do hope that there will be additional opportunity for public comment before any decision is made to site the proposed EMDF here in Oak Ridge.

Response: DOE thanks you for your participation in the public comment process. EMDF will be a permanent CERCLA waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge NPL Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 and the Oak Ridge National Laboratory that will meet the limits as documented in this ROD. The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with ARARs. The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

In response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the recent evaluation of the offsite disposal costs.

With submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

Comment 119: Comment from Jason Fishel

I do not approve of creating a new site for toxic waste disposal near Oak Ridge because other facilities better suited with lower chances of environmental contamination exist.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA

Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 120: Comment from Rhonda Bogard

As a long-time Oak Ridger, and a retiree from a long career at DOE facilities, I am writing to express my opposition to the proposed landfill. I have been watching this process develop for many years and I am disappointed at the outcome of the planning. Normally I find the projects in Oak Ridge on DOE lands to be well thought out, and well executed, and I appreciate the competency of so many of the workers and the managers. But this time it is different. I am going to include some of the words expressed by Ellen Smith, a well-known environmental scientist, because she captures it so well, and it reflects my own views as well. The bottom line, please do not dispose of this waste on the DOE properties in Oak Ridge, but transfer it to a more appropriate geographic location.

"The Oak Ridge environment is a problematic setting for management of highly hazardous waste. This environment has high rainfall; an exceptionally complex combination of geologic and hydrology that that is still poorly understood; and close proximity to water supplies, human populations, and rich ecological systems. Those challenges notwithstanding, we do understand that much of the legacy material will need to remain in the ground where it is, where the federal government is responsible for it in perpetuity. We also understood that the federal government accepted legal and moral responsibility for environmental remediation – for cleaning up the legacy to the extent possible and for preventing future spread of contamination.

Back in the 1990s, community members who had studied the situation agreed that a sensible way to manage some of the lower-hazard waste material produced during cleanup was to consolidate and contain it within an area of the Oak Ridge Reservation that is already permanently dedicated to waste containment due to its past history. That agreement led to creation of the existing EMWMF landfill, which people expected would serve all of the needs of future cleanup.

Language in DOE's proposed plan seems to try to imply that this new proposed landfill is somehow a result of that agreement, but it isn't. Some reasons:

1. This landfill is outside the bounds of areas that are already dedicated to waste management. Its establishment will increase that dedicated area by not only the 70 acres of the landfill but also an even larger area of unknown size that surrounds it.

   Response: The U.S. Department of Energy (DOE) believes that multiple sites in Bear Creek Valley can support construction of a protective landfill for wastes planned for onsite disposal. Protectiveness will be assured through a combination of facility engineering, restrictions on waste acceptance, and long-term monitoring and maintenance. The site selected in the Central Bear Creek Valley for the Environmental Management Disposal Facility (EMDF)

provides a controlled location within the Oak Ridge National Priorities List Site and is located in an area that is not being considered for reindustrialization or reuse, but rather has been identified for continued mission use. While the Central Bear Creek Valley Site is west of the existing Environmental Management Waste Management Facility (EMWMF) and in a greenfield area, it is in the same valley as the existing EMWMF, along with several other Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) areas in the Bear Creek Valley. The site allows waste to be placed between two tributaries and offers hydrologic separation from Pine Ridge. The slope of the Central Bear Creek Valley Site is not as steep as other sites considered, thereby minimizing the need for surface water diversion. Based upon strong State preferences related to site hydrology, the Federal Facility Agreement (FFA) parties have agreed to use of the Central Bear Creek Valley site.

2. This landfill is being treated as a Superfund cleanup action, not a landfill, so it would not be required to comply with the normal environmental regulations for landfills – even for ordinary municipal landfills. It could not be built if it had to comply with normal environmental laws and regulations. The proposed site would not even be suitable for a nonhazardous municipal landfill without the waivers that are being requested and that would be justified by the fiction that this landfill is a cleanup action. And a normal landfill would not be allowed to operate for decades without continuing regulatory oversight, but that's what can happen with the proposed EMDF. DOE has cited other sites at precedents for those action, referring to the Fernald site in Ohio and the Weldon Spring site in Missouri. At those sites, DOE demolished a production complex that had not operated for many years and consolidated all of the waste in a single disposal cell on the property. Those were one-time actions that could be addressed in a single decision. In contrast, here we are considering the continuing operation of a landfill over a period of decades, with construction of multiple disposal cells that would receive waste from many specific demolition and cleanup projects. That kind of activity requires many decisions throughout the landfill's operating life and normally would be subject to ongoing regulatory oversight over the years; it's not a single action that can be addressed in a single decision up-front.

   Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

   A Toxic Substances Control Act of 1976 (TSCA) waiver for two parts of TSCA 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this Record of Decision (ROD) to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

   - **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the Oak Ridge Reservation (ORR). Compliance with the Resource Conservation and Recovery Act of 1976 (RCRA) Subtitle C landfill requirements (identified as applicable or relevant and appropriate requirements [ARARs]) along with the geologic buffer and waste acceptance requirements for PCB**

waste disposal for the landfill supports the U.S. Environmental Protection Agency determination that the remedy is protective of human health and the environment.

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.**

An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

3. DOE would not be seeking a new landfill, at least not this soon, if the space in the EMWMF had been used responsibly. If waste had been characterized before disposal, a good fraction of what was placed in the EMWMF would have been found to be clean, and would not have needed to go there.

   Response: DOE does not agree that the capacity of EMWMF has been wasted or that operations at EMWMF have been mismanaged. Since EMWMF began operations in 2002, about 200,000 waste shipments have been made safely to the facility and approximately 80 percent of the landfill capacity has been used to date. DOE has sanctioned independent reviews or audits of the EMWMF operations from experts in the construction and operation of disposal facilities, DOE-Headquarters, and the environmental regulatory agencies. Results of the independent reviews have identified no immediate concerns with the performance of the facility and have confirmed that operations are being conducted following all ARARs. DOE works to continuously improve its efforts involving the cleanup mission at the ORR through lessons learned. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the EMWMF, provided characterization allows this path. The waste disposal hierarchy will also be applied for EMDF waste disposal.

4. DOE will not tell us what the Waste Acceptance Criteria for this landfill would be – that is, what they would dispose in it.

   Response: Remedial Investigations/Feasibility Studies for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for EMDF. The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF

(consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA-party approved primary document, the WAC Compliance Plan.

5. Because this landfill would receive waste from ORNL and is expected to receive mercury waste from Y-12, it would introduce contaminants into the watershed of Bear Creek that aren't part of the contaminant burden in that watershed. Mercury at the Y-12 site is in the watershed of East Fork Poplar Creek, not Bear Creek, and history of work at the ORNL site in Bethel Valley has involved pretty much every radionuclide on the periodic table, most of which were never found at the Y-12 facility. Adding new contaminants into the Bear Creek watershed will add to the monitoring and stewardship burden facing DOE and the community into the long-term future."

   Response: Mercury contamination is a national and global concern due to atmospheric deposition of mercury from non-DOE sources, and fish advisories due to mercury are found in all 50 states. Evaluation of mercury in surface water and fish in Bear Creek are already required. Historic disposal practices have already occurred across facility boundaries. Through the WAC and other protective measures, impacts to current or hypothetical future members of the public will not exceed the CERCLA risks of 10^{-4} to 10^{-6} excess cancer risk level or hazard index of 1. As well, protection of surface and groundwater is maintained through ARAR compliance. Mercury hazardous waste (RCRA D009 code) expected to result from the cleanup at the Y-12 National Security Complex is prohibited from disposal in EMDF. From these points, DOE disagrees that the presence of EMDF would result in contamination in Bear Creek Valley as depicted in this comment.

Please consider these comments as my own and enter them into the public record.

Response: DOE thanks you for your participation in the public comment process.

Comment 121: Comment from Joan Nelson

I, a resident of Oak Ridge, object to this proposed facility that will be used like a landfill but is being designed to the lesser standards of single use Superfund clean up site. This alone indicates bad faith and management on the part of DOE and a disregard for the residents of Oak Ridge and the surrounding area. The design critera and materials-diversion structures, gravel drains, pipes, liners and caps, are not sufficient for the long term protection of our watershed.

Our topography, karst with limestone; and weather, 50 t0 60 inches of rain a year, both argue against this kind of disposal facility. These materials should be shipped off site to a facililty like "commercial disposal sites in western states (Utah, west Texas, and Nevada) that are licensed for these wastes, have capacity to accept them, are in dry settings far more physically suitable for waste management, and are already destined to become the legal responsibility of DOE after they are closed – thus saving the long-term costs of dealing with an additional newly created waste site here in Oak Ridge." Quote from Ellen Smith

I understand the DOE will not describe the criteria for waste acceptance, which again shows the lack of good faith on the part of DOE and the continued abuse of the city of Oak Ridge, its residents, its watershed, and the health and well being of the surrounding area.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Remedial Investigations/Feasibility Studies for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for EMDF. The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs. (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, Federal Facility Agreement parties-approved primary document, the WAC Compliance Plan. Section 2.12.2.3 of the D2 ROD also includes the Federal Facility Agreement parties' agreed-upon mercury management approach.

Comment 122: Comment from Rebecca Bowman

Let me begin by clearly stating that I strongly oppose contaminating any green site within the Oak Ridge City Limits. The DOE is proposing a low-hazardous waste site in Bear Creek Canyon. This site is unsuitable for many reasons. The DOE has not provided answers posed by the City and other interested parties.

Without answers to the questions, including the cost benefit analysis compared to off-site storage, it is impossible for the public to comment on this proposal. The DOE has not only failed to respond to our questions, it has refused to extend the public comment period.

This is the second time this year that the DOE has used dubious tactics to disrupt and harm our community. The first was the clear-cutting of Pine Ridge. They filed a Categorical Exclusion to avoid having to comply with regulations that should have applied including informing the City of their intentions to clear-cut 25 acres of mature forest. Using CERCLA as well asking for additional waivers and exemptions for the proposed landfill are the tactics DOE to bypass the community yet again. This appears to be an unacceptable pattern of behavior.

Oak Ridge is the host city for the DOE and acknowledge the benefits of having the DOE here. However; a guest that disregards the well-being of the host is detrimental to all. These decisions must be mutually beneficial and address future impacts on the environment of Oak Ridge and the surrounding areas.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested. Although forested land will be used for disposal, upon closure much of that land can be returned to nature, with natural local grasses grown on the cover of the facility and land not used for disposal can be returned to forested land.

The comment notes a request for a cost-benefit analysis for offsite storage. Storage of waste is not a permanent solution, and eventual disposal would still be necessary; therefore, storage, either offsite or onsite, was not considered. Regarding the offsite disposal costs compared to onsite disposal costs, a more recent independent evaluation was undertaken as described in this ROD (see Sect. 2.14). This recent evaluation confirmed the conclusion that offsite disposal is approximately double the cost of onsite disposal, the major difference being the cost to transport the waste from Tennessee to western states. With submittal of the D1 ROD, the Federal Facility Agreement parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

Comment 123: Comment from David Bowman

I am a home owner in Oak Ridge and a nuclear physicist. I urge you not to site a mixed-waste landfill in Bear Creek Canyon. My understanding is that the site is at present undisturbed and free of any waste. Further the waste to go into the landfill is from the cleanup of Y12 & ORNL. The waste would involve radioactive and chemical hazards and cause the creation of a new deposit of mixed waste. I further understand that the ground beneath the site is limestone and subject to erosion by carbon dioxide dissolved in ground water. Barriers and drainage apparatus in the land fill may be expected to fail over the time scale of decades. Then there will be an even larger problem that we have now. There will be more mixed waste than we now have and the new containment may fail and cause the contamination of ground water and the porous lime stone below and down-stream of the site.

Creation of the new mixed-waste site may decrease the quality of the Oak Ridge environment, decrease property values and pose dangers to the population of Oak Ridge and East Tennessee.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE believes that multiple sites in Bear Creek Valley can support construction of a protective landfill for wastes planned for onsite disposal. Protectiveness will be assured through a combination of facility engineering, restrictions on waste acceptance, and long-term monitoring and maintenance. The site selected in the Central Bear Creek Valley for the Environmental Management Disposal Facility (EMDF) provides a controlled location within the Oak Ridge National Priorities List Site and is located in an area that is not being considered for reindustrialization or reuse. The Central Bear Creek Valley Site is in the same valley as the existing Environmental Management Waste Management Facility, along with several other Comprehensive Environmental Response, Compensation, and Liability Act of 1980 areas in the Bear Creek Valley. The site allows waste to be placed between two tributaries and offers hydrologic separation from Pine Ridge. The slope of the Central Bear Creek Valley Site is not as steep as other sites considered, thereby minimizing the need for surface water diversion. Based upon strong State preferences related to site hydrology, the Federal Facility Agreement parties have agreed to use of the Central Bear Creek Valley site.

The Remedial Investigation/Feasibility Study and Proposed Plan both clearly state that there are no karst features in the geology underlying any of the sites being evaluated for EMDF. The position that DOE has presented in both documents is based on past characterization of Bear Creek Valley. To further validate this position, DOE conducted additional geologic investigations at the proposed site, Site 7c in Central Bear Creek Valley. The resultant validation information is presented in the Phase I Site Characterization Technical Memorandum provided in the Administrative Record.

Comment 124: Comment from Bill Moore

I would like to express my opposition to the construction of a proposed hazardous waste disposal facility in Oak Ridge, for several reasons. First, although I am not a geologist, I have a friend, Virginia Dale, who is, and has expressed her concerns about the choice of Oak Ridge as a site, based on the geology of this region. I will stand by those concerns. There is already mercury contamination in Poplar Creek, so something which has the possibility of additional groundwater contamination should not be permitted.

Oak Ridge already is seen by many as an unsafe place to live. Many residents have been asked by non-residents if they “glow at night.” I know I have had that experience, and I know it was not a solitary event. It is already extremely difficult to persuade workers at Y-12 and ORNL to live here. One only has to look at the traffic on Pellisippi Parkway to see that the majority of those employees live in the Knoxville

area. If Oak Ridge is to maintain itself as a vibrant and vital community, ways need to be found to encourage more of them to live here. The existence of this disposal facility will not facilitate that process, nor one of encouraging new companies and enterprises to locate here.

Please do not approve the construction of this facility. There are existing facilities elsewhere which are much better equipped to handle this sort of waste, and they should be utilized as such.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

The comment expresses concern of a socioeconomic nature. DOE points to the socioeconomic study supporting the landfill that is referenced and summarized in this ROD (see Sect. 2.10.11).

Comment 125: Comment from Ann Mostoller

Please add my name to those opposed to the new DOE landfill in Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human

health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 126: Comment from Meg Tufano

Please reconsider. This is not the right terrain for this kind of waste.

It is just convenient.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 127: Comment from Abbie Moore

I am not an environmental scientist but my friends who are have spoken out about this proposed landfill. I trust them to tell the truth. I trust that when they say this is dangerous for Oak Ridge, I believe them. Our City already has problems attracting new, young, educated families who are the hope for our survival as a community. This dangerous proposed landfill will only serve to scare new families away. Please listen to experts who say Oak Ridge is not suited for this landfill. Please listen when they say other sites are better suited. I want to go on public record in opposition of this proposed landfill. Please listen to the people who want to continue living in Oak Ridge, who want their children to continue living here. Do not build the hazardous waste landfill in or around Oak Ridge, TN.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 128: Comment from Keith L. Kline

I do not support establishment of new disposal facility on the Oak Ridge Reservation (the Onsite Disposal Alternative) for the following reasons:

1. This region is inappropriate based on climate, hydrology and geology for this sort of facility.
2. DOE's proposed site would unnecessarily harm a relatively undisturbed area; calling this environmental destruction a "remedial action" appears to undermine the intent of CERCLA.
3. Proximity to residential areas is nearly impossible to avoid in this region.
4. A complete environmental impact assessment (EIA) process should be completed, including time for public input and public review or the resulting Environmental Impact Statement. The EIA should compare options in East Tennessee with other options more suited for this type of facility.

Clean water and a safe future for our children and subsequent generations is more important to the community than a few jobs in the short term. Thank you for considering my comments on this important matter.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their

current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Siting of the landfill has been very carefully studied, and the design incorporates the natural features of the site and takes into account the climate and hydrology. As a final assurance, a field demonstration is planned to confirm the site hydrology and design are compatible. The ARARs are the prescriptive rules and regulations that govern siting, design, construction, operation, and closure of the landfill. These have been agreed to by the three Federal Facility Agreement (FFA) parties and are included in the ROD.

ARARs also dictate mitigation activities that must compensate for the loss of environmental habitat such as wetlands and/or endangered species. DOE will work with the regulating authorities to perform/fund appropriate mitigation activities.

Existing and new data from hundreds of wells in Bear Creek Valley support the conclusion that any contamination in the valley cannot reach residential areas based on flow directions. The law also requires groundwater monitoring around any disposal facility so any unlikely releases would be identified quickly. The law also requires those releases to be remediated. There is no credible threat to any downstream water users.

An Environmental Impact Statement is a document conducted under the National Environmental Policy Act of 1969 (NEPA). DOE decided years ago that the Remedial Investigation/Feasibility Study under CERCLA augmented with NEPA values is the preferred documentation for making environmental cleanup decisions as the two types of documents are very similar and serve the same purpose (DOE 1994). With submittal of the D1 ROD, the FFA parties recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

Comment 129: Comment from Sophia Krusen

My name is Sophia Krusen. I am an Oak Ridge High School student and a youth member of the Environmental Quality Advisory Board (EQAB). As a resident of this town, I am becoming concerned about potential toxic seepage from the waste that will be deposited in Bear Creek Valley. I worry that as more waste landfills are located here, the quality of our ground and surface water will worsen. Tennessee is a very rainy state; therefore, the potential of harmful materials leaking from the landfill increases. For long term landfill solutions, locating disposal facilities in dry climates far from the water table would be more beneficial for the environment. Thank you for taking my concerns into consideration.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Existing and new data from hundreds of wells in Bear Creek Valley support the conclusion that any contamination in the valley cannot reach residential areas. CERCLA also requires groundwater monitoring around any disposal facility so any unlikely releases would be identified quickly. The law also requires those releases to be remediated. The specific remediation goals for landfill wastewater are specified in the ROD (Sect. 2.12.2.4). The approach was agreed upon among the Federal Facility Agreement parties. The discharge limits will be developed in the future, based on the remediation goals, when the specifics of the EMDF landfill wastewater treatment systems are known, including the discharge location. The remediation goals and future discharge limits are within the CERCLA risk range and protective of Human Health and the Environment. There is no credible threat to any downstream water users. The protectiveness offered by the design/operation/closure/monitoring of an onsite facility, combined with other factors such as protectiveness of people on the transportation route (due to vehicular accidents/carbon emissions) were the waste to be sent offsite, all factor into the determination that onsite is the preferred solution for disposing of this waste.

Comment 130: Comment from Sam Webb

The Emdf would be better suited in the outback of utah

I know transportation costs would be high, But not as high as the costs to enviroment and people in a already hazardous zone which has taken decades to reclaim

The legal battles with be astronomical just ask tva

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980

(CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Existing and new data from hundreds of wells in Bear Creek Valley support the conclusion that any contamination in the valley cannot reach residential areas. CERCLA also requires groundwater monitoring around any disposal facility so any unlikely releases would be identified quickly. The law also requires those releases to be remediated. There is no credible threat to any downstream water users. The protectiveness offered by the design/operation/closure/monitoring of an onsite facility, combined with other factors such as protectiveness of people on the transportation route (due to vehicular accidents/carbon emissions) were the waste to be sent offsite, all factor into the determination that onsite is the preferred solution for disposing of this waste.

Comment 131: Comment from Louise McKown

I am not an environmentalist advocate, now do I work at the DOE plants. However, I have been known to speak my mind on disability and health care issues. The disability community has a saying, "Nothing about us without us." That means being at the table when important issues are discussed and seriously being listened to and not being written off as a bunch of uneducated, ignorant people when decisions about our lives are being defined.

You did not allow the representatives of Oak Ridge that we elected for City Council to be at the table when you decided where to dump all the stuff that this landfill will hold. Nor did you allow environmental advocates to be there either----people like Ellen Smith and Virginia Dale who I know and respect their opinion. Their fears are not unfounded. Mercury in the Alpha facility is there and the last thing we need here is another mercury spill or leakage over time---hat would not happen if you shipped this material to the western part of the country. It may cost more, but you will not end up being pound foolish.

Not as many Oak Ridgers work at the plant as when I was growing up here in the 50s and 60s. Instead they live in Farragut, Hardin Valley, other parts of Knox or Anderson Counties----for fear of what DOE is going to dump here. I suggest you buy some land in West Knox County and dump all this toxic stuff there! But you know full well, you would never be able to do it because of the outcry of people who only work, but dare not live here! You should be striving to correct that stereotype and make this place the absolute safest

place to live and work. We do not deserve to have our home values diminished because of your decision to put the landfill here. There is no doubt in my mind that will happen. Those of us who live here like our schools and not having to deal with massive traffic to get to work. We are not undereducated about what DOE does and you should not write us off as ignorant people. Stop being penny wise and pound foolish when it comes to our and our grandchildren's health and safety.

I am now house or property hunting because my sister is moving back to Oak Ridge. Because of your reluctance to send this toxic material to Utah, I know not to buy out in Roane or the western part of Oak Ridge that has great housing or a new development of upscale homes off Tusculum. Talk about reducing the housing stock even further than it is. Well, you have one it. And that is not fair or what this City needs.

Thanks for at least letting us submit comments. I seriously doubt you will get many from West Knox County.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

DOE has made extensive effort to ensure meaningful community involvement throughout this nearly decade-long process of selecting a remedy for final disposition of CERCLA waste at the Oak Ridge NPL Site consistent with the U.S. Environmental Protection Agency and Tennessee Department of Environment and Conservation-approved EMDF Community Outreach Plan. Large-scale outreach began in 2015 and has continued to the present. City and county officials received tours and briefings. The Oak Ridge Office of Environmental Management (OREM) hosted numerous community meetings, and there was substantial media outreach on the topic. OREM also proactively reached out to numerous community groups to provide presentations about EMDF. DOE released the Proposed Plan to the City of Oak Ridge before the start of the formal public comment period. In addition to providing notices to the paper, every household in Oak Ridge received a flyer requesting input to the public comment process. The original comment period was 45 days but was extended to 120 days at the request of the public. DOE has made every effort to ensure there has been meaningful public input. With submittal of the

D1 ROD, the Federal Facility Agreement parties recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

Comment 132: Comment from Robert Kennedy

Part 1: DOE OREM should not create yet another waste dump by ruining a beautiful 70-acre greenfield in Central Bear Creek Valley.

No mercury whatsoever should be buried within city limits of Oak Ridge – every bit must go out West.

All waste and building debris should be properly characterized before disposal.

Part 2: When you're in a hole, the first rule is, *stop digging*!

There's a sign from TDOT on the recycle bin downstairs that says, "Nobody Trashes Tennessee". Yet that's exactly DOE's fixin' to do by putting another nuclear waste dump inside the city limits of Our Fair City.

Why would anyone want that stuff here? What's the interest? The answer is, *the tipping fee*. Either way, there's plenty of paying work to do—work by deconstruction people to demolish the buildings, work by technicians and scientists to characterize and treat the waste, work by truckers to haul it around. The only difference is where it ends up. If it goes to a safe landfill out West, then the DOE contractor UCOR doesn't get their tipping fee for dumping the stuff here. Someone else gets the tipping fee. *That's the interest*.

Would Providence will let someone in Heaven for poisoning Posterity? For doing that to their grandchildren—for money? I should think not. Let's *stop this stupidity*.

If not us, who? If not now, when?

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in EMDF.

Siting of the landfill has been very carefully studied, and the design incorporates the natural features of the site and takes into account the climate and hydrology. As a final assurance, a field demonstration is planned to confirm the site hydrology and design are compatible. The ARARs are the prescriptive rules and regulations that govern siting, design, construction, operation, and closure of the landfill. These have been agreed to by the three Federal Facility Agreement parties and are included in the ROD.

Comment 133: Comment from Shigeko Uppuluri

My name is Shigeko Uppuluri

We have lived in Oak Ridge since 1963 and we love this beautiful, friendly and very active community.

Please put your best thought and highest intelligence and do the best for this important historical community and please do not do any harm to our town so that our children will do well in their life and live with happiness and responsibility to their family and country.

Do not deposit any hazardous materials near Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 134: Comment from W. Mark Logan

Please be advised that it is my opinion that this landfill should not be built in or near Oak Ridge or for that matter in the state of Tennessee. The waste destined to be stored at this facility when constructed should be

shipped to an existing facility out west perhaps in Nevada, New Mexico or Utah. There are existing facilities in these locations. These areas are also more geologically stable, have less of a groundwater problem and are not as near to major population centers. Also please consider the following when making your decision:

- Mr. Jones and Mr. Rector's cautionary slideshow.
- Letters on this subject to the Oak Ridger newspaper.
- Numerous Oak Ridger newspaper articles on the subject.
- TDEC EMDF Fact sheet (s)

I have worked in Oak Ridge for many years at the Y-12, K-25, and ORNL sites as a contractor. Part of my duties involved preparing plans for the removal, storage, and security of hazardous waste. I have a definite appreciation of what is here, what needs to be done, and how to properly do it.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

The CERCLA process includes analyzing and comparing all posed alternatives against nine criteria. In this case, the onsite alternative was demonstrated to be the best solution under these criteria (see Sect. 2.10, where that comparison is made and details are provided that explain why the onsite disposal is preferable to offsite disposal).

Comment 135: Comment from Barbara Eggert

Much money has been spent in trying to clean up some of the hazardous buildings, equipment, containers and etc. that have already been dumped, buried, or abandoned in place from prior years in Oak Ridge/ Roane County.

If TDEC experts and environmental scientists recommend that hazardous waste be removed from populated areas so it can be safely monitored and maintained "forever" or the life span of the materials and chemicals, why is DOE not listening.

Stop the dumping in Oak Ridge and surrounding area. This is a financial issue with DOE but it is a financial and health issue for the community.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

The CERCLA process includes analyzing and comparing all posed alternatives against nine criteria. In this case, the onsite alternative was demonstrated to be the best solution under these criteria (see Sect. 2.10, where that comparison is made and details are provided that explain why the onsite disposal is preferable to offsite disposal).

Comment 136: Comment from Crystal Sherline, Ph.D.

I am a resident of Oak Ridge and I oppose the on-site disposal at Y-12.

I chose to make Oak Ridge my home in 2007, after my husband defended his dissertation, and decided to say after our divorce. We have had one child graduate from ORHS and the last is slated to do so 2021. The point is, we came to Oak Ridge for the sense of community, schools, and ease of commute to ORNL and OSTI, where he and I work, respectively. If talks concerning a disposal in Oak Ridge were happening in 2007, we would not have moved into the city.

The city of Oak Ridge already has problems recruiting its workers to live in Oak Ridge. We are diverse community of blue and white collar laborers. I appreciate the diversity of this city. I have been an advocate for others considering moving to the area, rather than West Knox, Farragut, Hardin Valley. I want to continue to advocate for a great life in Oak Ridge. With an on-site disposal at Y-12, I would feel uncomfortable doing so.

The fact is, there are plenty of places already set up to take the materials. Dare I say Yucca Mountain?

I would like my voice heard. I am part of the silent majority but I am not complacent. I am busy working 40 hours/week for DOE, teaching a class at UTK and raising teenagers. There are many like me, in Oak Ridge, that do not have spare time, as our lives belong to our children. So, I am here fighting for mine. My son, a Marine, would like to return to Oak Ridge after his deployment, but if this site goes through, I will discourage him from returning and raising a family here, as I would discourage any young families.

Please consider what this would do to my town, as I am not sure it is yours.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

To address your point about Yucca Mountain, that facility was designed to receive high-level waste, not low-level waste which will be disposed of in the EMDF. Low-level waste would not be eligible for disposal at Yucca Mountain, and the Yucca Mountain facility is not currently, or planned, to receive waste at this time.

Comment 137: Comment from Steven Sicular

The proposed DOE landfill in Oak Ridge is an extremely bad idea. Why does the DOE wish to make a bad problem even worse? Oak Ridge has endured seven decades of toxic abuse. Shifting one landfill - which in reality is what Y-12 already is - to another undisturbed and environmentally fragile parcel is absolutely ludicrous.

Knowing there are other disposal sites, in the western US - already in existence - away from human populations, makes much better sense.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a

permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 138: Comment from Ebony Capshaw

Greetings! My name is Ebony M. Capshaw and I am a resident of Oak Ridge in the Scarboro community. I do not feel confident with the proposed site or information provided. There is no guarantee that the liners will work and not contaminate the environment. I believe we should continue to send contaminated waste to off-site facilities. There have been no hazardous accidents reported in concern with the transport of waste from Oak Ridge by rail cars. I think protecting the surrounding communities and future generations from potential exposure to hazardous wastes is more precious than money. How many of the staff involved with this project live in close proximity to the proposed sites for EDMF? Would you want to expose your loved ones to hazardous wastes without a 100% guarantee that no exposure would occur? I've reviewed the EDMF fact sheet by the TN Department of Environment and Conservation, presentation posters, and sat in public meetings over the past year. I am opposed to this facility being placed in my backyard. I strongly support sending waste to off-site facilities built in better conditions that prevent contaminating water tables and viable communities.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate

requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Existing and new data from hundreds of wells in Bear Creek Valley support the conclusion that any contamination in the valley cannot reach residential areas. CERCLA also requires groundwater monitoring around any disposal facility so any unlikely releases would be identified quickly. The law also requires those releases to be remediated. There is no credible threat to any downstream water users. The protectiveness offered by the design/operation/closure/monitoring of an onsite facility, combined with other factors such as protectiveness of people on the transportation route (due to vehicular accidents/carbon emissions) were the waste to be sent offsite, all factor into the determination that onsite is the preferred solution for disposing of this waste. This protectiveness is supported by evaluations regardless of the condition of synthetic components in the liners in the facility. Liners are only part of the "defense in depth", which includes proper siting of the facility, waste acceptance criteria, facility design (multiple layers in facility cover and liner), correct placement and compaction of waste, and monitoring during operation and after closure, to name a few.

The Central Bear Creek Valley location is among the farthest from the Scarboro Community of the sites considered.

Comment 139: Comment from Ellen Faby

I am opposed to the proposed Oak Ridge Hazardous Waste Landfill, the EMDF. I have looked at the issues raised by TDEC, local organizations involved with protecting the environment for Oak Ridge citizens, and individual scientists who have analyzed the proposal, and based on their analyses I am opposed.

Among the many negative impacts of the landfill is the likelihood that our watershed could be contaminated with mercury or other hazardous materials. The proposed EMDF will not comply with environmental regulations that protect people and the history of DOE usage of the existing hazardous waste landfill does not inspire confidence that this proposed landfill will be operated safely for the very long timeframe that the materials it would store would be hazardous.

Other storage options outside of the Oak Ridge area are available and are more suitable for storing this type of hazardous waste; one or more of these should be utilized. The work performed in Oak Ridge at the DOE facilities has benefited the entire United States and the citizens of Oak Ridge and the surrounding areas should not bear the entire burden of the environmental and economic consequences of hazardous waste generated as a result of this work.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the

cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remediation is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 140: Comment from Lisa Ritter

I think there's already enough contamination in Oak Ridge. I vote no landfill. Thanks

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 141: Comment from Eric T. Johnson

I'm against the new landfill in Tenn.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 142: Comment from anonymous

No on landfield. I live downhill from here and everybody around me that's worked up in Oak ridge for DOE has died of cancer. I'll probabbly die next. The futhure away you get this stuff, the better will all be. Our famileys and our grandchildren.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of*

***Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.**

Comment 143: Comment from Scott Davis

I am opposed to ANY more landfills in Tennessee!!

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 144: Comment from Roger Johnson

Thank you for extending comment on the Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste. As stated in a recent letter to the editor in the "Oak Ridger" the actions in the proposed plan breach the agreement between DOE and local and state government over the use and management and recompense to local governments for DOE's occupation of the Federal reservation in Oak Ridge. The requirements for this landfill under the superfund are less adequate than our own county landfill and is proposed in geological formations that are not as stable and subject to water as currently available waste repositories in the western United States. A lower cost is not a factor to ignore and evict the long term safety, health, water quality and economic future of this area. The cost benefit ratio is negative on the above points of safety, health, water quality and future economic viablility and attractiveness to this region. The State of Tennessee still has issues they are not happy with. Oak Ridge, Anderson and Roane Counties have not been offered any compensation or in-lieu of tax payments for positing this landfill in Tennessee versus the western alternatives that already exist.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. These standards far exceed requirements for the county solid waste landfill. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD), which ensures that safety, health, and water quality are maintained. The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Issues identified by the State of Tennessee in the Proposed Plan have been addressed in this ROD.

Comment 145: Comment from Carol Plasil

From what I have learned recently, I believe that the Proposed Plan is detrimental to the health and safety of Oak Ridge and believe that the Department of Energy should ship the contaminated materials, etc. to a site where it is "wanted". Oak Ridge should not use a "Greenfield" to store these materials.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected

remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 146: Comment from Fran Pisano, MD FAAP

I am writing to voice my ***strong opposition t***o the proposed landfill on Oak Ridge Reservation being contemplated by DOE. I am a pediatrician living and working in Oak Ridge, and have lived here for 23 years. My reasons are as follows:

1) The current conditions are such that there is no guarantee that the radioactive waste and heavy metals will not seep into the ground water, and ultimately our drinking water.

   While I realize that Oak Ridge's water comes from the East side of Oak Ridge, other communities down stream from us take their water that they give to their children (many of whom are my patients).

   According to your document at https://doeic.science.energy.gov/uploads/A.0100.030.2596.pdf, the landfill will have predominantly the following sources of radioactive material:

   a) Cesium 137 which according to a Stanford University study reports that: Its half-life of about 30 years is long enough that objects and regions contaminated by cesium-137 remain dangerous to humans for a generation or more, but it is short enough to ensure that even relatively small quantities of cesium-137 release dangerous doses of radiation (its specific radioactivity is 3.2×10^{12} Bq/g). [2-4] (http://large.stanford.edu/courses/2012/ph241/wessells1/

   b) Uranium-234 which will remain hazardous for thousands of years due to it's half life of 75,400 years!

   c) Strotium-90 which if ingested is teratogenic, with studies showing increased rates of leukemia and skin cancers. (https://www.dhss.delaware.gov/dph/files/strontiumfaq.pdf)

   These are the major radioactive materials that can seep into ground water! And does not include the heavy metals of lead, mercury, beryllium, chromium and uranium! Perhaps Oak Ridge can gain the notoriety of Flint, Michigan for contamination of our water supply.

   Response: Existing and new data from hundreds of wells in Bear Creek Valley show groundwater flow from Pine Ridge towards Bear Creek and away from residential areas. Groundwater contamination is primarily located closer to Bear Creek in the upper part of the valley (as indicated in the 2021 Remediation Effectiveness Report). This data supports the conclusion that contamination in the valley cannot reach residential areas.

2) The landfill does not meet the requirements of landfills within a municipality. I am a pediatrician in Oak Ridge. Daily I meet families that opt out of living here because of the concerns of contamination of the environment. This landfill, with it's proximity to some of the nicest housing in the city, will not help this issue. Please protect our home values.

   Response: The disposal facility meets all requirements except for two where there is a basis for a waiver that is commonly granted, even to permitted landfills. The requirements are much more stringent than for a municipal landfill.

3) There are DOE sites that are more appropriate to the waste generated by DOE and ORNL that are willing to take the waste. According to Virginia Dale's, PHD, retired corporate fellow at ORNL and

chair of the Advocates for the Oak Ridge Reservation, DOE sites in the western part of the US are willing to take this waste. They do not have the ground water issues the site on OR Reservation has, so please allow them to service this important issue.

Response: The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust designed that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

4) Previous landfills have been mismanaged on DOE land, and that is why the need for a new one exists. How can we be assured there will be monitoring of ground water and the landfill in general. And when this one is full, there will likely be a need for another?

Response: DOE does not agree that the Environmental Management Waste Management Facility (EMWMF) operations have been mismanaged. Since EMWMF began operations in 2002, about 200,000 waste shipments have been made safely to the facility and approximately 80 percent of the landfill capacity has been used to date. DOE has sanctioned independent reviews or audits of the EMWMF operations from experts in the construction and operation of disposal facilities, DOE-Headquarters, and the environmental regulatory agencies. Results of the independent reviews have identified no immediate concerns with the performance of the facility and have confirmed that operations are being conducted following all ARARs. DOE works to continuously improve its efforts involving the cleanup mission at the Oak Ridge Reservation through lessons learned. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the EMWMF, provided characterization allows this path. The waste disposal hierarchy will also be applied for EMDF waste disposal.

I recognize the important role economically DOE has been in Oak Ridge.

I STRONGLY URGE YOU TO STOP THIS LAND FULL and protect all residents (human, animal and plant) living in this beautiful area.

Response: DOE thanks you for your participation in the public comment process.

Comment 147: Comment from Leonard Vaughen

I am emailing to express the following concerns about the DOE hazardous waste site proposal.

The DOE Proposal does not specify how much mercury will be stored there permanently, but any amount stored 'forever' is a ground-water contamination risk.

Other sites in the country have been constructed for this purpose and should be used accordingly for this need.

Oak Ridge is currently looking at TVA's proposal to make Bull Run Steam Plant site a hazardous coal-ash land fill, another groundwater contamination risk.

Oak Ridge should not be everyone's dumping ground. I urge you to proceed with other options than using Oak Ridge as a storage site.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in the EMDF.

Comment 148: Comment from Eileen Neiler

I have enclosed the item from The Oak Ridger because Virginia Dale has said it much better than I [see Comment 117]. I have lived in Oak Ridge since Aug 1953 and over the years I have noticed how the Fed gov has increasingly down-graded Oak Ridge. We get second or third-class treatment. We have gotten "un-listed" for home sites for new employees. In the past the western plant locations were always at the top of the list.

Please help us continue to be a place that people feel secure in, a place where people WANT to be.

P.S. Would you want to live next to a nuclear dump?

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 149: Comment from Donald Richard Miller

Oak Ridge residents are not treated like the citizens of other states.

In 1983, The Department of Energy (DOE) had regulated its own waste management and disposal operations throughout the Cold War. Then in 1984 a suit was filed by Oak Ridge residents that resulted in the United States District Court ruling that DOE must comply with environmental laws.

Within a few years, DOE established a nation-wide Environmental Management Program that took extraordinary measures to clean up cold war facilities. Rocky Flats outside of Denver, Colo. has been razed and is clean enough for the property to be sold to the public. DOE is spending billions on the 177 million-gallon tanks at Hanford in Washington State, working constantly to satisfy the state regulators.

But, Oak Ridge and Anderson County residents are not treated like the citizens of other states. DOE is proposing to dispose of legacy waste with radioactive and mercury contamination by the least costly

method. Rather than complying with environmental regulations, the DOE has entered into a formal Dispute Resolution Agreement with the Tennessee Department of Environment and Conservation (TDEC). If the DOE refuses to follow the minimum environmental regulations, there is no guarantee of public safety.

The major points of disagreement between DOE and TDEC are: 1) site characterization data are not included in the Record of Decision making it impossible for the State to judge the safety of the proposal disposal facility; 2) DOE has asked TDEC to grant exceptions from safe waste disposal requirements – DOE is proceeding as if these exceptions have been granted; 3) DOE is attempting to gain approval of their plan before completing several required assessments and technical studies; 4) DOE has not yet established strict waste acceptance criteria to limit or eliminate mercury disposal thus preventing further contamination of fish and the ecosystem in nearby streams and creeks; and 5) DOE has not yet established water discharge limits in compliance with the Clean Water Act nor included these limits in the Proposed Plan.

Alternatives to disposing of more hazardous and radioactive waste in our area must be considered carefully such as shipping the waste to a disposal site in the Utah desert away from wet conditions and the public. As more cost saving reductions in managed Oak Ridge work sites occurs by releasing more acres each year to non-government use, and the population increases, each acre of land in a green field state becomes more valuable. Also, each already permanently contaminated acre will eventually be in the hands of local governments, thus a cost to tax payers for protection. The burden of responsibility for what is written in future history book chapters about Manhattan Project activity can be framed now.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

In direct response to the five points made, DOE additionally offers: (1) this ROD indicates that a field demonstration of groundwater levels will be carried out to address the State of Tennessee's final concern regarding the site and to serve as a basis for the final design of the facility; (2) the approval of this ROD documents the agreement of the TDEC on the waivers to ARARs; (3) DOE is following the CERCLA approval process; (4) this ROD documents waste acceptance criteria, which dictates the regulatorily acceptable approach to disposing of mercury; and (5) this ROD

documents the Federal Facility Agreement parties' (DOE, U.S. Environmental Protection Agency, and TDEC) agreed on approach for water discharge limits in compliance with the Clean Water Act.

Comment 150: Comment from James D. Harless

It is my understanding you and/or county/city are reviewing citizen comments regarding more waste disposal in Oak Ridge soils and karst underground along with our Tennessee high amounts of rainfall, high amounts of groundwater and substantial surface water presence in Oak Ridge and in Tennessee generally. I have the impression, you may propose it short of proper characterization of wastes or total site evaluations that apply to such disposal. Your primary reason appears to be a low cost option, compared to DOE to more safely dispose by shipping hazardous and Radioactive wastes to disposal out west where rainfall and groundwater and surface water is very minimal for possible other sites. DOE on site contamination has been present inside the Oak Ridge Reservation for decades now, speaking generally from memory.

I worked a career in environmental health and environmental protection from 1967 to 2011, in Georgia, Oak Ridge City, Superfund Environmental Group UT MTAS and for TDEC DOE Environmental Monitoring program Oversight based OR location, all ORR plant sites on site and off site oversight work until my retirement in 2011. From my work in statewide Superfund programs it became evident that a very large portion of even our non hazardous landfills in Tennessee seem to leak, fail, and spread contamination off site in ways that might under circumstances bring harm to Tennessee citizens. High rainfall locations simply have higher risk considerations. My point is higher percent of hazardous waste and/or radioactive wastes pose still even greater environmental risk of seepage or leakage to off site populations. I would encourage high quality characterization of wastes and serious consideration to off site disposal in more safe site where waste contamination to groundwater or to surface water is less risk to the environment and to human health.

My Oak Ridge residence since 1974 would bring me immediate concern for any industry to select the low cost option for environmental disposal as my career impression is the low cost option is very frequently the option that least considers the point that the environment and the public health protection are critical to progressive management and the protection of environmental resources and human health long term. I am sure you and your peers and management would prefer safe disposal that will not cause future risk to the very Tennessee residents who have supported DOE missions since Wartime missions arrived to what is today the City of Oak Ridge.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic

Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 151: Comment from M. J. Lorenzen

I do not live in Oak Ridge, I live in Rocky Top. I am not from Tennessee. I moved to this area because in my travels it was one of the most beautiful places I had seen. I planned on spending the rest of my life here, but the prospect of living so near more hazardous waste is making me rethink my retirement plans. Please don't support an action that will change peoples minds about relocating their homes and businesses to this area.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 152: Comment from Colin Loring

I'd like to add my voice to the many speaking out in opposition to DOE placing a hazardous waste landfill for contaminated Y-12 debris in our community.

As a citizen, and retired USDA soil conservationist/geologist with concerns for the health and safety of the people in Oak Ridge, I support TDEC and other scientists and medical field experts whose testimony is a now a matter of record, in stating this material should be shipped to a suitable disposal area, already in existence such as the one on Utah.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 153: Comment from Lauren Miles

As a native Oak Ridge resident, I want to voice my opinion that I am against the preposed nuclear waste landfill in Oak Ridge. Our hydrology is not suited for correct and safe management of nuclear waste in perpetuity, nor do I want a Superfund site created near miles from where residents are living.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2

of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 154: Comment from Chris Miles

As the current nuclear waste landfill proposal stands, too much mercury will be released into the watershed. I am against having the landfill in Oak Ridge and am for the offsite disposal of the waste out west where it is drier.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in EMDF.

Comment 155: Comment from Hedley and Dale Pelletier

We own our home and pay taxes in Oak Ridge TN. We have two high schoolers attending Oak RIDGE High School. We do NOT want this Nuclear/Mercury Hazardous Waste Site located in Oak Ridge.

Some reasons:

1. It would be TOO close to residences in West Oak Ridge. Families in West Oak Ridge & Scarboro neighborhood do not need this contamination seeping into soil or well water.
2. Aunts, moms, grandmoms in Oak Ridge already have a higher rate of breast cancer. Out of the 5 houses on our Cul de sac, 5 women have been treated for breast cancer! We are concerned about our health. I am the only woman not affected, yet. I have a mammogram on Monday.

3. The US Government built Y12 on Oak Ridge land for suitable SECRECY reasons, not waste disposal reasons. East TN/Appalachian Mountain region geology is NOT land that is suitable for nuclear or mercury waste disposal. The presence of abundant surface and subsurface water requires significant engineering effort to manage, both through the operating period and after closure, relying on diversion structures, gravel drains, pipes, liners and caps, that can be expected to fail in the long term, with a life expectancy only of decades. Five feet of rainfall is the norm, and a warming climate is projected to result in every increasing rainfall.
4. Utah is willing and wanting to take this waste at their appropriate waste site. This is our Nation's waste, for the defense of our country, and to help end WW2. It is not just Oak Ridge's waste. Western states are more geologically stable for waste storage.
5. The local Sierra Club and various PhD scientist have informed us at County Commission Meetings of trust issues with this DOE plan. Looking more closely at the regulations, they are correct: "This [DOE] plan wouldn't get you a permit for a normal landfill, let alone a toxic waste landfill [without a CERCLA Superfund exemption]." It is a bad move for Oak Ridge and Tennessee.

Please take our concerns seriously. We will not have DOE abuse our fellow residents or wildlife.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

In direct response to the five points made, DOE additionally offers: (1) the site selected for this disposal facility is located such that a groundwater divide exists between the site and the nearest residents, meaning the groundwater flows away from the nearest residents; (2) analyses completed demonstrate that a hypothetical receptor placed adjacent to the disposal facility is protected and experiences no greater than an excess lifetime cancer risk of 10^{-4} under maximum exposure scenarios; (3) waste acceptance criteria (WAC) will limit the disposal of contaminants and, in conjunction with the highly engineered components of the facility, will ensure protectiveness under the expected environmental conditions experienced in this climate; (4) the more highly contaminated wastes encountered during cleanup activities that do not meet

the onsite facility WAC are sent offsite for disposal; and (5) regulations followed for construction of this landfill exceed simple solid waste landfill requirements and include: (a) TSCA disposal facility, (b) Resource Conservation and Recovery Act of 1976 subtitle C facility, (c) Nuclear Regulatory Commission disposal facility, and (d) DOE disposal facility requirements.

Comment 156: Comment from Harold R. Waddle

Hello! I've been an Oak Ridge resident for more than 20 years and I love living in this city! I have worked at all 3 major government sites over the last 40 years! As a citizen of Oak Ridge where I plan to retire in a year, I want it to be a safe environment for my family and others. I know of the mercury contamination in the east fork Poplar Creek and the radioactive waste in deep wells and Watts Bar Lake! I hope you consider that Uranium and mercury, two of the largest contributors of the ground water contaminants, **should not be dumped** into this proposed landfill for many reasons! The water table is very close to the surface in the valley floor where unfortunately the EMWMF took the supposedly "fixated" waste from K-25 (ETTP site) over the last 15 years! These contaminants should not be buried in Tennessee but shipped to Utah's Envirocare or other waste disposal site where ground water leaching is not a problem!

I appreciate your consideration of protecting our Oak Ridge ground water and waterways as landfills in this rainy climate and geography are not practical! Please do the correct thing and ship this leachable waste somewhere else where it's not a problem to the local citizens!

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

DOE additionally offers: (1) the site selected for this disposal facility is located such that a groundwater divide exists between the site and the nearest residents, meaning the groundwater flows away from the nearest residents; (2) analyses completed demonstrate that a hypothetical receptor placed adjacent to the disposal facility is protected and experiences no greater than an excess lifetime cancer risk of 10^{-4} under maximum exposure scenarios; (3) waste acceptance criteria (WAC) will limit the disposal of contaminants and, in conjunction with the highly

engineered components of the facility, will ensure protectiveness under the expected environmental conditions experienced in this climate; and (4) the more highly contaminated wastes encountered during cleanup activities that do not meet the onsite facility WAC are sent offsite for disposal.

Comment 157: Comment from Ruth K. Young

Part 1: Re the Oak Ridge Hazardous Waste Landfill, I am vehemently opposed to your plans and implementation.

Having listened to the discussion of those whose business it is to understand hazardous materials because of their personal career and research, I cannot accept your proposals.

I am personally acquainted with a number of those opponents and know them to be honest as well as knowledgeable. At the moment, DOE does not have a reliable reputation.

Do Not Implement This Proposal!! Oak Ridge constantly fights the myth that we are a contaminated city. DOE's proposal for this particular landfill will only add to that myth.

Again, I am vehemently opposed and shall not accept this landfill.

Part 2: It is mind-boggling that you want to put radioactive waste in a clean greenfield. I am saying an irrevocable NO to that proposal.

You have made a decision that has not complied with a variety of legally required environmental regulations. You also are ignoring data that unarguably concludes that the proposed use of this particular area is unsuitable in multiple ways for a toxic waste site.

I demand that you drop this proposal NOW.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2

of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 158: Comment from Kathryn Olsen

The planned EMDF has many worrying aspects. I believe that sending the waste out West is the best truely long-term option. I am concerned about the lack of timely communication between DOE and the City of Oak Ridge and its citizens. Neither the dates of the information sessions nor the last minute rescheduling of the public meeting were plainly published. Please extend comment period.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

DOE received and granted two separate requests to extend the original comment period – one by another 45 days and the second by an additional 30 days. Therefore, the comment period was for 120 days. With submittal of the D1 ROD, the Federal Facility Agreement parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

Comment 159: Comment from John Houvenagle

This is to register my family's opposition to the plans to bury hazardous waste in East TN.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will

meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 160: Comments from the City of Oak Ridge (as prepared by The Ferguson Group (TFG))

Comment 160.1: Page 4. Land Use Designations. In this section of the Proposed Plan DOE notes that the EMWMF was located in the East Bear Creek Valley per the recommendation of the End Use Working Group (EUWG) – a group composed of citizens from diverse stakeholder organizations who were asked to develop recommendations for end uses of contaminated areas on the ORR. Their recommendation at the time was that any CERCLA waste facility should be located on or adjacent to an area that is already contaminated and used for long-term waste disposal. Absent from this section of the Proposed Plan is DOE's land use description for the Central Bear Creek Valley (CBCV) which is DOE's preferred location for the EMDF site 7c. Site 7c is located in the CBCV approximately 1.5 miles west of the EMWMF. It would be constructed in a Greenfield (Zone 2 of Bear Creek Valley), where the current designated future land use is Recreational and the future land use is Unrestricted. If this site is the selected alternative, a change to the future land use to DOE-Controlled Industrial would be required. In addition, on Page 1 of the Proposed Plan DOE indicates that site 7c is located in an area not considered for reindustrialization and ruse. This statement contradicts the position of the EUWG and DOE's support of such a position.

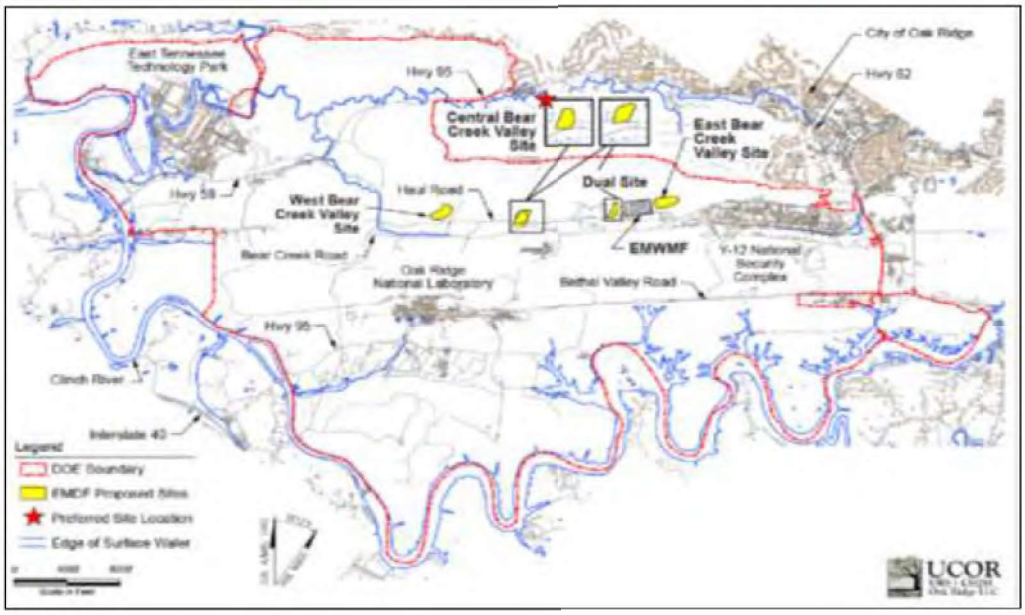
Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. Based on strong state preferences related to site hydrology, the Federal Facility Agreement (FFA) parties have agreed to the Central Bear Creek Valley site for the waste disposal facility. DOE has indicated in the Proposed Plan that the land use around and including the Central Bear Creek Valley site would have to be changed to industrial use from that designated in the Bear Creek Valley Record of Decision (ROD) (consistent with the recommendation of the End Use Working Group). This ROD changes the land use designation for Central Bear Creek Valley as part of this remedy selection. The land use recommendations from the End Use Working Group and eventually documented in the Bear Creek Valley ROD were identified solely to set remediation levels across the valley. There was never any expectation that the land in Bear Creek Valley would be released by DOE for use by others. The land was always intended to be a buffer between DOE activities and the public and to provide future opportunities for DOE use.

Comment 160.2: Page 6. Site Characteristics. DOE indicates that the Bear Creek Valley is the most appropriate location for construction of an on-site waste disposal facility. As part of the 2017 RI/FS, DOE evaluated several locations for the construction of the EMDF. The site locations are shown in the figure below. DOE indicates that these site areas have been thoroughly tested over the past three decades and the

Department directs the reader to Appendix E in the completed in 2017 RI/FS to review the summary of investigations completed.

DOE also then indicates that further data collection efforts will be undertaken at site 7c to further characterize the site during wet and dry seasons. In the event the data indicates that site suitability will require changes to the EMDF design, it will be documented in the Administrative Record and possible issuance of a revised Proposed Plan. DOE also indicates that a "buffer area" will be maintained between site 7c and the Maynardville Limestone formation which is a karst forming geologic unit. Further on Page 8, DOE indicates that "a preliminary review of the TM indicates that the conceptual design of the EMDF…..may need to be revised to accommodate the new information on the site hydrology and to satisfy the threshold CERCLA criteria."

The above statements are contradictory. First, DOE indicates that site 7c is the most appropriate location for the EMDF, but then states that more study is required and the landfill design needs to be changed. A site should not be characterized as most appropriate if pertinent data has not been collected and the design has to change.



Response: There are hundreds of wells in Bear Creek Valley with decades of data. This extensive data set was used to support conclusions in the Remedial Investigation/Feasibility Study (RI/FS). During preparation of the Proposed Plan, DOE began more site-specific characterization efforts at the request of the other FFA parties. The additional site characterization for Central Bear Creek Valley evaluating geologic and hydrogeologic conditions was conducted in two phases. The first phase, with the referenced eight well pairs (16 wells) monitored for over a year as well as monitoring results from other existing wells in Bear Creek Valley to supplement the general understanding of the site, was used to support identification of a preferred location in the Proposed Plan and the selection of the location in this ROD. Analysis of the first phase data confirmed DOE's understanding of the site. Since then, data were obtained from 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization completed to support the design. The design, as it progresses, will be modified as needed to consider the new data. Technical Memoranda presenting the results of the initial evaluation can be found in the Administrative Record.

Comment 160.3: Page 9 and 14. The EMDF has not been designed to be in compliance with Toxic Substances Control Act (TSCA) landfill siting requirements. On Page 9, DOE indicates that the EMDF will be designed to accept TSCA waste. On Page 14, DOE indicates its intention to request a waiver of the TSCA landfill siting requirement with respect to separation of the landfill liner from the historical high water table (i.e., groundwater). TSCA requires that there be no hydraulic connection between the site and standing or flowing surface water and the bottom of the landfill liner system or, natural in-place soil barrier of a chemical waste landfill be at least 50 feet above the historical high water table (40 CFR 761.75[b][3]). Construction of a disposal facility anywhere in Bear Creek Valley would not meet this requirement. A TSCA waiver from this requirement will be required under that statute for all of the onsite alternatives. Such a waiver is granted through 40 CFR 761.75(c)(4) by providing "...evidence to the EPA Regional Administrator that operation of the landfill will not present an unreasonable risk of injury to health or the environment from polychlorinated biphenyls.."

In addition to DOE seeking a waiver from the aforementioned TSCA provision, the Department has indicated that it will seek an exemption under the State of Tennessee's Radioactive Waste Disposal Rule. TDEC 0400-20-11-.17[1] [h]) requires that the hydrogeologic unit used for disposal shall not discharge groundwater to the surface within the disposal site. At each alternative location in Bear Creek Valley, groundwater discharges to the surface within the proposed disposal site and will not meet this requirement. An exemption under the state rules will be requested by DOE, as allowed through the state rule TDEC 0400-20-04-.08, whereby the Division of Radiological Health (Department) may "...grant exemptions, variances, or exceptions from the requirements of these regulations which are not prohibited by statute and which will not result in undue hazard to public health and safety or property."

TFG has commented extensively on prior DOE Proposed Plans and Remedial Investigations for ORR waste disposal at locations that fail to meet both the TSCA and TDEC siting requirements for separation of the landfill liner to the high water table, or in the case of the TDEC rule, disallowance of sites where the groundwater media is discharging to the ground surface. Our concerns remain that the exemption and waiver that DOE seeks are for the disposal sites for low-level nuclear and hazardous wastes that will remain toxic to human beings, fauna and invertebrates for thousands of years. TFG also does not support DOE's contention that engineering underdrains beneath the landfill to lower the groundwater table should be employed at this type of facility. DOE has not made the case that the underdrains won't become "clogged" at some time in the future which would in turn impact the viability of the waste cell(s) to effectively contain waste from release to the environment. In our opinion, the shallow groundwater conditions that are pervasive in the Bear Creek Valley makes this area not viable for placement of a low-level nuclear and hazardous waste landfill.

Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

A Toxic Substances Control Act of 1976 (TSCA) waiver for two parts of TSCA 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation "…*will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met.*" The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

- **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of**

operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the Oak Ridge Reservation (ORR). Compliance with the Resource Conservation and Recovery Act of 1976 (RCRA) Subtitle C landfill requirements (identified as applicable or relevant and appropriate requirements [ARARs]) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the U.S. Environmental Protection Agency (EPA) determination that the remedy is protective of human health and the environment.

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The Environmental Management Disposal Facility (EMDF) site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.**

An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

The Central Bear Creek Valley site, as stated in the Proposed Plan, does not require use of an underdrain beneath the waste.

Comment 160.4: Page 13. Incomplete information provided in the Proposed Plan for wastewater treatment systems for the EMDF. DOE has not provided sufficient information on support systems that will be needed for the EMDF operation (i.e., wastewater management ponds, treatment systems, utilities, roads). DOE indicates that a wastewater treatment system will be constructed, however, no other information is provided.

TFG has documented the significant problems DOE experienced with support operations at the EMWMF facility in its report to the City on the "Remedial Investigation/Feasibility Study (RI/FS) for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Oak Ridge Reservation (ORR) Waste Disposal Oak Ridge, Tennessee - DOE/OR/01-2535&D3." The City should be particularly concerned with runoff into the Bear Creek from leachate that is contaminated with Mercury. DOE should be required to produce these documents related to support systems for the EMDF for public inspection prior to issuance of the Proposed Plan.

Response: The current levels of mercury in Bear Creek surface water are comparable to reference streams. Any water contacting the waste will be treated prior to discharge to ensure it is protective of recreational use (human health), specifically fish ingestion. The EMDF will not negatively affect the quality of Bear Creek water for any contaminant, including mercury. Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in EMDF.

DOE has provided information on Page 16 of the Proposed Plan on Onsite Support Facilities described as the Trans-load facility and the Size-reduction facility. Additional description of these facilities should also be included in the Proposed Plan. For example, the description, capabilities and capacities of both the Size-reduction and Trans-load facility are not included in the document.

Response: A detailed discussion of the EMDF support systems is included in the RI/FS, Sect. 6. A written description, tables, and figures identifying the support facilities required for each location evaluated for EMDF are included in the RI/FS, Sect. 6.2.2.5. The Proposed Plan summarizes the evaluation of support systems contained in the RI/FS, including roads, leachate collection and treatment facilities, and wastewater collection and treatment systems. DOE will treat wastewater to remove contaminants that exceed regulatory discharge limits.

Because the trans-load and size-reduction facilities are not part of the preferred alternative, additional details are not included in the Proposed Plan and are also not addressed in the ROD. The intent of the Proposed Plan, as required by Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) guidance, was to provide a summary of the evaluation in the RI/FS and identify DOE's preferred alternative for public comment. The RI/FS should be reviewed for detailed information on the other alternatives evaluated.

Comment 160.5: Page 13. Landfill Cover System. DOE asserts that land use controls that are adopted would restrict access to the site and prohibit actions that could penetrate the cover and expose the waste in the closed landfill. This is a highly optimistic perspective that also assumes that the landfill cover and other engineered features incorporated into the landfill will perform as designed for any extended period. See "Compacted Soil Barriers at Abandoned Landfill Sites Are Likely to Fail in the Long Term," by Glenn W. Suter, Robert J. Luxmoore, and Ellen D. Smith, Journal of Environmental Quality 22(2), January 1993.

Response: The comment provided by The Ferguson Group references a 1993 publication by Glenn W. Suter, Robert J. Luxmoore, and Ellen D. Smith, providing important information regarding the long-term performance of compacted soil barriers at abandoned landfill sites. The cover that DOE is proposing for EMDF is not a compacted soil cover, but rather an engineered cover to isolate waste over the long term. In fact, the cover that DOE is proposing for EMDF is consistent with the recommendations made in the article regarding the design of a landfill cover that will withstand long-term threats; the cover does not rely on compacted soil alone. The conclusions of this referenced paper, with respect to the inadequacies of soil barriers are not relevant for evaluating the cover system for the EMDF. Additionally, EMDF will not be abandoned but will remain under long-term institutional control by the DOE. CERCLA requires a review of all monitoring results, the cover integrity, and the effectiveness of land use controls every 5 years.

Comment 160.6: Page 14. Size Reduction Facility for Hybrid Disposal Alternative. DOE indicates that due to the limited capacity of the onsite disposal element of this alternative, a size reduction facility to reduce disposal volumes has been added to the onsite portion of the Hybrid Disposal Alternative. If a size-reduction facility would be needed for the Hybrid Disposal Alternative, why not provide such a facility for all onsite disposal options. Reduction of disposal volume would reduce the adverse effects of an onsite landfill and reduce the possibility that DOE will return 20 years from now and tell the regulators and the public that yet another landfill is needed.

Response: The Hybrid Disposal Alternative includes both an onsite and offsite component for the disposal of Oak Ridge National Priorities List (NPL) Site CERCLA waste. The alternative was designed to significantly reduce the footprint of EMDF for onsite disposal. Due to the limited capacity of the onsite disposal element of this alternative, a size-reduction facility to reduce disposal volumes had to be added to the onsite portion of the Hybrid Disposal Alternative. This helped reduce the costs of the offsite disposal aspect of the alternative. For the Onsite Disposal Alternative, use of a size reduction facility would increase the costs of the alternative with no

improvement in long-term protectiveness and therefore is not considered cost-effective, a requirement of CERCLA.

Comment 160.7: Page 15 and Page 20. On-Site versus Off-Site Disposal Costs. DOE asserts that off-site disposal of ORR waste costs $675 per cubic yard based on 2016 present worth dollars. In contrast, the on-site disposal costs vary in cost based on the amount of volume disposed into the EMDF. The higher the volume of material disposed of in the EMDF, the lower the cost per cubic yard. DOE has estimated that the cost differential between on-site to off-site disposal is from $732M - $928M for on-site disposal and $1.567M - $1,799M for off-site disposal.

The cost differential for the off-site disposal option does not include an assessment of cost savings from guaranteeing volumes of material shipped to the off-site disposal landfill. TFG has provided comments on previous DOE documents with respect to disposal of ORR wastes at NRC approved LLW/RCRA waste disposal facilities that are located in Texas and Nevada. These facilities have indicated that if they were provided volumetric assurances from DOE price discounts would be provided. TFG recommends that the City of Oak Ridge request DOE to engage in discussions with the western waste management facilities to determine the cost reduction that could be realized by guaranteeing waste shipment volumes from the ORR.

Response: The current contracts between DOE and the offsite disposal facilities include discounts for large volumes of waste, comparable to what may be expected to be generated. These discounts were included in the RI/FS cost estimate. In response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the recent evaluation of the offsite disposal costs.

The government cannot guarantee any specific waste volume in any contract negotiations for decades in the future due to the annual appropriation process, so any assumption that used such a cost savings based on guaranteed volumes would not be appropriate.

Comment 160.8: Page 16. Waste Minimization. DOE indicates that for any onsite location selected for pursuit as the remedy, the ROD will contain a commitment to waste minimization. It is unclear how DOE would (or could) make a "commitment to waste minimization" and how it could be enforced? DOE has been criticized for failing to minimize waste disposal volume at the EMWMF, thus accelerating the need for additional CERCLA waste disposal capacity. Unless there are specific commitments restricting excessive disposal, how can DOE expect the community and regulators to trust DOE's commitment?

Response: DOE is committed to waste minimization throughout the remediation of the Oak Ridge NPL Site and the operation of EMDF. Waste minimization is a priority for DOE, but there are no specific waste minimization goals that are subject to regulatory enforcement on the Oak Ridge NPL Site. DOE implements a waste disposal hierarchy that initially evaluates a potential waste stream to see if all or part of it is eligible for reuse or recycling – eliminating it from requiring disposal. Waste remaining after that initial evaluation is characterized and profiled for disposal in an order from sanitary/industrial waste disposed on the Oak Ridge NPL Site, to onsite disposal of waste in the Environmental Management Waste Management Facility (EMWMF), to offsite disposal at another DOE site, to offsite commercial waste disposal. The waste disposal hierarchy will also be applied for EMDF waste disposal.

Comment 160.9: Page 16. Off-Site Disposal Facilities. DOE indicates that any off-site disposal facility must be operated in compliance with all applicable Federal, state, and local regulations; there must be no

relevant violations at or affecting the receiving facility. This standard is perfectly reasonable. Why then does not DOE seek the same standard of care at the site 7c EMDF? At site 7c, DOE is seeking regulatory exemptions and waivers as described in comment 3 [160.3].

Response: Compliance with the requirements of the ROD including the ARARs for an onsite facility is the same as complying with the offsite rule for offsite facilities. The same standard of care is provided. ARARs are the substantive requirements of all the environmental regulations that are behind the offsite disposal facility's permit. Substantive requirements include all technical requirements and anything that is needed to ensure that any aspect of the regulation that provides environmental protection. The ROD requires that the substantive requirements (ARARs) be met unless there is a justification for a waiver. A permit requires that all substantive and administrative (paperwork) requirements be met unless there is justification for a waiver. The offsite rule requires that the final disposal or treatment facility be in compliance with their permit which oftentimes has waived certain technical or substantive requirements.

Comment 160.10: Page 18. Reduction of Toxicity, Mobility, or Volume through Treatment. DOE asserts that onsite disposal alternatives would provide landfill wastewater treatment needed to address hazardous chemicals, and that treatment would reduce contaminants to levels required for discharge. While it is correct to say that the No Action Alternative does not reduce toxicity, mobility or volume through treatment, the same is true for both the onsite and offsite disposal alternatives. The treatment of wastewater generated in the landfill operation is not treatment of the contaminated material to be addressed by the remedial action, but rather treatment of waste generated as part of the action (and since the treatment methods have not been disclosed, it's not clear whether the treatment would reduce toxicity, mobility or volume).

Response: The contaminants present in the wastewater are directly from the waste, and treatment of that wastewater reduces the mobility of the contaminants. Reducing the contaminant volume, toxicity, or mobility is a part of the development of alternatives and will remain in the evaluation.

Comment 160.11: Page 21 State Acceptance of DOE's Preferred Remedy. The Proposed Plan indicates that TDEC is unable to approve DOE's preferred remedy of site 7c. TDEC has indicated that it will consider site-specific data, assumptions, and exposure scenarios in evaluating whether the WAC support an onsite disposal alternative that meets CERCLA requirements, remedial action objectives in this Proposed Plan, and performance objectives in Tennessee radiological health rule 0400-20-11-.16. The State will also evaluate potential toxic effects of uranium in addition to potential cancer risk.

TDEC expressed concern that site 7c may not be good candidate for the construction of the EMDF because of the shallow depth to groundwater from the land surface and the numerous surface water streams that persist in the area. This is a significant concern for TFG because the area is very wet and should not be used as a repository for LLW and hazardous waste. This area would not be approved for landfill siting of a commercial LLW/hazardous waste facility under NRC permitting requirements and can only be approved for placement should TDEC grant a waiver of the Radioactive Waste Disposal Rule, TDEC 0400-20-11-.17[1][h]) which requires that the hydrogeological unit used for disposal shall not discharge groundwater to the ground surface within the disposal site. At each alternative location in Bear Creek Valley, groundwater discharges to the ground surface within the proposed disposal site and will not meet this requirement. In addition, DOE would have to grant itself a waiver of the TSCA groundwater separation distance requirement to the bottom of the landfill liner which requires that there can be no hydraulic connection between the site and standing or flowing surface water and that the bottom of the landfill liner system or natural in-place soil barrier of a chemical waste landfill of at least 50 feet above the historical high water table (40 *CFR* 761.75[b][3]).

TDEC also raised concerned with the potential for release of Mercury contaminated waste from the EMDF into the Bear Creek, East Fork Poplar Creek and Clinch River which would contaminate fish that people eat and further degrade these water bodies that already fail Tennessee Surface Water Quality Standards for Mercury.

TDEC is concerned with DOE's plan to use underdrains for the EMDF to mitigate the presence of shallow groundwater, creeks, springs and streams that are present on site 7c. TDEC is concerned that these underdrains will clog at some point in the future and will undermine the integrity of the landfill liner system.

TFG concurs with all of the concerns raised by TDEC on the Proposed Plan for the site 7c EMDF. These are significant concerns that raise serious doubt on the viability of constructing the EMDF in the Bear Creek Valley.

Response: Federal law requires that any remedy selected under CERCLA must comply with ARARs (or show just-cause for a waiver) and be protective of human health and the environment. The FFA parties have worked together to sign this ROD. All three parties agree that the onsite remedy selected is protective and will either comply with the ARARs or shows justification for waiving a portion of a regulation. The FFA parties believe there is sufficient information available to support this decision. The concerns mentioned in the comment to be TDEC concerns have been addressed.

The comment indicates a concern with shallow groundwater. A groundwater field demonstration is proposed to follow the ROD, where the groundwater elevation response to simulated landfill construction will be analyzed and results used to support final design of the facility. This effort is planned to address the concern about groundwater elevations beneath the facility and demonstrate the ability to maintain 15 ft of separation between the bottom of waste and the groundwater table.

The comment indicates a concern with mercury disposal. Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in EMDF.

The comment indicates a concern with the use of underdrains. As discussed in this ROD, no permanent underdrains beneath the waste are incorporated in the design.

Comment 160.12: Page 22. Waste Acceptance Criteria. DOE indicates that Waste Acceptance Criteria (WAC) have not been developed but will be included in the Record of Decision (ROD). This approach of determining WAC following the issuance of the Proposed Plan denies the public the opportunity to understand and to offer comment on the waste that would be permitted to be disposed in the EMDF. DOE should be required to provide in the Proposed Plan a process for characterizing waste that is deemed acceptable for landfill disposal. Specifically, DOE should describe the extent of sampling and testing that would be implemented to verify that waste materials are acceptable for disposal in the EMDF. For example, DOE should include defined intervals for sampling waste materials as well as a description of the material testing program. DOE should also identify certain wastes that will be excluded from disposal in the EMDF. The following are waste streams should be excluded from the EMDF:

- Enriched Nuclear Material;
- High Level Waste;
- Transuranic Waste;

- Cylinders containing DUF6 oxides or DUF6;
- Contaminated nickel barrier materials;
- Waste in containers and other non-land-based units from being placed in Corrective Action Management Unit (CAMU);
- Placement of liquids in CAMUs; and
- Placement in a CAMU of wastes that would otherwise be CAMU-eligible.

With respect to the above limitations on waste material handling in a CAMU, TFG notes that DOE would need to secure EPA and TDEC approval to establish a CAMU at the Site 7c EMDF. A request for a CAMU designation was not included in the Proposed Plan, however, in the 2017 DOE Strategic Plan for Mercury Remediation at the Y-12 National Security Complex (Y-12 DOE/OR/01-2605&D2/R1), DOE indicates that it intends to secure regulatory approval for land disposal of treated mercury contamination in the proposed EMDF (Site 7c) pursuant to Resource Conservation and Recovery Act (RCRA) standards. DOE will also seek TDEC and EPA approval for establishing a CAMU that will facilitate the movement and treatment of mercury contaminants inside the ORR. DOE should specify in the Proposed Plan its intention to either seek regulatory approval for establishing a CAMU at site 7c, or that it will not seek to establish a CAMU. Under either circumstance, DOE should be required to agree to the above noted CAMU restrictions.

Response: Some of the discussion in the comment on waste acceptance criteria (WAC) is not relevant to the Oak Ridge NPL Site and appears to be from an evaluation of work being conducted at the Portsmouth Gaseous Diffusion Plant. There are no DUF_6 cylinders or nickel barrier material relevant to the EMDF decision.

The comment also includes a discussion regarding the potential need for a Corrective Action Management Unit (CAMU) to support onsite disposal. The potential for a CAMU was not mentioned in the Proposed Plan, nor is it included in this ROD.

With submittal of the D1 ROD, the FFA parties have recommended additional public engagement to include discussion of WAC. That effort allows for additional public comment that is addressed within the D2 ROD.

DOE has included in the Proposed Plan several waste types generated on the ORR that will be excluded from disposal at a proposed EMDF because they do not meet the anticipated acceptance criteria (e.g., transuranic waste, liquid waste, and hazardous waste that does not meet land disposal restrictions). EMDF disposal restrictions with respect to activity criteria of radiological waste should be further evaluated. Radiological limits must be established and achieved through a rigorous and statistically significant analytical sampling program in order to ensure the prevention of nuclear criticality, including the potential for criticality induced by aqueous transport of disposed materials. There are several parameters that affect the criticality of the system including the following that DOE should incorporate into their EMDF WAC:

- Mass: The probability of fission increases as the total number of fissile nuclei increases.
- Absorption: Absorption removes neutrons from the system. Large amounts of absorbers are used to control or reduce the probability of a criticality.
- Geometry/shape of the fissile material: The shape of the fissile material affects the probability of occurrence of fission events. Large surface areas favor leakage and is safer than small, compact shapes.

- Interaction of units: Two units, which by themselves are sub-critical, could interact with each other to form a critical system.
- Concentration/Density: Neutron reactions leading to scattering, capture or fission reactions are more likely to occur in dense materials.
- Moderation: Neutrons resulting from fission are typically fast (high energy). These fast neutrons do not cause fission as readily as slower (less energetic) ones. Neutrons are slowed down (moderated) by collision with atomic nuclei. The most effective moderating nuclei are hydrogen, deuterium, beryllium and carbon. Hence hydrogenous materials including oil, polyethylene, water, wood, paraffin, and the human body are good moderators. Note that moderation comes from collisions; therefore most moderators are also good reflectors.
- Enrichment: The probability of a neutron reacting with a fissile nucleus is influenced by the relative numbers of fissile and non-fissile nuclei in a system.
- Reflection: When neutrons collide with other atomic particles (primarily nuclei) and are not absorbed, they are scattered (i.e. they change direction). If the change in direction is large enough, neutrons that have just escaped from a fissile body may be deflected back into it, increasing the likelihood of fission.
- Volume: Increasing the size the body of fissile material increases the average distance that neutrons must travel before they can reach the surface and escape.
- Temperature is another parameter that affects the criticality of the system. It is important for DOE to understand where this parameter would apply in a landfill condition.

Response: RI/FSs for disposal facilities sometimes contain placeholder WAC, as was done for EMDF. The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the ORR indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan. Safety-basis WAC will also be developed that takes into consideration the nuclear criticality issues raised above. This WAC will be documented outside of the ROD as it is not associated with long-term protection of the environment; however, Safety Basis limits and evaluations, including those that deal with criticality, are managed by specific DOE requirements and trained personnel throughout the lifetime of the facility.

Mercury contaminants should also have restrictions imposed with respect to disposal in the EMDF. DOE should be required to remediate Mercury contaminants in compliance with applicable state and Federal agreements and regulations. In the 2017 DOE Strategic Plan for Mercury Remediation at the Y-12 National

Security Complex (Y-12 DOE/OR/01-2605&D2/R1), DOE indicates that it intends to secure regulatory approval for land disposal of treated mercury contamination in the proposed EMDF (Site 7c) pursuant to Resource Conservation and Recovery Act (RCRA) standards. DOE also indicates that it will either seek a waiver from regulatory standards for mercury cleanup, or pursue TDEC and EPA approval for interim cleanups. Further, DOE indicates that it might seek a reclassification of designated uses for surface water and groundwater and that land use designations will not be a determinant in assigning groundwater or surface water resource classifications.

Response: Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in the EMDF.

DOE's intent to ignore land-use designations may be considered by some in the local community as a breach of faith with the citizens who devoted many hours of their time to working with DOE to hammer out a mutually acceptable (and technically practicable) set of end-use designations for DOE's Oak Ridge lands, with the expectation that DOE would achieve sufficient cleanup to support the designated uses. DOE along with TDEC and EPA Region IV should provide meaningful opportunities for public engagement on this issue and related issues on this Proposed Plan.

Response: Based on strong State preferences related to site hydrology, the FFA parties have agreed to the Central Bear Creek Valley site for the waste disposal facility. DOE has indicated in the Proposed Plan that the land use around and including the Central Bear Creek Valley site would have to be changed to industrial use from that designated in the Bear Creek Valley ROD (consistent with the recommendation of the End Use Working Group). This ROD changes the land use designation for Central Bear Creek Valley as part of this remedy selection. The land use recommendations from the End Use Working Group and eventually documented in the Bear Creek Valley ROD were identified solely to set remediation levels across the valley. There was never any expectation that the land in Bear Creek Valley would be released by DOE for use by others. The land was always intended to be a buffer between DOE activities and the public and to provide future opportunities for DOE use.

With submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

DOE notes in the Mercury Strategic Plan that its remediation efforts over the past 20 years at the ORR have not resulted in acceptable mercury concentrations in fish samples taken from the Upper East Fork Poplar Creek (UEFPC). The regulatory limit for methyl mercury is .3 mg/kg (ppm - parts per million) in fish tissue. Mercury contamination is present in the soil, sediment, water, biota and building structures. Potentially compounding the mercury contamination concern is DOE's plan to demolish several process facilities totaling 1.8 million square feet at the Y-12 complex that contain both radioisotopes and mercury contaminants.

DOE estimates that total loss of mercury to the environment since operations commenced at the ORR to be in excess of 2 million pounds. DOE asserts that it will seek to construct a water treatment facility in the near proximity to Outfall 200 in the Y-12 Complex for mercury removal. DOE believes that a significant portion of Mercury contamination is located at the Y-12 complex, although the treatment facility will also serve to remediate Mercury contamination from other locations on the ORR.

DOE considers the remediation of Mercury to be a high priority. TFG agrees that Mercury contamination is a significant issue at the ORR and one that needs further assessment relative to a decision to dispose of

Mercury wastes in the EMDF. Specifically, DOE should undertake further investigations to ascertain the type of Mercury forms present at ORR. Mercury exists in various forms at the ORR. The toxicity of mercury varies by forms. DOE asserts in the Mercury Strategy that most typically mercury exists·due to its stability in a "mercury II valence state versus the mercury I valence state..., from the more soluble inorganic mercury (II) compounds (e.g., mercuric oxide, HgO) to the least soluble, mercuric sulfide (HgS, cinnabar), as well as (more sparingly) organic methylmercury compounds and, finally, a portion is present as elemental mercury. Depending on the location, any of these mercury compounds may be dominant in soils (with the exception of methylmercury, which is typically present in very low concentrations in soils, usually representing far less than 1 percent of total mercury)." The City of Oak Ridge will want to insure that treatment technologies proposed to remediate or stabilize mercury are effective for all forms and that these technologies are effective for stabilizing the physicochemical form(s) of mercury to which it is applied and will remain stable over the long term in the setting where it is placed.

Response: The regulatory compliant design, operation, and closure of the onsite disposal facility, coupled with DOE's compliance with all regulatory requirements concerning mercury, will help to ensure that the new disposal facility is protective of human health and the environment over the long term. For West End Mercury Area remediation projects with EMDF-bound waste streams, DOE will take all practical measures to remove mercury before waste generation and send that mercury offsite to treatment/storage/disposal facilities. Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in the EMDF.

DOE should be required to develop landfill waste attenuation modeling that is calibrated to the defined hydrogeological conditions at the EMDF location and which accounts for the construction of the landfill multi-layer protective design. The modeling would be used to predict the concentration of contaminants at Points of Compliance.

The TM and in turn this Proposed Plan did not include detailed information on how DOE will assess the adequacy of site 7c for construction of a low-level nuclear and hazardous waste landfill. The TM should have provided greater detail on the Conceptual Site Model (CSM). Development of a CSM is an element of defining environmental problems. CSMs consist of understanding the nature and extent of contamination present, the fate of those contaminants in the environmental setting, and the potential location of receptors that use or may use the contaminated media. Development of a complete CSM and then defining the magnitude of the impact of the contaminants on receptors completes the problem definition. More specifically, a CSM that identifies the source(s) of the contaminants·of potential concern (COPC), will also assess the likely migration pathways and potential exposure routes, and their ultimate fate in the environment. Finally, using the transport and fate information along with toxicity information, the COPCs are identified for applicable potential receptors.

A future condition CSM identifies the key elements of fate and transport, which include the media that contaminants may move through and the receptor that could become exposed to contaminants. The locations of these receptors are termed point of assessment (POA) or point of compliance (POC) and are used to define the exposure assumptions that are in the modeled Waste Acceptance Criteria (WAC) development. A POA is a point at which it is assumed that a receptor may come in contact with media that may be contaminated by a potential site 7c EMDF based on fate and transport modeling and current and future site characteristics. POA locations are selected based on water flow directions beneath the site and likely future use scenarios in the vicinity of a potential 7c landfill, resulting in potential exposure to a receptor. Based on characteristics of the relevant exposure media and locations, specific exposure scenarios apply to the POAs which are considered in the development of modeled WAC to ensure protection of

human health and the environment. The POC is a regulatory-driven requirement and is the basis for future monitoring of groundwater in the regional aquifer.

The TM and the Proposed Plan do not provide information on either POAs or POCs. This information as well as a more robust description of the contemplated CSM should have been provided in the both of these documents.

Response: The referenced analysis of evaluating the release potential of contaminants and their impact on future human health and the environment is documented in the Performance Assessment and Composite Analysis. These documents, developed in accordance with DOE Order 435.1, are provided in the project Administrative Record.

Comment 160.13: Pages 23-24. NEPA. DOE has limited its assessment of National Environmental Policy Act (NEPA) impacts from the proposed site 7c EMDF to land use impacts. Congress, through the National Environmental Policy Act of 1969 (NEPA), established a framework for the review of remedial actions carried out by the federal government and has imposed on federal agencies the obligation to assure a "safe and healthful environment." NEPA was enacted not only to force federal agencies to consider the environmental impacts associated with projects under federal jurisdiction, but, more importantly, to establish procedures by which members of the public would be afforded the opportunity for meaningful participation in the agency's consideration of proposed actions.

While NEPA does not directly apply to the EMDF siting decision, in October 1989, the DOE called for integrating the requirements of NEPA with those of the CERCLA for DOE remedial actions conducted under CERCLA (DOE Order 5400.4, issued October 6, 1989). This resulted in the creation of the RI/FS process used by DOE to assess the proposed site 7c EMDF.

The Proposed Plan offers a minimal NEPA analysis. The City of Oak Ridge should request that DOE prepare a NEPA Report of Findings that fully complies with Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 CFR parts 1501). Specifically, the regulations require federal agencies to consider actions that impact environmental, social, cultural, economic resources, and natural resources. Specific NEPA analysis that DOE should undertake relative to the site 7c are as follows:

- Consideration of impacts to wetlands and associated habitats is noticeably absent from this discussion…
- Socioeconomic impact is not measured solely in numbers of jobs, as implied on page 21. DOE needs to acknowledge the potential for adverse effects on the host community of Oak Ridge, including the opportunity cost from businesses unwilling to locate near a radioactive/hazardous waste disposal site, resulting from negative publicity about the landfill.
- The discussion should include a full comparison of onsite and offsite disposal alternatives, to include (for example) distances to the nearest neighbors, potential·exposure to visual and noise impacts, hydrologic and other pathways of potential exposure. Since the potential locations for offsite disposal are known to be specific facilities in Utah, Nevada, and Texas, their attributes can be used as a basis for this discussion.

TFG has previously documented the negative socioeconomic impact of ORR activities on the City of Oak Ridge. The DOE has failed to integrate any of these findings in their decision-making processes. The City of Oak Ridge should insist that DOE undertake these NEPA studies (i.e., either an Environmental Impact Statement or Environmental Assessment) and quantify the impact ORR operations have had on the City.

Response: The Oak Ridge NPL Site cleanup is being conducted primarily using CERCLA response authority. In accordance with the DOE "Secretarial Policy Statement on the National Environmental Policy Act (NEPA)", NEPA values have been incorporated into the CERCLA documentation prepared for this project. Some CERCLA evaluation criteria are the same as NEPA review criteria, including protectiveness, long-term effectiveness and permanence, short-term effectiveness, and cost. DOE incorporation of other NEPA values into the evaluation of each alternative contained in the RI/FS is described in the RI/FS, Sect. 7.1.10. The NEPA values included in the evaluation of alternatives, but not specifically required in the CERCLA evaluation criteria, include socioeconomic impacts, land use, environmental justice, irreversible/irretrievable commitment of resources, and cumulative impacts. The incorporation of NEPA values into the evaluation of each alternative is also summarized in the Proposed Plan. The ROD does include another element of the socioeconomic value for offsite disposal that was evaluated since the Proposed Plan was developed. The ability for the public to comment on NEPA values before a decision is made has been a key aspect of every DOE CERCLA decision.

Comment 160.14: Page 25. Preferred Site Location. DOE indicates that site 7c is the preferred location for construction of the EMDF because it is protective of human health and the environment, cost-effective, appropriately compliant with all Federal and State requirements, and effectively balances the CERCLA remedy selection criteria. In addition, DOE asserts that the site minimizes short-term risks to humans through transportation or industrial accidents. The first statement is inaccurate, as DOE will need to seek regulatory waivers and, therefore, the preferred alternative is not "compliant with all Federal and State requirements." The second DOE statement is not supported by any data to substantiate the claim. It is not apparent that onsite disposal would minimize industrial accidents, and traffic accidents are not normally the focus of a CERCLA evaluation of short-term effectiveness.

It is concerning that DOE has intentionally inserted qualifications in their advocacy for Site 7c in a manner that distorts the CERCLA evaluation criteria, presumably in order to cast the preferred alternative in an undeservedly favorable light. An action is supposed to comply with ARARs; the words "appropriately comply" appear to be a hedge related to DOE's desire to comply only with those ARARs that the action can comply with. The words "use permanent solutions and resource recovery technologies to the extent practicable" are not in the CERCLA evaluation criteria. Treatment cannot be represented as "a principal element of the proposed remedy" when the proposed plan doesn't describe the WAC nor explain how treatment of mercury would be accomplished, much less provide assurance that the treatment would be effective in reducing toxicity or mobility of this contaminant.

Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

A TSCA waiver for two parts of TSCA 40 *CFR* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

- **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding PCB management and disposal practices on the**

ORR. Compliance with the RCRA Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the EPA determination that the remedy is protective of human health and the environment.

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.**

An exemption to TDEC 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

Comment 160.15: Page 26. Community Participation. The City of Oak Ridge does not support DOE limiting the public comment period to 30 days. A 30-day public comment period isn't long enough for the sole predecisional opportunity for public input on a radioactive and hazardous waste landfill that might operate for 30 years. The statement that "The proposed plan provides stakeholders with the information necessary to determine if the action is warranted" is not true of the current draft.

Response: The original comment period was 45 days, not 30 as stated in the comment. In addition, DOE received and granted two separate requests to extend the original comment period – one by another 45 days and the second by an additional 30 days. Therefore, the comment period was for 120 days. With submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

Comment 160.16: Page 26. Long-Term Stewardship of the EMDF. DOE has indicated that they will assume long-term stewardship of the EMDF following landfill closure.

Response: DOE agrees with the comment. This ROD requires that DOE implement long-term maintenance, surveillance, and monitoring of EMDF in compliance with ARARs for as long as the waste remains a threat to human health or the environment. DOE will implement institutional controls at EMDF to prevent access to the waste in the future for as long as the waste remains a threat to human health or the environment.

Comment 160.17: Contingency Planning. DOE should include the Proposed Plan a Contingency Plan in the event site 7c is not determined to be an acceptable remedial option for disposal of ORR wastes. DOE has indicated in the Proposed Plan that the operating EMWMF is approximately 75% filled. DOE should update the community on the estimated date when the EMWMF will be 100% filled and its contingent plan to dispose of wastes in the event of a non-decision on the site 7c EMDF.

Response: The RI/FS includes the evaluation of multiple locations for the construction of EMDF under the Onsite Disposal Alternative. The evaluation in the RI/FS was prepared consistent with CERCLA guidance. The FFA parties have agreed that the preferred alternative presents a protective remedy and therefore has been selected.

DOE reports through the Oak Ridge Site Specific Advisory Board annually on the status of waste disposal. During the last discussion in May 2022, DOE indicated the EMWMF is approximately

80 percent full, and that it is estimated to be full in the late 2020s. DOE will continue its work to utilize the solid waste landfills for disposal as much as possible. If the EMWMF is full and another low-level waste onsite facility is not available, one option is to send that waste offsite, which is a more costly operational effort than onsite disposal, meaning less funding is available to do the actual cleanup, and thus cleanup will take longer.

Comment 160.18: It is apparent that the Proposed Plan released by DOE is incomplete as significant data is lacking and needed for the public to make an informed opinion or judgement on the viability of site 7c as the repository for low-level nuclear and hazardous substances and wastes. As a consequence, the City of Oak Ridge, TDEC, EPA Region IV and the general public have only been presented with DOE's preferred remedy for the disposal of low-level nuclear and hazardous substances and wastes from the operations at the ORR absent the requisite site data to support any site decision. The release of a pre-decisional document that will have an impact to the local community and the nation as a whole should not be taken lightly. DOE should be undertaking a more open, transparent, comprehensive and deliberative process that seeks to educate the public on the benefits and costs of proposed actions to determine the appropriate and safe location for the disposal of nuclear wastes with half-lives of millions of years. TFG encourages the City of Oak Ridge to make clear to DOE and the regulators of the ORR (i.e., TDEC and EPA Region IV) that the approach and process being employed by DOE is unacceptable and changes are required in how and when DOE presents its Proposed Plan to the public.

Response: DOE has made extensive effort to ensure meaningful community involvement throughout this nearly decade-long process of selecting a remedy for final disposition of CERCLA waste at the Oak Ridge NPL Site consistent with the EPA and TDEC-approved EMDF Community Outreach Plan. Large-scale outreach began in 2015 and has continued to the present. City and county officials received tours and briefings. The Oak Ridge Office of Environmental Management (OREM) hosted numerous community meetings, and there was substantial media outreach on the topic. OREM also proactively reached out to numerous community groups to provide presentations about EMDF. DOE released the Proposed Plan to the City of Oak Ridge before the start of the formal public comment period. In addition to providing notices to the paper, every household in Oak Ridge received a flyer requesting input to the public comment process. The original comment period was 45 days but was extended to 120 days at the request of the public. DOE has made every effort to ensure there has been meaningful public input and will look for opportunities for future public involvement as the project proceeds.

DOE disagrees that the Proposed Plan is incomplete. The CERCLA process requires that DOE issue a Proposed Plan to summarize the evaluation of alternatives contained in the detailed RI/FS and to identify DOE's preferred alternative for implementation of the selected remedy. Detailed information on the alternatives evaluated, including the sites evaluated for the onsite alternative, are contained in the RI/FS. Anyone seeking detailed information on any aspect of the alternatives evaluated will be able to find that information in the RI/FS.

Comment 161: Comments from City of Oak Ridge, Environmental Quality Advisory Board (EQAB)

Part 1: Comments on draft Proposed Plan, from EQAB July 9, 2018 letter

Comment 161.1: Summary/Recommendation: EQAB recommends that City Council should withhold endorsing this Plan until the serious flaws which have been identified by us, by the city's consultant Ferguson Group, and by TDEC, are corrected ***AND ALSO*** until DOE has committed itself in writing to fully follow in good faith the NEPA process as provided by law, especially in regard to timely understandable communication with the host community (us), without reservations, holdbacks, artificial deadlines, or any *a priori* exception- or waiver-seeking.

Response: The U.S. Department of Energy (DOE) does not agree that serious flaws with the proposed remedy existed. The responsiveness summary contains responses to issues and Tennessee Department of Environment and Conservation's (TDEC's) concurrence with the Record of Decision (ROD) indicates that their concerns have been resolved. The Oak Ridge National Priorities List (NPL) Site cleanup is being conducted primarily using Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) response authority. In accordance with the DOE "Secretarial Policy Statement on the National Environmental Policy Act (NEPA)", NEPA values have been incorporated into the CERCLA documentation prepared for this project. Some CERCLA evaluation criteria are the same as NEPA review criteria, including protectiveness, long-term effectiveness and permanence, short-term effectiveness, and cost. DOE incorporation of other NEPA values into the evaluation of each alternative contained in the Remedial Investigation/Feasibility Study (RI/FS) is described in the RI/FS, Sect. 7.1.10. The NEPA values included in the evaluation of alternatives, but not specifically required in the CERCLA evaluation criteria, include socioeconomic impacts, land use, environmental justice, irreversible/irretrievable commitment of resources, and cumulative impacts. The incorporation of NEPA values into the evaluation of each alternative is also summarized in the Proposed Plan. The ROD does include another element of the socioeconomic value for offsite disposal that was evaluated since the Proposed Plan was developed. The ability for the public to comment on NEPA values before a decision is made has been a key aspect of every DOE CERCLA decision.

Comment 161.2: Not Ready for Prime Time: In brief, it was EQAB's sense, many who work in the private sector, that if this Plan were a response to an RFP, the Proposer would not win the work. The Plan as presently written has dozens of serious flaws–numerical, logical, grammatical, programmatic–to be detailed in a forthcoming report this month.

Response: DOE does not believe that the document contains significant numerical or programmatic "errors" in the document. To engage the city of Oak Ridge, a draft of the document was provided and, as such, was subject to potential inadvertent errors. The final document was carefully written together by members of DOE, U.S. Environmental Protection Agency (EPA), and TDEC.

Comment 161.3: No Need for Rush to Judgement: How the toxic waste and radwaste from the ORR is ultimately handled has ramifications for centuries into the future for the residents of Oak Ridge and all those who live downstream of here. In this context, a 30-day timeframe for a Record of Decision is unnecessary, unseemly, and unwise. There is no technical need for a legally binding decision now.

Response: The original comment period was 45 days, not 30 as stated in the comment. And this is the timeframe for public response to the Proposed Plan, not the timeframe to write a ROD. In addition, DOE received and granted two separate requests to extend the original comment period – one by another 45 days and the second by an additional 30 days. Therefore, the comment period was for 120 days. The process of developing documentation for an onsite disposal cell began in 2010 and the time has been taken to ensure that all parties involved, including the City of Oak Ridge have been engaged in the process. As a result of the extended time to date for the CERCLA process, there is some urgency to complete the decision to provide cost-effective disposal options for waste generated during the upcoming important planned cleanup actions at the Y-12 National Security Complex and Oak Ridge National Laboratory.

Comment 161.4: Past Performance and Beer: EQAB is unimpressed by DOE's past performance at the existing EMWMF, which has wasted much of its design capacity due to mismanagement. Hence EQAB is unhopeful that yet another waste dump (confusingly termed "EMDF" in the Plan) in the neighborhood

would be run any better. It is always fair and prudent to evaluate past performance as a factor before making any decision, not only one as weighty as this. For example, a beer permit is only granted to an *individual* manager working at a *particular* venue. Change either, and a new license must be applied for. Past performance is a significant factor in that Board's decision–for example, a history of violations for serving alcohol to minors would be disqualifying. If past history is any guide, we'll be doing this again in 20 years, ruining yet another greenfield. Vetting a project of this magnitude (hundreds of millions of dollars) with such a long tail (centuries, even millennia) ought to be at least as rigorous as what we do when granting someone a beer license.

Response: DOE does not agree that the capacity of the Environmental Management Waste Management Facility (EMWMF) has been wasted or that operations at EMWMF have been mismanaged. Since EMWMF began operations in 2002, about 200,000 waste shipments have been made safely to the facility and approximately 80 percent of the landfill capacity has been used to date. DOE has sanctioned independent reviews or audits of the EMWMF operations from experts in the construction and operation of disposal facilities, DOE-Headquarters, and the environmental regulatory agencies. Results of the independent reviews have identified no immediate concerns with the performance of the facility and have confirmed that operations are being conducted following all applicable or relevant and appropriate requirements (ARARs). DOE works to continuously improve its efforts involving the cleanup mission at the Oak Ridge Reservation (ORR) through lessons learned. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the EMWMF, provided characterization allows this path. The waste disposal hierarchy will also be applied for the Environmental Management Disposal Facility (EMDF) waste disposal.

Comment 161.5: Bad Writing/No Plain English: All the Board members who reviewed the 07 Jun 18 draft of the Plan had trouble understanding the text, following the logic, or readily finding support for claims. In addition, there was no executive summary, laying out the most important considerations and recommendations.

Response: The evaluation of alternatives for final disposal of Oak Ridge NPL Site CERCLA waste is a very complex issue. The evaluation of multiple disposal sites as part of the Onsite Disposal Alternative further complicates the evaluation. DOE recognizes the complexity of this evaluation and has attended many public and local government gatherings to answer questions or provide clarification as needed. The organization of the Proposed Plan is dictated by EPA CERCLA guidance and as such, does not include an executive summary. DOE, TDEC, and EPA personnel together wrote the Proposed Plan to facilitate public review of the proposed remedial action. To the degree possible, technical information has been summarized or simplified to facilitate review by the public and stakeholders that may not be as familiar with the technical issues at the Oak Ridge NPL Site.

Comment 161.6: Bad Faith: While claiming that they will follow CERCLA (which also means, bound by the NEPA process), DOE has also stated out the outset in the Plan and in other venues that they will seek waivers for *at least* three significant elements that EQAB is aware of as of today: reducing required height above water table, reducing maximum permissible uses of surface water and groundwater, and exception with respect to the handling mercury. If the site is "perfect", why are *any* waivers needed? This is akin to saying, "we will sell bladeless knives without handles". With such items waived, the process is not CERCLA. Under these conditions, RCRA is the more appropriate process. If a private-sector entity entered a deal with no intention of honoring the deal due to such reservations in mind, they would be rightfully accused of "negotiating in bad faith".

Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

A Toxic Substances Control Act of 1976 (TSCA) waiver for two parts of TSCA 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation "*…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met.*" The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

- **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the ORR. Compliance with the Resource Conservation and Recovery Act of 1976 (RCRA) Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the EPA determination that the remedy is protective of human health and the environment.**

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.**

An exemption to TDEC 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

Comment 161.7: Masonry and Mercury are Like a Sponge and Water: Some technical specialists such as toxicologists know that metallic mercury (liquid at room temperature) is so slick that it will penetrate and infiltrate, simply by the force of gravity, just about any material, even a seemingly solid one like concrete. A rare few understand that under the right circumstances the mercury can move right back out again–at the microscopic scale, stone is a sponge. It is certain that the vast majority of the public, who would have to live with the mercury if it is released again in that form, do not understand this essential fact. Nowhere is it made clear to the reader, or even hinted at. East Tennessee is a temperate rain forest, above miles of fractured bedrock full of holes. There is no safe way to store such a fugitive substance like mercury, except far away from people, and far away from water, i.e., at any of a number of existing, already-permitted, appropriate facilities out West.

Response: The RI/FS and Proposed Plan both clearly state that there are no karst features in the geology underlying any of the sites being evaluated for the EMDF. The position that DOE has presented in both documents is based on past characterization of Bear Creek Valley. To further validate this position, DOE conducted additional geologic investigations at the proposed site, Site 7c in Central Bear Creek Valley. The resultant validation information is presented in the Phase I Site Characterization Technical Memoranda provided in the Administrative Record.

The regulatory compliant design, operation, and closure of the onsite disposal facility, coupled with DOE's compliance with all regulatory requirements concerning mercury, will help to ensure that the new disposal facility is protective of human health and the environment over the long term. For West End Mercury Area remediation projects with EMDF-bound waste streams, DOE will take all practical measures to remove mercury before waste generation and send that mercury offsite to treatment/storage/disposal facilities. Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in the EMDF.

Part 2: Comments on Proposed Plan from EQAB September 4, 2018 letter

Comment 161.8: Summary/Recommendation: The EQAB resolves that its position of July 7, 2018 remains unchanged. While we thank DOE-EM for providing their Plan for review, it has serious flaws. The concerns we expressed then still apply (attached at bottom for your convenience); now we have identified more issues. We advise City Council that DOE-EM needs to complete its response to the City Manager's July 12 submittal and answer the previous questions, as well as the new concerns we are bringing to light in this letter. EQAB strongly endorses the NEPA process and urges consideration of the City's concerns by DOE-EM in this proposed landfill planning process.

- The Superfund law (CERCLA) is designed for cleaning up contaminated property, but DOE-EM's Preferred Choice is to contaminate a clean site, Central Bear Creek Valley (CBCV). *Forever sacrificing 70 green acres is not "remediation"; it is the exact opposite*. It is unreasonable to put the entire ORR (most of which is clean) into one basket (1 monolithic site on the National Priorities List) just in order to shuffle hazardous waste around it. In this situation, RCRA is the correct process, not CERCLA.

  Response: The identification of permanent solutions for the onsite and offsite disposition of CERCLA waste has always been a fundamental part of the CERCLA process. CERCLA actions are not complete without all waste that has been generated having a disposal decision. The CERCLA process has been used to support decisions for many disposal facilities across the United States, some on previously disturbed sites and others on "greenfield" sites, including many disposal sites at CERCLA facilities (e.g., Oak Ridge, Hanford, and the Fernald and Portsmouth sites in Ohio). In many of these cases, a program-level evaluation of disposal needs has been conducted under CERCLA and a final decision on disposal to apply to CERCLA actions made. Agreements reached under the CERCLA framework are enforced by the State and EPA.

- *The more DOE-EM's Preferred Choice is looked at, the worse it looks*. Recent well sampling indicates the groundwater table does not meet TDEC and EPA requirements, as noted by EPA on August 16.

  Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

  A TSCA waiver for two parts of TSCA 40 *CFR* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

- **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding PCB management and disposal practices on the ORR. Compliance with the RCRA Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the EPA determination that the remedy is protective of human health and the environment.**

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/ slumping.**

An exemption to TDEC 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

- DOE says onsite disposal "creates jobs". (1) Those jobs would be created no matter where the waste ultimately ends up, and (2) *trashing Tennessee's future is not a viable worthy "jobs program" for us*.

  Response: As discussed in the Proposal Plan, Onsite Disposal would have the greatest effect on local socioeconomic factors. From design, engineering, construction, 20 plus years of operation, closure and many years of post-closure care, local jobs would be created in the east Tennessee area. Offsite disposal also would generate jobs, but the majority of the jobs would not be local. The transportation of Oak Ridge NPL Site CERCLA waste to disposal facilities in the west would generate jobs for the transportation companies, but this does not equate to local jobs. Some local jobs will be needed for packaging and loading waste, but obviously no jobs will be needed for construction and operation of EMDF.

- In other forums, DOE has stated that it will not publish its waste acceptance criteria (WAC) before the record of decision (RoD). This is unacceptable for a problem that our descendants must live with for centuries. The WAC must be publicly disclosed before the RoD.

  Response: RI/FSs for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for EMDF. The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the ORR indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in

accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, Federal Facility Agreement (FFA) parties' approved primary document, the WAC Compliance Plan.

With submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

- DOE-EM's analysis neglects Central Bear Creek Valley's substantial long-term future value to the City as greenspace, hence it is not a proper full cost:benefit analysis as defined by NEPA. It should also factor in that ecosystem services provided by the greenfield as-is (forested) to the community, which EQAB estimates are worth roughly $0.5M/year, or ~$30M present value. DOE grossly undervalues this greenfield at less than 1/10th of that. (EQAB notes this problem of undervaluing ORR land applies to PILT, too.)

  Response: In accordance with DOE policy, NEPA values have been incorporated into the CERCLA documentation prepared for this project. DOE's incorporation of NEPA values into the evaluation of each alternative contained in the RI/FS is described in the RI/FS, Sect. 7.1.10. Neither CERCLA nor NEPA values require that the cost analysis performed in the evaluation of a proposed remedial action consider the value of ecosystems services or the value of the resources to be impacted. The cost evaluation is required to focus specifically on the implementation of the remedy. Impacts on ecological resources are considered in other evaluations, such as short-term effectiveness, long-term effectiveness and permanence, and long-term commitment of resources. Each of these topics has been appropriately addressed in the CERCLA document prepared for the evaluation Oak Ridge NPL Site CERCLA waste disposal.

  The Natural Resource Damage Assessment (NRDA) provisions of CERCLA do consider issues such as the loss of natural resource services prior to remediation, but this is a separate regulatory process than the CERCLA process used to evaluate and select a proposed remedy. The NRDA provisions of CERCLA generally address the loss of natural resource services that occur before and during implementation of the remedial action and any impacts caused from the implementation of a remedial action are generally not considered in NRDA evaluations.

- *Onsite disposal is not safer*. DOE-EM's Preferred Choice is predicated on the idea onsite disposal is safer than offsite (but they didn't provide backup). EQAB disputes this proposition. Transportation of every kind has gotten much safer with time. In 1990-2009, overall US motor vehicle deaths dropped by *half* (corrected for population growth), from 2 fatalities per 100 million miles, to 1. At the same time, heavy truck fatalities dropped by a quarter, from 571 to 422, i.e., about 1.3 per year per million people. Source: Statistical Abstract of the United States, 2012 ed., p. 694. DOE has a good transportation record, e.g., reporting ***zero*** transit incidents (i.e., ***accidents***) sending extremely hazardous waste 1300 miles away to the WIPP in Carlsbad, NM. Compared to the toxic hazards to residents from the ongoing leaching of mercury into our underground aquifers in rainy east Tennessee, offsite disposal at a dry unpopulated site is safer.

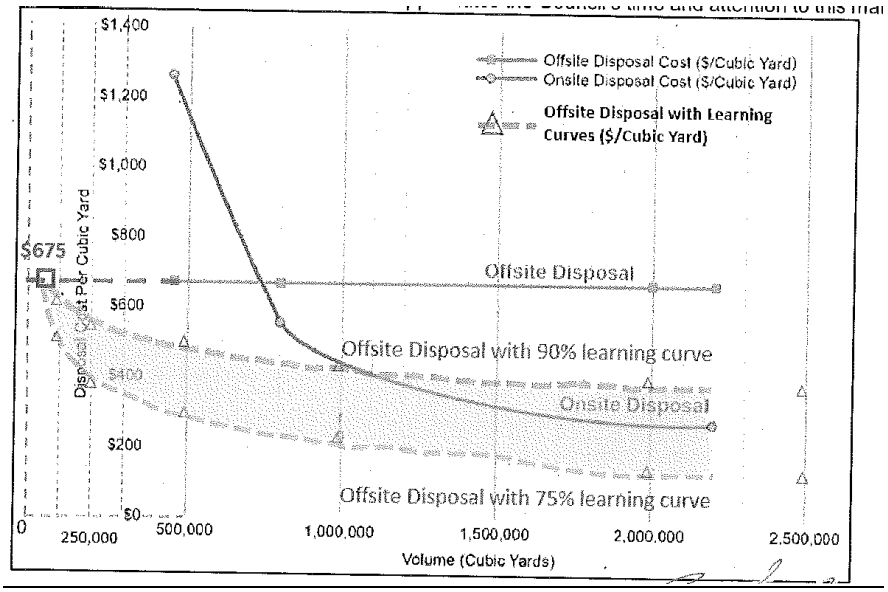
  Response: This selection of DOE's preferred alternative was based in part on the increased transportation risks associated with the offsite shipment of waste. The evaluation of

transportation risks as presented in the RI/FS and summarized in the Proposed Plan were based on the latest techniques using up-to-date actuarial statistics. The safety of DOE's waste shipment program is an extremely high priority and DOE strives to make every shipment safe, but both trucks and trains must interact with the public over which DOE has no control. When the volume of waste and the distance required for disposal are considered, the statistical evaluation shows a significant increase in fatalities and injuries resulting from accidents. Again, DOE will strive to make every shipment safely, but the projected accident statistics associated with offsite disposal are a significant concern.

- *Onsite disposal is not cheaper*. DOE-EM's Preferred Choice is also predicated on the proposition that onsite disposal is cheaper than offsite. EQAB disputes this, and performed some independent research. There are three *appropriate landfills out West right now*, in Utah, Nevada, and Texas, *far away from water and people, ready, willing, and able to take the waste* we can send. EQAB does not agree with DOE-EM's conclusion (their cost analysis was not provided to us). We challenge them to justify their conclusion. DOE claims for itself a very generous aggressive cost reduction per unit as Onsite Disposal ramps up. The claimed reduction is especially steep in the early years. However, DOE states that the unit cost of the Alternative Offsite Disposal will remain flat for decades, no matter the volume. Not only is this unwarranted/unproven, it goes against every principle of economics and industrial engineering. If the usually customary benefits of learning curve, economy of scale, and mechanization/automation (not to mention robotics in the future) are applied to Offsite Disposal, we should expect cost to decline in the long run:

  1. Learning Curve: Most any process gets significantly cheaper per unit as people get more productive and efficient. Just about every industry falls somewhere between the 75% (rapid process improvement) and the 90% (slower process improvement) experience curves (in blue) below.
  2. Economy of Scale: Every process gets cheaper per unit as the total enterprise gets larger.
  3. Bulk transportation tends to get more mechanized and automated over time.
  4. Therefore, bulk transportation tends to get cheaper in constant dollars over time. Look how containerized shipping has revolutionized the global economy. According to the *Economist*, during the container shipping price wars in 2015-2016, the price to send a Conex box across the Pacific Ocean (half the world) dropped from over $1000 to only $300, a 70% reduction.
  5. This phenomenon also occurs in construction, esp. bulk work like earthmoving. Simple cut and fill operations can be less than $1 per cubic yard, according to *R.S.Means Construction Cost Data* handbook, which is orders of magnitude less than the $675 per cubic yard cited in the Plan.
  6. It costs the same money to package waste, load, and unload it, regardless how far it goes. Variable costs like mileage and fuel are only a minor component of the total, amounting to pennies per cubic yard per mile, according to *R.S.Means Construction Cost Data* handbook.
  7. Therefore, EQAB's assessment is that it is reasonable to expect continuing volume discounts from the 3 offsite western facilities in exchange for the steady predictable work.

  EQAB examined Figure 10 on page 15 of DOE's Plan. DOE had omitted the origin of their original figure, so we adapted the figure for EQAB's use by extending the chart all the way to the left (dotted gray lines) and overlaying experience curves (blue). Using DOE's own data and applying the learning curves, you can see that offsite disposal would likely be cheaper, immediately and in the future, than onsite disposal. This is without factoring in the future value of an unspoiled CBCV to the City. EQAB encourages City Council to submit our concerns to DOE-EM and appreciates the Council's time and attention to this matter.



Response: In response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the recent evaluation of the offsite disposal costs.

Part 3 (from November 7, 2018 public meeting): I'm Darcy Holcomb, and I'm here representing EQAB, the Environmental Quality Advisory Board, with the city of Oak Ridge. And while we thank DOE for their plan that they've provided for us, we feel like that it has a number of serious flaws. We also think that CERCLA is designed more for cleaning up contaminated property, and we feel like that your preferred choice is to take a clean site, look at the whole reservation, and you're just kind of moving the waste around. So you will actually be contaminating a portion of that site that we feel like has value. It's a clean site, the Central Bear Creek Valley, and that it also – 70 green acres is not remediation. We feel like that's the exact opposite.

We also feel that the recent well samplings indicate that the groundwater table does not meet TDEC and EPA requirements, as noted by EPA on August 16. And DOE says this will create jobs, but we don't feel like that this would – okay. We feel that this would create jobs no matter where that waste is disposed of, whether it's here or offsite, and we don't believe that trashing Tennessee's future, it's not a viable jobs program for us.

We also don't agree with the onsite disposal, it is safer, because we believe that the onsite disposal is predicated on – well, we're saying that transportation of every type has gotten safer over time and, overall, U.S. motor vehicle deaths dropped by half, fatalities dropped by a quarter. And so we don't think that – and DOE is known for having a good transportation record. So they reported zero incidents in transit, sending extremely hazardous waste 1300 miles away to the WIPP facility in Carlsbad, New Mexico. Compared to the toxic hazards to what residents from the ongoing leaching of the mercury into our underground aquifers in rainy East Tennessee, offsite disposal at a dry, unpopulated site is safer.

We also looked at the graph. I guess it's a cost proposal graph. It was on, like, page 15, maybe. We're not sure where the original figures came from, but we believe that there are a lot of assumptions in doing an economic analysis that weren't looked at, like a learning curve. Most any process gets significantly cheaper

per unit as people get more productive, and basically you say that the offsite disposal is a flat cost over time. Bulk transportation tends to get more mechanized and automated; economy of scale, every process gets cheaper per unit. So we think there's probably at least seven assumptions that weren't taken into account when you looked at the cost of offsite disposal.

We also looked at the fact that DOE has stated at the outset in the plan, and in other venues, that they will seek waivers for at least three significant elements – reducing required height of water table, restricting maximum permissible uses of surface water and groundwater, an exception with respect to the handling of mercury. This is like saying we will sell bladeless knives without handles. If the site is perfect, why are any waivers at all needed? And under these conditions, we think RCRA is a more appropriate process. If a private sector entity entered a deal with the reservations like this in mind, they would be accused of negotiating in bad faith.

So we just have several issues. We also know that, like you said, there's issues with TDEC and EPA that also need to be resolved. So I'm not even going into that. But we feel like that there are a lot of issues that still need to be addressed. Thank you.

Response: DOE thanks you for your participation in the public comment process.

Comment 162: Comments from Doug Colclasure

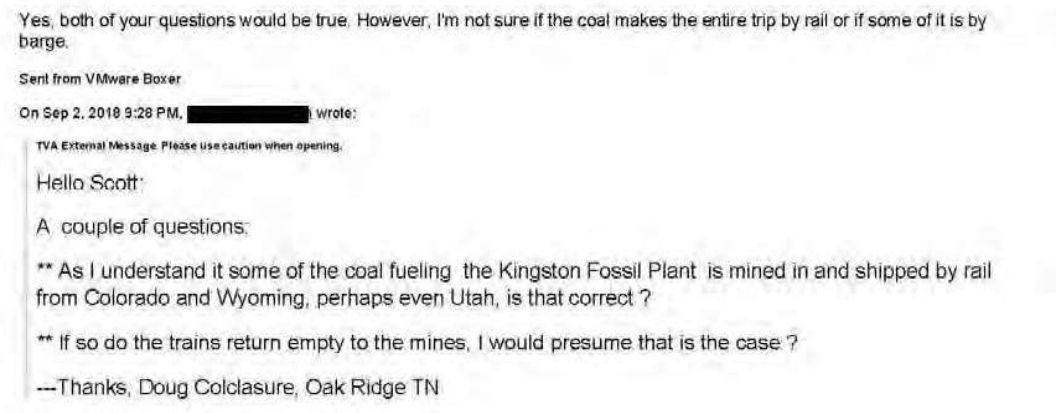
Part 1: There are a dozen or so bulk high-volume rail box cars with removable tops parked on the rail spur in the old "S-50 - Power House" area of East Tennessee Technology Park. See attached pictures [below]. The ENVX acronym-number on the side of the car is a railroad car numbering standard. Looking at the national RR data base, this number/ownership is EnergySolutions LLC.

EnergySolutions also owns the short line railroad at ETTP and also manages the hazardous materials disposal facility at Clive Utah http://www.energysolutions.com/clive-disposal-facility/.

There are a projections that off site disposal of Y-12 & ORNL hazardous demolition debris will be more expensive than a new on site facility such as the proposed EMDF.

As a way to more accurately assess the off site disposal costs it might be possible to work with EnergySolutions to design and conduct a one time experimental off site (Clive, Utah) disposal. Consider filling 10 of these rail cars with ETTP demolition debris for example, debris otherwise headed to EMWMF. And do documentation requirements, followed by shipping and disposing at the licensed disposal site in Utah. This would provide a cost per ton figure based on actual parameters.

It might also be possible to reduce shipping (rail road) costs by working with TVA to hitch a ride on one of the empty TVA coal trains going west from Kingston Fossil plant. See below.



Yes, both of your questions would be true. However, I'm not sure if the coal makes the entire trip by rail or if some of it is by barge.

Sent from VMware Boxer

On Sep 2, 2018 9:28 PM, [redacted] wrote:

TVA External Message. Please use caution when opening.

Hello Scott:

A couple of questions:

** As I understand it some of the coal fueling the Kingston Fossil Plant is mined in and shipped by rail from Colorado and Wyoming, perhaps even Utah, is that correct ?

** If so do the trains return empty to the mines, I would presume that is the case ?

---Thanks, Doug Colclasure, Oak Ridge TN

Part 2: I appreciate the hard work of The DOE, the Tennessee Department of Environment and Conservation (TDEC), and U.S. Environmental Protection Agency on planning for cleanup and disposition of the ORR hazardous waste. And by extension appreciation of the commitment of Congress and our legislative representatives on supporting the federal budget funding priorities for this cleanup. The Manhattan Project and subsequent Cold War era programs were a national priority and dealing with the legacy is as well, a national responsibility.

I have attended 6 public information reviews of the proposed EMDF and Bear Creek siting options over the past three months and the number of unaddressed concerns and unknowns expressed, creates considerable uncertainty for the projected cost, the environmental safety and public safety of the "on site" option.

The option for a new landfill on the ORR should be kept to an absolute minimum due in part to all the challenges and unknowns this region's rainfall can and will have on the ultimate goal of safe disposal of the hazardous waste. See following:

- The Central Bear Creek Valley Site should not be an option; The objective is to clean the ORR landscapes of legacy waste, not the opposite of creating another hazardous materials landfill. Especially one that will require stewardship (largely due to the wet environment) and maintenance for decades into the future. This proposed site is a hardwood forest, largely undisturbed for the past 75 years. Old forests have great value.

Response: Based on strong state preferences related to site hydrology, the Federal Facility Agreement (FFA) parties have agreed to the Central Bear Creek Valley site for the waste disposal facility. The U.S. Department of Energy (DOE) has indicated in the Proposed Plan that the land use around and including the Central Bear Creek Valley site would have to be changed to industrial use from that designated in the Bear Creek Valley Record of Decision (ROD) (consistent with the recommendation of the End Use Working Group). This ROD changes the land use designation for Central Bear Creek Valley as part of this remedy selection. The land use recommendations from the End Use Working Group and eventually documented in the Bear Creek Valley ROD were identified solely to set remediation levels across the valley. There was never any expectation that the land in Bear Creek Valley would be released by DOE for use by others. The land was always intended to be a buffer between DOE activities and the public and to provide future opportunities for DOE use. Although forested land will be used for disposal, upon closure much of that land can be returned to nature, with natural local grasses grown on the cover of the facility and land not used for disposal can be returned to forested land.

- Current annual rainfall of five to six feet and a changing climate with a warming atmosphere is forecast to result in more frequent and heavier rainfall events.

  Response: East Tennessee has annual rainfall varying from 38-77 in. per year as measured at the Y-12 National Security Complex (Y-12) over the last 30 years with an average of 54 in. per year. According to the original Feasibility Study conducted in Bear Creek Valley, approximately 50 percent of the precipitation exits through evapotranspiration (evaporation or use by vegetation) with the highest rate when the vegetation is growing. Of the precipitation remaining after evapotranspiration, 80 percent of the flow exits the valley through surface water flow. Very little of the rain enters the groundwater. There are multiple engineering features that can be used to control water flow. These features such as interim covers, diversions trenches, and sedimentation basins have been used successfully to divert rainwater during operations at the existing disposal facilities on the Oak Ridge National Priorities List (NPL) Site as well as at other disposal facility locations. Rainwater that contacts the waste will be treated prior to discharge to ensure it is protective of recreational use (human health), specifically fish ingestion. When the facility is closed, a final cover will be installed that will prevent rainwater from entering the waste.

- The porous and complicated geology and hydrology of this unique Ridge & Valley province creates uncertainty and unknowns in the adequacy of a design for this proposed option.

  Response: One of the criteria for site selection is the avoidance of karst features. The Remedial Investigation/Feasibility Study (RI/FS) and Proposed Plan both clearly state that there are no karst features in the geology underlying any of the waste footprints being evaluated for the Environmental Management Disposal Facility (EMDF), based on historical characterization of Bear Creek Valley. To further validate this understanding, DOE conducted additional geologic investigations at the proposed Central Bear Creek Valley site. The resultant validation information is presented in the Phase I Site Characterization Technical Memoranda provided in the Administrative Record.

- Damaging impacts to Bear Creek water quality related to EMWMF and supporting operations, have occurred and continue. And another similar landfill will likely cause more. Attached are pictures [see below] of the sedimentation loading of Bear Creek following heavy rainfall runoff events -- July 2009 & July 2018. Numerous pictures in the intervening nine years reveal much the same. Another disposal facility will only add to the impairment of Bear Creek and down stream water quality.

- Bear Creek sedimentation also comes from the Haul Road. About six miles of the road is within the Bear Creek watershed and at 35' wide it represents 26 acres with no silt controls. Add to that, constant loosening of the surface from motor grader maintenance and the result is a ready surface of loose and finely pulverized material subject to erosion. See attached picture [see below].

- Contact water (rainfall -- 5' to 6' per year) removed from the landfill cells is also a potential impact to the Bear Creek water quality. This may also explain why the "fish warning" sign was placed at two locations along Bear Creek in late 2016. See attached picture [see below].

Response: Please note that the mercury warning signs were not placed along Bear Creek because of ongoing waste disposal activities in the valley. Current mercury levels in Bear Creek are on the order of those in reference streams throughout the state. Even so, the fish in the creek exhibit elevated levels of mercury. DOE will control levels of mercury in landfill wastewater through treatment and per applicable or relevant and appropriate requirements and agreements reached by the FFA parties, prior to discharge to Bear Creek.

- The off site option may not be overly costly factoring in the considerable experience already gained as is evident from the shipping rail cars staged at Heritage Center- ETTP- see attached pictures [see below].

Response: In response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the recent evaluation of the offsite disposal costs.

- Redirecting the efforts & work force away from a proposed new landfill to more focused demolition materials screening, characterization, and volume reduction could significantly reduce the off site shipment volume and more efficiently utilize the remaining capacity of EMWMF.

Response: The RI/FS had an analysis of volume reduction to support offsite disposal. Even with the reduction in waste volumes, the offsite disposal alternative was significantly more expensive than onsite disposal.

I appreciate the opportunity to provide input regarding the proposed siting of a Hazardous Waste Landfill (EMDF_Environmental Management Disposal Facility) along upper Bear Creek valley on the Oak Ridge Reservation. Hopefully this input will be helpful in reaching a determination.

Observed Weather | Climate Locations | Climate Prediction | Climate Resources | Local Data/Records | Astronomical | NOWData

NOWData - NOAA Online Weather Data Enlarge results Print

Monthly Total Precipitation for Oak Ridge Area, TN (ThreadEx)

Click column heading to sort ascending, click again to sort descending.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1973	4.21	3.42	11.43	5.66	10.43	6.94	5.54	2.25	3.41	3.36	10.78	8.90	76.33
2011	3.99	5.70	6.65	9.13	2.14	7.30	4.80	0.91	10.14	4.59	10.89	5.02	71.26
1967	3.78	3.77	6.11	2.62	4.77	6.40	19.27	2.22	3.27	3.61	5.01	7.94	68.77
1957	10.08	8.60	2.13	4.55	2.45	4.80	2.72	1.82	9.10	4.16	10.07	7.40	67.88
2004	3.18	5.71	6.19	3.33	3.90	7.75	4.94	2.91	7.61	5.51	11.15	5.36	67.54
2013	10.51	2.32	5.72	6.37	5.33	7.92	8.04	4.61	3.38	0.72	4.43	8.04	67.39
1979	7.60	4.30	5.01	5.25	9.32	3.73	12.92	5.49	3.74	1.93	5.77	2.24	67.30
1956	4.57	10.47	6.44	9.71	4.44	2.28	7.90	2.08	2.91	3.80	2.23	10.31	67.14
2003	2.17	12.78	2.85	8.03	10.01	6.05	5.29	3.86	4.68	1.58	5.89	3.72	66.91
1996	7.67	3.60	5.53	3.95	5.08	6.35	12.29	3.35	3.70	1.55	8.18	5.32	66.57

This data is on our website and can be accessed here.

Column 1. Select ***"Oak Ridge Area"***
Column 2. Select ***"Monthly Summarized data"***
Column 3. Year range ***POR - 2018*** (POR) stands for Period of Record. Variable will be ***Precipitation***, and Summary will be ***Sum***
Column 4. Select ***"Go"***

Once you get your results you can sort the columns of data. I clicked on the ***Annual*** column to sort the amounts from high to low.

TENNESSEE CLEAN WATER NETWORK

P. O. Box 1521 Knoxville, Tennessee 37901
office: 865.522.7007 fax: 865.525.4988 *website:* www.tcwn.org

Contact: Renée Victoria Hoyos – 865.522.7007 x100 or 865.607.6618 (cell)

Op-Ed column
Renee Victoria Hoyos
Tenenssee Clean Water Network – Executive Director
April 30, 2014

You now have a great opportunity to stand up for clean water in Tennessee. Until Monday, July 21, 2014, the Environmental Protection Agency is taking public comment on a new rule that will clarify what are the waters of the United States under the Clean Water Act. I urge you to voice your support for this new rule that will protect clean water in the Volunteer state.

It is a story most everyone learned in elementary school science classes. The rain that falls on the slopes of the Smoky Mountains flows into larger and larger streams until it empties out in the Tennessee River. The Tennessee River flows into the Mississippi River which empties into the Gulf. The interconnectivity of our water resources makes it essential to protect each leg of clean water's movement…from the smallest creek and wetland to the largest rivers and lakes in the state.

Recent U.S. Supreme Court decisions that interpreted the Clean Water Act questioned whether the health of upstream tributaries and wetlands impacted downstream water quality. The important physical, chemical and biological connections between upstream and downstream waterways were called into question by the Justices.

This proposed EPA rule draws on a large body of scientific evidence demonstrating a significant connection between the health of upstream waters and wetlands and larger navigable or interstate waters. This rule will provide protection to about two million miles of streams and rivers and about 20 million acres of wetlands in the United States. As these rivers and streams are the source of drinking water for millions of Americans and provide protection to the multi-billion dollar water recreational industry dependent on clean water, it is important to get this EPA rule finalized to get the needed protection in place.

It is important to note that the proposed rule preserves the existing Clean Water Act exemptions for farming, forestry, mining and certain other land use activities. When finalized, this water of the United State rule will bolster the Clean Water Act's legal and scientific

foundation, provide greater long-term certainty for landowners and protect the streams, wetlands, and other waters that feed our nation's rivers, lakes and bays.

The Tennessee Clean Water Network strongly supports this proposed EPA rule. TCWN's work to help citizens in Knox, Hamilton, Shelby and many other counties force improvements to water quality in their neighborhoods has resulted in healthier and stronger communities. The Clean Water Act is an important tool used by TCWN to protect water quality across the Tennessee and the proposed EPA will be a great benefit to many Tennesseans.

According to the EPA, the proposed rule would provide an estimated $388 million to $514 million annually of benefits to the public, including reducing flooding, filtering pollution, providing wildlife habitat, supporting hunting and fishing and recharging groundwater. EPA's cost/benefit analysis shows the public benefits significantly outweigh the costs of about $162 million to $279 million per year for mitigating impacts to streams and wetlands and taking steps to reduce pollution to waterways.

To make sure that farmers, ranchers and foresters do not suffer under this new rule, the EPA and the Army Corps worked with the United States Department of Agriculture to improve the opportunities to participate in USDA's voluntary conservation programs that help to protect water quality and improve the environment. By working together, the three federal agencies ensured that 56 specific agricultural conservation practices are not subject to the Clean Water Act.

There are several ways to send in your comment in support of this rule. First, you can visit the EPA website at www2.epa.gov/uswaters and click on the "submit your comment" link. Another way to comment is to send an email to ow-docket@epa.gov and include the rule number, EPA-HQ-OW-2011-0880, in the subject line of the email. The Federal eRulemaking Portal is also taking comments on the proposed rule at www.regulations.gov and type EPA-HQ-OW-2011-0880-0001 in the search field. And if the US Post Office is still the best option for you, here is the address:

Water Docket
EPA
Mail Code 2822T
1200 Pennsylvania Ave. NW
Washington, DC 20460
Attention: Docket ID No. EPA-HQ-OW-2011-0880

Please take just a few minutes to send in your comments in support of this important rule. It is important that we protect our valuable water resources for many generations to come.

About TCWN:
Tennessee Clean Water Network is a nonprofit organization created to advocate for strong policies and programs that result in more effective protection and restoration of Tennessee's waters and to educate organizations, decision-makers and the public about important water resource issues.

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TCWN empowers Tennesseans to exercise their right to clean water and healthy communities by fostering civic engagement, building partnerships and advancing and when necessary, enforcing water policy for a sustainable future.

Response: Please note that the data presented above is just for the wettest years. East Tennessee has annual rainfall varying from 38-77 in. per year as measured at Y-12 over the last 30 years, with an average of 54 in. per year. According to the original Feasibility Study conducted in Bear Creek Valley, approximately 50 percent of the precipitation exits through evapotranspiration (evaporation or use by vegetation) with the highest rate when the vegetation is growing. Of the precipitation remaining after evapotranspiration, 80 percent of the flow exits the valley through surface water flow. Very little of the rain enters the groundwater. There are multiple engineering features that can be used to control water flow. These features such as interim covers, diversions trenches, and sedimentation basins have been used successfully to divert rainwater during

operations at the existing disposal facilities on the Oak Ridge NPL Site as well as at other disposal facility locations. Rainwater that contacts the waste will be treated prior to discharge to ensure it is protective of recreational use (human health), specifically fish ingestion. When the facility is closed, a final cover will be installed that will prevent rainwater from entering the waste.

The response of the closed facility to excessive rainfall has been evaluated by assuming three times more infiltration passes through the facility as is normally encountered on an annual basis due to precipitation (e.g., assumption corresponds to three times more rainfall on an annual basis). This scenario was analyzed and remains protective as demonstrated by results obtained in the Performance Assessment (UCOR 2020).

Part 3: The objective of the Y-12 & ORNL cleanup of the Manhattan Project and Cold War era legacy hazardous waste is at a minimum, to leave the environment cleaner and safer than it is now at an affordable cost. This legacy waste is not a isolated Oak Ridge or Anderson County or Roane County problem but rather a national problem and a national challenge and solution. The facilities and their operations over the decades were a national mission and addressing the legacy waste is likewise a national priority. Please do not be constrained by the point some (locally or nationally) make that the waste was created in Oak Ridge and must remain in Oak Ridge.

The last thing anyone wants is to find out in decades to come or even 10 years out, that the waste destined for EMDF has more residual contaminants- mercury than anticipated and the monitoring reveals that mercury is escaping into Bear Creek. Rainfall on Mt Mitchell, barely 100 miles east of Oak Ridge in 2018 totaled 118", almost 10 feet. In fact in the past 6 weeks Oak Ridge has received 10" of rain. Managing ground water for decades to come and especially contact water during the burial process, etc. is a big deal and by some assessments leaves a big unknown.

Since plans are for the most hazardous waste to be transferred to licensed more arid disposal locations, perhaps the threshold for "most hazardous" should be further lowered, thus further lowering the volume now destined for EMDF. And avoid EMDF entirely by placing the even lesser amount of remaining lower level hazardous material/debris, in small engineered cells within the Y-12 fence upstream of the Out Fall 200/the planned mercury treatment facility, and thus within a brownfield and in the existing EFPC watershed not another watershed. Much the same for ORNL. As it was with ETTP cleanup, to leave a reindustrialization site, not so with Y-12 and ORNL. DOE operations at these sites is to continue for the foreseeable future, where infrastructure is in place for monitoring and stewardship.

Response: The RI/FS did evaluate a single smaller disposal facility with more waste being sent offsite. The Hybrid Alternative is a combination of onsite and offsite disposal, thereby using a smaller onsite landfill. However, due to the large volumes of waste that were to be disposed offsite under this alternative, the major reasons for not selecting the total offsite disposal alternative were still an issue. The transportation risks are considered unacceptably high and the costs for disposal would limit the amount of remediation work that could be accomplished. Additionally, once the smaller landfill was full, the remediation effort could be stopped if there were any issues with either transporting waste across the country or with any of the offsite disposal facilities. From the alternatives within Bear Creek Valley considered for locating the EMDF, DOE considered brown field sites first, but ultimately the Central Bear Creek Valley site provided the most beneficial attributes in total over those other sites.

Comment 163: Comments from Dale Rector

Part 1: Post Link to RI/FS in Public Outreach materials. Post Performance Assessment and WAC with Public Outreach Materials.

Part 2 (from November 7, 2018 public meeting): Yeah. My name is Dale Rector, and these guys probably dread me standing up, but here I am. I worked with the State of Tennessee for 30 years, and most of it trying to oversight the Oak Ridge Reservation cleanup. And before that, as a biologist, seems like forever. But anyways, one of the thing that they presented was a regulatory process that seemed to just have a proposed plan on it. Some of you have already noted that it seems to be an awkward way to build a landfill under CERCLA, which is ordinarily a way to basically clean up discrete areas that are contaminated without the red tape of having to go through permitting.

And so – but what the typical CERCLA process has, leading up to a proposed plan, is remedial investigation, and a feasibility study, which there are five drafts of that have not been, as far as I know, resolved. The DOE is supposed to do a composite analysis that not only considers the performance of this particular facility, but in combination with other waste areas around it. We should have had access to all this information here at least for the first time, but probably before the meeting. And a performance assessment, which evaluates how well the engineering design and the intrinsic safety of the site, which there's very little here to give you the hydrogeology conditions, in combination perform under a waste acceptance criteria, which we also don't have. Okay. We don't have that to discuss.

EPA, by this time, should have a risk assessment for us to look at, which we don't have that. And under NEPA there should be some equivalency that considers all the things that people have talked about and the community concerns. And so that's some things that we should have had in hand before we came here tonight. The proposed plan is something that you have to discuss and evaluate and consider after you've had a look at all these other things. So that's all I've – that's all I've got to say. Thanks.

> **Response: While not required under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the U.S. Department of Energy (DOE) is required to develop two documents under DOE Order 435.1 that complement those developed during the CERCLA process. The first document, a Performance Assessment, evaluates the potential for releases of radioactivity from a low-level (radioactive) waste (LLW) disposal facility and resultant impacts on future members of the public and the environment. The second document, a Composite Analysis, evaluates the impact of a new LLW disposal facility in aggregate with other sources of radioactivity in the area on members of the public and the environment. These documents were reviewed under DOE's independent regulatory authority, and approval to proceed with construction was granted before signature of the Record of Decision (ROD).**

Part 3: Environmental Management Disposal Facility (EMDF) water resource protection requirements should not be waived.

DOE has not provided EMDF Waste Acceptance Criteria (WAC). This is the equivalent of not providing sampling data to generate a risk assessment for an area of contamination that is a typical superfund site. These data make up the Remedial Investigation Feasibility Study (RI/FS) that is the basis for the Proposed Plan. In our case we have no WAC, no data, so no Risk Assessment, and so no RI, so on. This more than any other one thing is the problem. The RI/FS was first drafted and reviewed in 2012. There are five drafts, inferring that DOE is not seriously concerned with compliance. These ignored technical and regulatory details may ultimately cause the disposal facility to fail.

Furthermore, I understand from State remarks at the Anderson County Commissioners meeting (1/7/2019) that DOE is not using an EPA type Risk Assessment for radionuclides but instead using the internal DOE Orders to complete evaluation for waste acceptance. Doing that isolates information from public review. The public is being asked to comment on the project without the most important information. This approach cannot meet the community acceptance criteria under CERCLA. Indeed the equivalency is to do a NEPA Environmental Impact Statement. That is the detail that should be completed under CERCLA for a project this size anyway. The community, from what I can tell, is upset about this disposal proposition. The community is reasonably informed enough to see omission of critical detail.

Even the best available sites on the Oak Ridge Reservation cannot be easily modeled to estimate groundwater elevations let alone contaminant fate and transport. The problem is abundant rain and complex geology. Furthermore DOE waste has additional uranium and heavier radioactive elements, (transuranics) that emit more radioactivities over time while the disposal facility becomes degraded. NRC and agreement state regulations require that wastes be short lived enough so that when engineered components fail wastes are not harmful anymore. The DOE orders recognize this too and that is the reason that ORNL no longer shallow land disposes its operational low level rad waste in Oak Ridge. This place is not intrinsically safe enough to meet disposal requirements for any but innocuous wastes. Unfortunately, the inclusion of this disposal in CERCLA provides DOE an opportunity to waive regulations. Ones that were written to protect people for millennia, not just for a time of immediate economic convenience.

What about the EMWMF, the facility already in use? The WAC for it was biased to begin with. It did not even include details enough to protect DOE workers let alone the environment (EPA-350-R-07-002, p26). Furthermore it was not corrected for a drain that was installed to reduce groundwater elevations directly under waste. This drain exits the disposal facility like a spring directly to the headwaters of Bear Creek. Water, regional geologic processes, and component degradation will probably spread contamination from this buried waste within a 1,000 years period of evaluation. Sadly, without remediation, the only real attenuation of the releases will be from waste dispersion. In the meantime, over such a long period of time inadvertent exposure to intruders is likely. Because DOE disposed uranium and transuranic wastes, a typical time progression to evaluate it is a geometric series such as three years, 10 years, 30 years, 100 years, 300 years, 1,000 years, 3,000 years, 10,000 years. This proposal should really be about the design of geologic markers for EMWMF wastes. These are the types of things the public should know about.

Response: Remedial Investigations/Feasibility Studies for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for the Environmental Management Disposal Facility (EMDF). The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as applicable or relevant and appropriate requirements (ARARs) (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury.

These WAC limits will be implemented through the post-ROD, Federal Facility Agreement parties-approved primary document, the WAC Compliance Plan.

There is not an environmental reason to move mercury waste in with rad waste creating mixed waste to impact another watershed. It does not degrade with time and will eventually further pollute fish and wildlife. Aggressive thermal desorption with subsequent treatment of residuals in waste to sulfide might produce a stable residual material for storage. The elemental mercury from desorption should be put in DOT compliant containers for storage. The mercury waste could be shipped off site to mercury waste processers for compliant treatment, disposal, or storage under regulatory permits.

Response: The regulatory compliant design, operation, and closure of the onsite disposal facility, coupled with DOE's compliance with all regulatory requirements concerning mercury, will help to ensure that the new disposal facility is protective of human health and the environment over the long term. For West End Mercury Area remediation projects with EMDF-bound waste streams, DOE will take all practical measures to remove mercury before waste generation and send that mercury offsite to treatment/storage/disposal facilities. Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in the EMDF.

Please realize that the Clean Water Act drove the enactment of CERCLA in the first place. Since water driven fate and transport is the overwhelming factor here, just about all variables are related to the Clean Water Act. The most important of these is the concentration of waste to be disposed. Withholding those concentrations from review eliminates public evaluation of compliance with the Clean Water Act. Water resource protection requirements should not be waived.

Finally, if DOE ever does provide enough risk related data to support EMDF, the approval should include remediation of the pollution source areas that already exist in Bear Creek Valley. That way the overall environmental degradation of the watershed could be reduced. Water resource protection requirements should not be waived.

Response: EMDF will be a permanent CERCLA waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this ROD. The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 164: Comment from Brian Paddock

Part 1 (from November 7, 2018, public meeting): My name is Brian Paddock. I'm an attorney. I practice environmental law in Tennessee. I'm former legal chair of the Sierra Club's Chapter of Tennessee. I went to the TDEC open house where they had a poster show and their show was much different than the one you saw in the hallway here, because basically it showed all of the unresolved problems of this plan.

This plan has been through seven iterations among the agencies, and you have one in which two of the agencies that are involved with public health and environmental protection do not agree to it and have identified a number of very serious problems. The site has not been properly characterized. Apparently, they think they can build a dam – they can build a dump right over the top of flowing underground water. TDEC would never allow that for the simplest garbage dump in Tennessee. They have not got waste acceptance criteria. They say, oh, we're not going to take this, we will take that, so forth and so on, but those waste acceptance criteria should have been built into this plan in detail before this hearing was ever held so you would know what you were really getting into and what was really going into that.

And no final approval can ever be given under CERCLA to a situation where that approval acts as an approval of waste acceptance that's done after public comments are over, after the problems begin to arise. And the representation that the current dump was operated safely is simply untrue. Go back and read the newspapers. It got flooded, a cell wedge broke, radioactively affected water got offsite, a contractor was fined. They just – you know, they don't seem to have learned any of the lessons of how you try to do this as safely as possible from the first operation.

So I drove an hour and a half to have three minutes, but I think that we're kind of wasting our time here because they're not really telling you what they're going to do, how they're going to do it. And I can tell you, from talking to the solid waste people in Tennessee, which I do frequently, that the plans they have for both this location and the engineering, would never be approved for an ordinary garbage dump, let alone for a hazardous waste dump. Thank you.

Additional Comment from Brian Paddock: Thank you. Brian Paddock. On your website, you have a description of CERCLA and how it's supposed to work, and it has been noted, and I, as an attorney, I agree that it is not suitable for actually managing the disposal of the hazardous waste that CERCLA and the Superfund law intend to deal with. And I think one should not overlook these requirements where the State and you are to pick out which of the – which of the State's regulations, which of other federal regulations are to be applied here; for example, the standards for a hazardous waste dump site and how it's to be monitored and how it's to be supervised.

The other thing the CERCLA sheet says is that community involvement is critical to CERCLA, and it has this in a little box. And it says, "DOE has established a 30-day comment period during which time local residents and interested parties can express their views and concerns on all aspects of the plan." We don't have all aspects of the plan. "DOE has scheduled a public meeting to discuss cleanup alternatives and to address questions the public may have." And it says, at the end, "Upon timely request, DOE will extend the public comment period by an additional 30 days."

Now, let's look back at how we got to this, which is that originally the comment period was going to be from the beginning of early September to December 10th. Then you were going to have a hearing on October 18th, which you canceled on very short notice. Luckily, I had not started traveling when I got that word. And now you have this at the very end of a period, and you've made your best case here, but you're certainly not being fair to the public when you say, well, we used up most of that time for public comment, without giving you any particular information except the whole plan if you wanted to read it, and then say from now on get this to us by December 10th. You're not going to do anything over Christmas with what

we say on December 10th, if we file it at the deadline, and you're not going to sit down with the TDEC people, and you're not going to get with the EPA people and resolve all these uncertainties and unknowns. So I suggest you go ahead and extend the comment period. And I suggest, further, that for those of us that are concerned enough to have commented here tonight, you email us each time you have made progress and have specifics about what you are doing about things like the waste acceptance criteria and other issues that have been raised here. Thank you.

Part 2: As was explained at the public hearing which I attended, the Department of Energy now plans an additional landfill similar in size and scope to the current on-site facility, but regulatory documents that would authorize its construction and operation have yet to be approved by either the state or federal regulatory agencies.

The DOE request for public comment is premature. The public, in addition to the regulatory agencies, must have a chance to comment after all the information that DOE is promising (and should have already delivered) about site suitability, waste acceptance, and waivers of regulations is actually available (if it ever is).

DOE's "plan" for an expanded landfill dump for mixed radioactive waste has been poorly conceived and inadequately researched and prepared despite the several iterations of the plan.

Endless hours of careful research and analysis by the Tennessee Department of Environment and Conservation (TDEC) expert staff with a wide variety of expertise in geology, biology, landfill siting and engineering and the special problems of landfill disposal or radioactive and dangerous chemicals in karst with resultant problems or pollution transport via groundwater, have been offered to your agency in writing and in many face to face meetings.

Your agency has resolutely avoided engaging with the omissions and inadequacies of your plan. TDEC's ongoing criticisms of your plan set out in writing and in a TDEC public meeting with explanatory exhibits demonstrate that you are repeating avoidable errors made in the siting and operation of the existing radwaste landfill.

As an lawyer, I concede that CERLA is an inadequate framework in some respects, since it does not directly embody standards (prescriptive or functional) for the disposition of hazardous and toxic wastes in ways that assure neutralization or isolation so that threats to human health and safety are avoided. However, your disregard of the existing State and Federal regulatory standards for hazardous waste isolation found in the Clean Water Act (CWA) and Resource Conservation and Resource Recovery Act (RCRA), for example, is inexcusable. The state regulations under the authority delegated to TDEC and our Boards for Water Quality and Solid Waste have been largely ignored by your plans.

Response: The identification of permanent solutions for the onsite and offsite disposition of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste has always been a fundamental part of the CERCLA process. CERCLA actions are not complete without all waste that has been generated having a disposal decision. The CERCLA process has been used to support decisions for many disposal facilities across the United States, some on previously disturbed sites and others on "greenfield" sites, including many disposal sites at CERCLA facilities (e.g., Oak Ridge, Hanford, and the Fernald and Portsmouth sites in Ohio). In many of these cases, a program-level evaluation of disposal needs has been conducted under CERCLA and a final decision on disposal to apply to CERCLA actions made. Agreements reached under the CERCLA framework are enforced by the State and U.S. Environmental Protection Agency.

Please note that no Clean Water Act or Resource Conservation and Recovery Act of 1976 regulations are being waived. They will be met in their entirety. Two specific Toxic Substances Control Act of 1976 regulations and one specific Tennessee Department of Radiological Health regulation are being waived, as is done for many disposal facilities.

Lastly, with submittal of the D1 Record of Decision (ROD), the Federal Facility Agreement (FFA) parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

As an attorney for communities that are faced with proposals for Class I and II landfills, I am familiar with our solid waste permit processing, siting rules, and engineering requirements. I have attended many TDEC public hearings on proposed permits for landfills. The proposed site is unsuitable as it stands. I understand the desirability of a site near the existing landfill and the difficulty of avoiding the hazards of the karst geology of Bear Valley. It would be much wiser to more fully and carefully characterize the site as well as areas nearby and locate a smaller fotprint site at which all hazards and deficiencies have been identified.

Response: There are hundreds of wells in Bear Creek Valley with decades of data. This extensive data set was used to support conclusions in the Remedial Investigation/Feasibility Study (RI/FS). During preparation of the Proposed Plan, the U.S. Department of Energy (DOE) began more site-specific characterization efforts at the request of the other Federal Facility Agreement parties. The additional site characterization for Central Bear Creek Valley evaluating geologic and hydrogeologic conditions was conducted in two phases. The first phase, with the referenced eight well pairs (16 wells) monitored for over a year as well as monitoring results from other existing wells in Bear Creek Valley to supplement the general understanding of the site, was used to support identification of a preferred location in the Proposed Plan and the selection of the location in this ROD. Analysis of the first phase data confirmed DOE's understanding of the site. Since then, data from 16 more wells, 32 borings, and 17 test pits were obtained as part of a second phase of characterization completed to support the design. The design, as it progresses, will be modified as needed to consider the new data. Technical Memoranda presenting the results of the initial evaluation can be found in the Administrative Record.

Please do not expect TDEC ever to agree to a site which lies, even partially, below the water table (with the wide variations in elevation seasonally in Bear Valley). Likewise, a site footprint which lies above groundwater conduits must be rejected.

The facility footprint should not cover the wetlands area on the east of the currently proposed site, and should encroach as little as possible toward the Maynardville contact.

Response: The footprint will be located to minimize impact to wetlands. Mitigation through the creation of new wetlands will be required for any disturbed wetlands. There will be a significant setback from the Maynardville contact. Disposal facilities cannot be located over karst geology such as that found in the Maynardville Limestone.

I note that the TDEC text expressing non-acceptance of the plan deals mostly with siting issues and applicable, relevant and appropriate regulations (ARARs). TDEC does not adequately question the suspect cost analysis, nor do they question DOE's discussion of the waste inventory or capacity demand. All of these defects remain in the plan and its justification.

The large footprint is, like the desire for a quite generous Waste Acceptance Criteria (WAC), apparently driven by contractor assertions. The footprint size is not supported by any actual analysis of the anticipated volume of CERCLA waste generation that is appropriate for on-site disposal. Reduction of the footprint by

30 to 50 percent would make evaluating and delineating a more adequate site, with lower risks from the karst and groundwater challenges significantly easier.

Should political pressure result in acquiescence by TDEC or EPA, be advised that any waivers or variances which present significance risk of pollution release or transfer via groundwater will likely be challenged in federal court.

DOE has some language about Waste Acceptance Criteria as an example, referring to the Environmental Managment Waste Management Facility (EMWMF). You also mention tri-party approval of waste handling plans for waste going into the facility but, under the current system, clear and specific waste handling plans should be approved prior to detailed characterization. In other words the WAC standards and process should be detailed explicitly now and before the plan was presented for public comment.

Response: RI/FSs for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for the Environmental Management Disposal Facility (EMDF). The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as applicable or relevant and appropriate requirements (ARARs) (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

With submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

Both the EMWMF WAC, the protocol for approving waste for disposal as well as failure to adequately characterize the site, have been shown by well documented history and experience as root causes of some of the more spectacular failings of DOE on-site disposal in Oak Ridge over the last two decades. I believe any poll of those actually working on radioactive and toxic waste management would support this conclusion.

You have received several expert comments from those who have studied the EMWMF for lessons learned and have analyzed the several iterations of the plan DOE now presents. Likewise you have comments from residents and public officials asserting many legitimate concerns. I respectfully suggest that DOE promptly start gathering the site characterization information, draft WAC criteria and processes, and do the analysis necessary to reduce the landfill footprint. This and other problem solving actions should be accompanied by honest acceptance of criticism of defects in the plan and by open and honest dialog with the Oak Ridge community.

To file a Record of Decision in the face of so much adverse comment of all types and the lack of acceptance by TDEC and EPA will likely drive the CERCLA process into a dispute loop or litigation, or both, which will not solve the real problems but will delay adequate acknowledgment of the issues which must be addressed before a plan can be approved.

Response: DOE thanks you for your participation in the public comment process. Federal law requires that any remedy selected under CERCLA must comply with ARARs (or show just-cause for a waiver) and be protective of human health and the environment. The FFA parties have worked together to sign this ROD. All three parties agree that the onsite remedy selected is protective and will either comply with the ARARs or shows justification for waiving a portion of a regulation. The FFA parties believe there is sufficient information available to support this decision.

Comment 165: Comment from Mark Watson, Oak Ridge City Manager

Part 1: I am in receipt of Roane County Executive Ron Woody's request as Chairman of the Oak Ridge Reservation Communities Alliance (ORRCA) that DOE extend the comment period for the Proposed Plan for the Proposed Environmental Management Disposal Facility by 45 days.

As Oak Ridge City Manager, I concur with Chairman Woody's letter, and also formally request a 45-day extension from the current October 26, 2018 deadline on behalf of the City of Oak Ridge.

An extension is warranted and appropriate for several reasons. First, the City of Oak Ridge has not received answers to its questions and comments transmitted to the Department of Energy on July 10, 2018. Responses are needed in order for the City to make more informed comments on the proposed project. Second, City Council's October meeting schedule does not allow sufficient time for staff and Council to review documents, attend DOE's public meetings, and develop comments by the current deadline.

Finally, officials from the City of Oak Ridge, Roane County, and Anderson County will be attending the DOE's Annual Intergovernmental meeting in November. That meeting agenda calls for a special session to focus on DOE's Oak Ridge Environmental Management's Ten-Year Plan, which would certainly encompass waste management and disposal options.

Response: The U.S. Department of Energy (DOE) received and granted two separate requests to extend the original comment period – one by another 45 days and the second by an additional 30 days. Therefore, the comment period was for 120 days.

Part 2 (from November 7, 2018 public meeting): Good evening everyone. My name is Mark Watson. I'm the City Manager of Oak Ridge and not knowing, I did not know the format tonight, so I have a very long presentation, but I think I will, I'd like to take a couple of the highlights of that, and I will pass this on to the recorder as far as my comments today.

First off, we appreciate everything that you all have done. I have been talking with Mr. Adler for 5 years now on this project and as we move forward. We recognize the mission, we recognize everything that is going on within the Department of Energy, and its needs.

We have continuously tried to express the concern for the community and the community impacts as we go along. We are not at the table. This is a decision that is made by the Environmental Protection Agency, the Department of Energy, and the State of Tennessee. Most recently, I think, the Department of Energy has received comments from TDEC. We support those comments. I think they are well thought out, and all of

the initiatives that they talked about should be carefully considered in what we look at as we move ahead. We're appreciate of their interest because they do represent Tennessee, and ultimately us.

A couple of things that we have added in our process is, as we've looked at the technical challenges of the landfill, is to look at how we can remediate, and a couple of observations that we've added on to the proposed plan. We think the landfill site testing needs to be looked at for selection and provide further data collection efforts. I think there's particular concerns with the – with the shallowness of the water table and what those effects might be. And those characteristics are important. You've heard from some of the other speakers on characterization of the waste and getting that out front. We would – we would certainly concur with that. But as we look at the – at the water streams that may be in the hill, we want to look at that. I've looked at a LiDAR photograph, and it is very, you know, very informative as to where we go.

We finally go down to the aspect of the mercury waste. And mercury is a scary thing. We don't really know how it is handled. It doesn't necessarily go into a magic box and then it comes out all right. I think more information on what that process is when you have residual waste in a building, how does that – how does that affect us? Tearing down buildings affects the City of Oak Ridge. When we look at an incident that occurred on K-25 where technetium ended up in the city sewer system, and we're still hauling that waste away 4 years later. I think those kinds of things need to be looked at. What happens if we do have a release? And if it's going downstream to Poplar Creek, we face the EPA. Not the DOE, we face the EPA. And if that gets into our wastewater plant, then I have the $10,000 a day fines.

Just, and this is a serious matter, because as of today we received a filing by Tennessee River Keepers out of Alabama, and they have sued the City for stormwater overflows and sewer discharges that have occurred in the past based on public records. So we need to look at what those impacts are on the community. [Comment cut short due to time constraint; continued as follows.]

Continuation of Comment from Mark Watson: Let me just kind of finish out a couple of things. As we continue to go through this process, I want to encourage that the communications people work very closely in monitoring what's said or how it's said. We've all heard about the Oak Ridge residents glowing in the dark and those types of things. And, you know, I just did a quick internet search. Everything that we put down is in the paper these days. And when we label a low-level waste landfill and it comes out Oak Ridge nuke dump, it becomes really hard for me to attract new industry and reindustrialization of ETTP without being able to look at those and how our message is conveyed out to neighboring communities.

And I'll share a story with you, too, a short one, that we had the possibility for our neighboring cities to the south having a large brewery located in that city. And it boiled down to two cities, one in North Carolina and down south in the Alcoa/Maryville area. That prospect – the prospect discussed the situation and tried to make a final decision, and discussed that the spouse had said, "Have you looked up north? Oak Ridge is to the north. We should go to the other site." And that's 600 jobs and hundreds of millions of dollars that were lost in the East Tennessee region. So what we say here, what I have couched really becomes important for economic development. We don't have to be completely nuclear oriented with what we building in our economy, and I think that's important to keep in mind. So as we move forward in what's listed and commented on, I think we've got to be careful with that.

Finally, what would the City like to receive out of this? I am concerned about – I am concerned about the City's wastewater system. And when we disturb these buildings and if shifts and then there's an 8-inch rainfall that goes along with that, we need to be careful as to what impact may be upon the City's system. We have to be compliant with the Clean Water Act, and we've invested millions of dollars. We're looking at a $44 million water plant that's coming along with that. But I think that we would like the State of Tennessee and the EPA and DOE to give us some protections for anything that may be released in any final order or final agreement that comes along.

We presently receive compensation in the form of a PILT payment for DOE lands within here. If we create a low-level waste landfill that's going to be here permanently, let's put it on at a proper value for a landfill and add that into the community base as far as the City is concerned.

A couple more comments that are in here. I'll just give that to the lady over here. And we appreciate being here tonight and we'll have some further written comments. And if there are any questions on what we've submitted, please give us a call.

Response: Pursuant to Federal statute, DOE may receive applications from certain state and local governments for payments in lieu of taxes (PILT), and reach agreement to make payments not to exceed the value of taxes that would have been payable for such real property in the condition in which it was acquired. The Oak Ridge Reservation (ORR) was acquired in 1942 and 1943 and was predominantly assessed for tax purposes as agricultural property. DOE has current PILT intergovernmental agreements with the City of Oak Ridge as well as Roane and Anderson Counties, which have all demonstrated self-sufficiency over time; those annual agreements define the terms and conditions of PILT payments. Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) remedial action decisions cannot play a role in the determination of PILT payments.

Part 3 (written comments from November 7, 2018 public meeting, attached to city of Oak Ridge Resolution submitted December 11, 2018): We are here tonight in a public hearing format to comment on DOE's Oak Ridge Office of Environmental Management (OREM) proposed plan to construct a *second* low-level nuclear and hazardous waste landfill in Oak Ridge for the disposal of up to 2.2 million cubic yards of building debris and waste associated with DOE's remediation. As we have repeatedly heard, contractors are running out of available space at the current landfill, known as the Environmental Management Waste Management Facility (EMWMF). Huge national budgets and private sector contracts are at stake to get remediation done quicker, better and faster. Disposal pathways need to be established for the large volumes of contaminated building and demolition waste and soils that will result.

Cold War-era research and processing buildings at Y-12 and Oak Ridge National Laboratory targeted for demolition are located on the DOE's Oak Ridge Reservation, inside the Oak Ridge city limits. *We are now faced with understanding a 200-year decision being made by others for our Oak Ridge Community.*

Oak Ridge has been a strong supporter of the Federal Government's remediation efforts to reduce risk from legacy environmental hazards for many years. The legacy waste was the result of DOE programs and missions that advanced national security and cutting edge research, and Oak Ridge trusted the decision makers because most of them lived here and were part of the well-being of the City. Today, the landfill decision will be made for us by the U.S. Environmental Protection Agency, the U.S. Department of Energy, and the State of Tennessee. *Oak Ridge is not at the table to shape the destiny of our City.*

The City of Oak Ridge first learned about the need for another landfill in mid-2014, and has sought to provide perspectives to help solve this challenging problem by engaging in discussions with DOE, EPA, TDEC, private contractors, elected representatives, along with other local officials from the region who formed *the Oak Ridge Reservation Communities Alliance (ORRCA)*. ORRCA has reviewed technical information and studies prepared by DOE on the first preferred landfill site, located alongside EMWMF. We have examined EPA and TDEC comments on these documents. The Oak Ridge City Council transmitted questions and comments about potential community impacts, due to the proximity of the landfill. The City held public meetings on the results of a Community Impact Assessment it commissioned to systematically examine potential costs and benefits associated with a second landfill.

This Community Impact Assessment was in line with the requirements of the National Environmental Policy Act, which requires federal agencies to prepare a detailed *environmental and socioeconomic analysis* of their proposed projects. However, the DOE is using a Federal Superfund, modified "CERCLA" process, which by its design discounts community impact, cost, and acceptance. While the CERCLA process requires decision makers to consider "Community Acceptance" as one of the nine decision making criteria, DOE's Proposed Plan but makes no reference to the Community Acceptance criterion.

Response: The purpose of the Proposed Plan is to provide an opportunity to receive community input that is used to draft the Community Acceptance criteria that is documented in the Record of Decision (ROD). The Proposed Plan cannot have an evaluation against Community Acceptance until that input is received.

For a variety of reasons, DOE's first preferred site was deemed unsuitable, so the agency considered additional sites in Bear Creek Valley that led to selection of the new preferred site as described in the proposed plan. DOE issued "Technical Memorandum #1" this past summer, which describes the results of testing of environmental media at the 70-acre "site 7c" that is located in the Central Bear Creek Valley. The Technical Memorandum is the basis for DOE's issuance of the Proposed Plan for the site.

The new preferred site also presents significant technical challenges, with DOE and the State within the past year not being able to reach agreement on issuing a final remedial investigation/feasibility study for the proposed site.

Many of the issues raised by the State of Tennessee in the proposed plan, and which were summarized in a handout at their recent public meeting, have been similarly raised by EQAB, the public, and by the City in its reviews of the Technical Memorandum and proposed plan. As City Manager, I transmitted a number of questions and comments to the local DOE EM office in early July, but have not received responses to-date.

Among the key issues identified in the City's review of the Proposed Plan:

- Site Testing is incomplete to make a Landfill Site Selection. On Page 6 of the Proposed Plan DOE indicates that the Bear Creek Valley is the most appropriate location for construction of an on-site waste disposal facility. However, DOE also indicates that further data collection efforts will be undertaken at site 7c to further characterize the site during wet and dry seasons and that "the conceptual design of the EMDF…may need to be revised to accommodate the new information on the site hydrology and to satisfy the threshold CERCLA criteria." *A site should not be characterized as most appropriate if pertinent data has not been collected and a determination has already been made that a design change is needed.*

  Response: There are hundreds of wells in Bear Creek Valley with decades of data. This extensive data set was used to support conclusions in the Remedial Investigation/Feasibility Study (RI/FS). During preparation of the Proposed Plan, DOE began more site-specific characterization efforts at the request of the other Federal Facility Agreement (FFA) parties. The additional site characterization for Central Bear Creek Valley evaluating geologic and hydrogeologic conditions was conducted in two phases. The first phase, with the referenced eight well pairs (16 wells) monitored for over a year as well as monitoring results from other existing wells in Bear Creek Valley to supplement the general understanding of the site, was used to support identification of a preferred location in the Proposed Plan and the selection of the location in this ROD. Analysis of the first phase data confirmed DOE's understanding of the site. Since then, data from 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization completed to support the design. The design, as it progresses, will

be modified as needed to consider the new data. Technical Memoranda presenting the results of the initial evaluation can be found in the Administrative Record.

- From a Community Perspective, the requested regulatory waivers are not well understood or justified. On Page 14 of the Proposed Plan, DOE indicates its intention to request a waiver of the Toxic Substances Control Act (TSCA) landfill siting requirements with respect to separation of the landfill liner from the historical high water table (i.e., groundwater). TSCA requires that there be no hydraulic connection between the site and standing or flowing surface water and the bottom of the landfill liner system or, natural in-place soil barrier of a chemical waste landfill be at least 50 feet above the historical high water table. Construction of a disposal facility at the proposed site will not meet this requirement. *A TSCA waiver from this requirement will be required under that statute for all of the onsite alternatives.*
- In addition, the Department has indicated that it will seek an exemption under the State of Tennessee's Radioactive Waste Disposal Rule. TDEC requires that the hydrogeological unit used for disposal shall not discharge groundwater to the surface within the disposal site. At each alternative location in Bear Creek Valley, groundwater discharges to the surface within the proposed disposal site and will not meet this requirement. *The placement of low-level nuclear and hazardous wastes in an environmental setting where the groundwater is discharging to the ground surface, where wetlands are proximate and where surface water streams have documented flow rates in excess of 700 gallons per minute represent significant concerns.*

  Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

  A Toxic Substances Control Act of 1976 (TSCA) waiver for two parts of TSCA 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

  - **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the ORR. Compliance with the Resource Conservation and Recovery Act of 1976 Subtitle C landfill requirements (identified as applicable or relevant and appropriate requirement [ARARs]) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the U.S. Environmental Protection Agency determination that the remedy is protective of human health and the environment.**

  - **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The Environmental Management Disposal Facility (EMDF) site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley**

can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.

An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

- The Waste Acceptance Criteria need to be finalized BEFORE a Record of Decision is signed. DOE needs to provide more details about what kind, and how much waste it intends to put in the landfill. Because some of the waste will remain dangerous for many years, it is critical for the community and the public to understand possible impacts to the public and the environment. DOE's approach of determining the Waste Acceptance Criteria *following* the issuance of the Proposed Plan denies the public the opportunity to understand and to offer comment on the waste that would be permitted to be disposed in the EMDF. *DOE should be required to provide in the Proposed Plan a process for characterizing waste prior to landfill disposal. Specifically, DOE should describe the extent of sampling and testing that would be implemented to verify that waste materials are acceptable for disposal in the EMDF.*

  Response: RI/FSs for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for the EMDF. The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the ORR indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

  With submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

- The Proposed Plan fails to adequately detail DOE's plan for remediation and disposal of Mercury wastes. The City of Oak Ridge has long advocated for DOE address mercury removal in Oak Ridge to allow for the removal of Fish Advisories in East Fork Poplar Creek. There are DOE approved disposal facilities in the Western U.S. and licensed private sector facilities that accept mercury contaminated waste. About two years ago, TDEC added new signage to Bear Creek, (which is near the proposed landfill site), stating that no fish should be eaten there because of Mercury and PCB levels.

DOE must also comply congressional mandates included in the Mercury Export Ban legislation of 2008, which specifically prohibits the Department of Energy from long-term management and storage of elemental mercury at *"the Y-12 National Security Complex or any other portion or facility of the Oak Ridge Reservation."* While DOE asserts that the remediation of mercury residuals remaining at the Y-12 site is a priority for the Oak Ridge cleanup program, the treatment and disposal of Mercury contaminated wastes are not described in the Proposed Plan.

Response: The regulatory compliant design, operation, and closure of the onsite disposal facility, coupled with DOE's compliance with all regulatory requirements concerning mercury, will help to ensure that the new disposal facility is protective of human health and the environment over the long term. For West End Mercury Area remediation projects with EMDF-bound waste streams, DOE will take all practical measures to remove mercury before waste generation and send that mercury offsite to treatment/storage/disposal facilities. The ROD has been updated consistent with the FFA parties' agreed-upon mercury management approach (Sect. 2.12.2.3). Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in the EMDF.

- DOE did not incorporate cost savings from guaranteed waste volume shipments to off-site landfills. The cost differential for the off-site disposal option does not include an assessment of cost savings from guaranteeing volumes of material shipped to an off-site disposal landfill. It is important to consider DOE's excellent transportation record, with thousands of shipments of many types of waste annually without incident.

  Response: In response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive (about double) than onsite disposal and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the recent evaluation of the offsite disposal costs.

- DOE has not provided sufficient information on support systems that will be needed for the EMDF operation (wastewater management ponds, treatment systems, utilities, roads). The DOE issued Proposed Plan (page 13) and supporting documents are incomplete with respect to describing the wastewater treatment systems that will be needed to operate the EMDF. DOE indicates that a wastewater treatment system will be constructed, however, landfill wastewater from EMDF would be staged and sampled. If sampling results indicate that water quality complies with the discharge limits agreed to by EPA, DOE, and TDEC, then the water would be directly discharged without treatment to Bear Creek. If the sampling results indicate the water quality is unacceptable for discharge, then the staged water would be treated prior to release. As part of the remedy, a treatment system would be provided adjacent to the EMDF facility. *The City is particularly concerned with runoff into the Bear Creek from leachate that is contaminated with Mercury. DOE should have produced these documents related to wastewater treatment systems for the EMDF for public inspection prior to issuance of the Proposed Plan.*

  Response: A detailed discussion of the EMDF support systems is included in the RI/FS, Sect. 6. A written description, tables, and figures identifying the support facilities required for each location evaluated for EMDF are included in the RI/FS, Sect. 6.2.2.5. The Proposed Plan summarizes the evaluation of support systems contained in the RI/FS, including roads, leachate collection and treatment facilities, and wastewater collection and treatment systems. DOE will treat wastewater to remove contaminants that exceed regulatory discharge limits.

The ROD discusses the treatment system as well (Sect. 2.12.2.5), and the mercury discharge limits will be met.

- DOE fails to adequately integrate NEPA analysis into the CERCLA process. DOE has limited its assessment of National Environmental Policy Act (NEPA) from the proposed site 7c EMDF to impacts on land use. This approach fails to integrate NEPA requirements within the CERCLA process per DOE's own requirements (DOE Order 5400.4, issued October 6, 1989.) The Proposed Plan does not include a thorough assessment of the potential socio-economic impacts on the surrounding communities from the proposed EMDF. The few paragraphs in the "NEPA Values" section are incomplete, and do not address any of the questions and comments submitted by the City in its report and transmitted to DOE in my July letter. Nor is the City's Community Impact Assessment referenced or acknowledged. *This lack of a thorough NEPA assessment underscores the need to re-examine DOE's policy of using NEPA-like criteria in CERCLA decision making. In this case, the policy is not covering the necessary aspects of NEPA relevant to facility siting.*

  Response: In accordance with the DOE "Secretarial Policy Statement on the National Environmental Policy Act (NEPA)", NEPA values have been incorporated into the CERCLA documentation prepared for this project. DOE incorporation of NEPA values into the evaluation of each alternative contained in the RI/FS is described in the RI/FS, Sect. 7.1.10. Some CERCLA evaluation criteria are the same as NEPA review criteria, including protectiveness, long-term effectiveness and permanence, short-term effectiveness, and cost. These evaluation criteria are included in the RI/FS as part of the CERCLA evaluation. The NEPA process informs decision makers on a wider range of environmental and socioeconomic concerns than those specifically addressed under CERCLA. The NEPA values included in the evaluation of alternatives, but not specifically required in the CERCLA evaluation criteria, include socioeconomic impacts, land use, environmental justice, irreversible/irretrievable commitment of resources, and cumulative impacts. The incorporation of NEPA values into the evaluation of each alternative is also summarized in the Proposed Plan. The evaluation of NEPA values does provide information regarding the alternative's impact on surrounding communities. The ROD does include another element of the socioeconomic value for offsite disposal that was evaluated since the Proposed Plan was developed. Other than this added evaluation, there is no further NEPA evaluation required to support the decision.

- Finally, DOE has not included in the Proposed Plan a Contingency Plan in the event Site 7c is not accepted as the remedial alternative. DOE should include in the Proposed Plan a Contingency Plan in the event site 7c is not determined to be an acceptable remedial option for disposal of ORR wastes. DOE has indicated in the Proposed Plan that the operating EMWMF is approximately 75% filled. DOE should update the community on the estimated date when the EMWMF will be 100% filled and its contingent plan to dispose of wastes in the event of a non-decision on the site 7c EMDF.

  Response: The RI/FS includes the evaluation of multiple locations for the construction of EMDF under the Onsite Disposal Alternative. The evaluation in the RI/FS was prepared consistent with CERCLA guidance. The FFA parties have agreed that the preferred alternative presents a protective remedy and therefore has been selected.

As City Manager, I am deeply concerned about the negative public perceptions about Oak Ridge that I have observed as an 8-year member of this community. Such perceptions have adversely impacted growth and development, not only in our community, but in the East Tennessee region. Most everyone has joked about Oak Ridgers' reputation as "glowing in the dark," but we have experienced how this image and environmental misunderstanding puts us at a competitive disadvantage with lost opportunities for new

industries, industrial expansions, and population growth. It is not unusual for industrial prospects to ask about Internet stories from local media outlets about Oak Ridge's nuclear legacy. Although this nuclear legacy has enhanced the quality of our workforce it's hard to dispute a headline that labels a "low level waste landfill" as the "Oak Ridge Nuke Dump" (Knoxville News Sentinel 7/27/2016). Private companies are looking for reasons to eliminate your site and sensationalized media like this makes recruiting industry very difficult at times. In fact, a neighboring community advised they were one of two finalists for a very large brewery project worth 600 jobs and millions of dollars of investment in the Knoxville region. The prospect selected the city in North Carolina, and stated one reason was that his spouse was afraid of proximity to Oak Ridge!

In closing, three important recommendations that I believe are necessary to promote the long-term viability of the City of Oak Ridge. First, the remaining space in the existing landfill should be *closely monitored and utilized sparingly*. DOE should make every effort to exercise existing contracts with out-of-state vendors to dispose of waste that is currently projected to go into EMWMF. This new approach, while likely requiring a contract amendment with the cleanup contractor, will take some pressure off all the parties, provide a reasonable timeframe to fully assess potential impacts, and allow sufficient time to study and develop a more comprehensive of alternatives to constructing a new landfill on green space at a location with a very high water table. The current timeframe to site a new landfill is unreasonable. If scheduled properly, the workforce we all value and respect will not stop working, their assignments may be modified, which happens on a routine basis.

Second, DOE should supplement the proposed plan to incorporate a much more comprehensive NEPA analysis of the potential impact of the EMDF on the greater Oak Ridge community in order to fulfill the requirement of DOE Order 5400.4. The City of Oak Ridge offered extensive comments on this issue to the parties to the FFA in its comment letter submittal to DOE on the report entitled "Remedial Investigation/Feasibility Study (RI/FS) for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Oak Ridge Reservation (ORR) Waste Disposal Oak Ridge, Tennessee – DOE/OR/O1-2535&D3."

Third, if the proposed plan is ultimately accepted by the EPA and the State of Tennessee, there are a number of *community mitigation measures* that MUST be incorporated into the Record of Decision:

- A 25-year waiver for the City of Oak Ride from EPA and the State of Tennessee from compliance with the Clean Water Act. The City has just completed a $25 million investment to comply with an EPA Administrative Order on Inflow and Infiltration into our wastewater system. We also encountered a release of Technetium into the City's sewer system four years ago due to remediation. We are very concerned about the uncontrolled release of elevated levels of mercury, uranium, and other "classified" contaminants entering our system that during the lifetime of the proposed landfill which could result in Clean Water Act violations and significant fines on the Oak Ridge community.
- A requirement that DOE provide payment in lieu of taxes on the proposed landfill and associated facilities that are equal to the taxation of a comparable industrial landfill. The Oak Ridge property is valued at the low agricultural value for PILT purposes. Communities such as Andrews, Texas are receiving over $8 million annually in offset fees. Such a requirement would help offset the economic opportunity costs associated with changing the future land use designation of the location and surrounding area, from the current recreational and future unrestricted use designation, to DOE-industrial use designation. DOE's intent to seek a waiver to land-use designations may be considered by some in the local community as a breach of faith with the citizens who devoted many hours of their time to working with DOE to hammer out a mutually acceptable (and technically practicable) set of end-use designations for DOE's Oak Ridge lands, with the expectation that DOE would achieve sufficient cleanup to support the designated uses.

- A requirement that annual financial assurance payments be continued to be paid by the federal government for the lifetime operation of the proposed landfill.
- An amendment to the BORCE conservation easement that will allow utility corridor easements for the development of industrial parks and facilities for the community. This easement was negotiated without any city involvement, and thus places the city at a competitive disadvantage by not allowing normal growth "outside the gates."

Response: DOE thanks you for your participation in the public comment process. DOE believes that the remedy only supports the local community and protects public health and the environment, so no community mitigation methods are needed to be implemented.

Comment 166: Comment from Alfreda Cook

Part 1 (from November 7, 2018 public meeting): My name is Alfreda Cook and I am a resident of Oak Ridge, also a retiree of one of the DOE facilities here. So I've been around here for quite some time.

What I had hoped to see at this presentation was more of, this is what we would like to do. Okay. And these are the positives for the reasons that we have selected this approach, and these are the negatives that we have looked at that caused us to go in this particular direction.

This is a great overview, but I spent a couple of days actually going through the Proposed Plan and looking at some of the other documentation that supported it, and it would really have been great to have seen and heard the negatives that have been looked at, such that those would be juxtaposed against the positives.

We, as citizens, tend to not know the technical reasons for things that occur, and we depend on our regulatory agencies to tell us. I need to be convinced that this is the right approach. And what I have seen and heard thus far, I'm really not convinced. I'm not for, and I'm not against, the EMDF. It's just I don't have anything that is pushing me in that direction.

Now, one thing that is what I think is the elephant in the room has to do with the groundwater. And if you look at the drawings for the proposed placement of the EMDF, you're looking at tributaries that are all around that particular site. The groundwater table is very shallow. What happens if there is a breach in the liner at the bottom of the cell? Okay. Is there a plan for – an emergency action plan for collecting that discharge that's at the bottom? Suppose that there is a tremor that causes the karst and the limestone to have a problem around this facility and we end up with a sinkhole, what is the emergency plan? Things like that I'm not hearing, and I really do think as citizens that that's what we need to know – is what is the emergency remediation if something does not go according to plan. Thank you.

DOE Representative: Could I offer a quick response to that? Basically, we do have to have a plan. As part of the design of the facility, we'll have to design a monitoring plan that would be put into place to detect any type of problems like that, if they developed, and then we have to have a corrective action plan. So if there were to be a release from the facility in the future, we would have a regulatory obligation to detect it and respond to it. The engineering details of that would be something we would have to work out in collaboration with EPA and TDEC, but we're not allowed to release and not respond to it.

Ms. Cook: That was Question A. Question B: Do we have any remaining unlined burial grounds that in the future may need remediation? The reason that I'm asking that question is would there be capacity in this EMDF for unplanned remediation activities? Now, I know that when we planned for the EMWMF it was for a particular total capacity, looking at cleanup of ETTP and some cleanup at ORNL and Y-12. All right.

Now we're looking at major cleanup at ORNL and Y-12. Is there any excess capacity in this new facility for emergency cleanup of other areas?

DOE Representative: There is. We basically plan a volume contingency. When I talk about 2.2 million cubic yards, that's all the waste we know we have, plus a contingency factor. There are unlined disposal trenches on the reservation that have not had final decisions made on them yet. There are some in Bear Creek Valley. So, yes, there is space. Should we decide to dig those up and relocate them to the landfill, there would be space for some.

Part 2: As a resident of the City of Oak Ridge, I am responding to DOE's request for comment on the Proposed Plan to construct a second hazardous waste landfill -- the Environmental Management Disposal Facility (EMDF) – on the Oak Ridge Reservation (ORR).

A simplistic concept of DOE's role in Oak Ridge is that of promoting scientific research, managing radioactive materials, and cleanup of radioactive and chemically hazardous contaminants left over from the Cold War era. An equally simplistic concept of TDEC and EPA roles is that of protecting human health and the environment. I am mentioning these roles to highlight that decisions made by these agencies directly affect the livelihood of residents in Oak Ridge and surrounding communities.

In the early 2000's, DOE promoted the existing EMWMF as the single landfill needed for disposal of chemically and radiologically hazardous waste generated from cleanup of the ORR. The cleanup plan was limited to the ETTP site and small areas in and around ORNL and Y-12 sites. The public accepted DOE's assessment of onsite vs. offsite disposal risks and supported placement of a single landfill on the ORR – which is within the city limits of Oak Ridge and proximate to two heavily populated residential areas.

DOE expanded its cleanup scope around 2004 to include demolition of many outdated and highly contaminated facilities at Y-12 and ORNL. This expanded scope, along with the recognized inefficient use of EMWMF, has created a shortage in onsite disposal capacity. Now, DOE is proposing a second hazardous waste landfill on the ORR.

The Proposed Plan discusses "what" DOE plans to develop; however, it omits parameters that limit "how" the plan will be implemented. Within the document, TDEC – the community's protector of human health and the environment – identifies multiple concerns regarding the proposed location of EMDF and even questions whether onsite disposal should be the preferred alternative. I believe those concerns are valid and warrant resolution prior to going any further in the evaluation process. I offer the following observations:

- Insufficient site characterization prior to release of the Proposed Plan gives the appearance of a rush to gain approval of a remedy that favors DOE's goals over the welfare of the community. Long-term success should be the goal, not short-term convenience.

  Response: There are hundreds of wells in Bear Creek Valley with decades of data. This extensive data set was used to support conclusions in the Remedial Investigation/Feasibility Study (RI/FS). During preparation of the Proposed Plan, the U.S. Department of Energy (DOE) began more site-specific characterization efforts at the request of the other Federal Facility Agreement (FFA) parties. The additional site characterization for Central Bear Creek Valley evaluating geologic and hydrogeologic conditions was conducted in two phases. The first phase, with the referenced eight well pairs (16 wells) monitored for over a year as well as monitoring results from other existing wells in Bear Creek Valley to supplement the general understanding of the site, was used to support identification of a preferred location in the Proposed Plan and the selection of the location in this Record of Decision (ROD). Analysis of the first phase data confirmed DOE's understanding of the site. Since then, data

from 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization completed to support the design. The design, as it progresses, will be modified as needed to consider the new data. Technical Memoranda presenting the results of the initial evaluation can be found in the Administrative Record.

- TDEC, EPA, and DOE could not reach consensus on the remedial investigation / feasibility study which forms the basis for the Proposed Plan. The study's data are available in the Administrative Record; however, not presented in the Proposed Plan for public review.

  Response: Federal law requires that any remedy selected under Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) must comply with applicable or relevant and appropriate requirements (ARARs) (or show just-cause for a waiver) and be protective of human health and the environment. The FFA parties have worked together to sign this ROD. All three parties agree that the onsite remedy selected is protective and will either comply with the ARARs or shows justification for waiving a portion of a regulation. The FFA parties believe there is sufficient information available to support this decision.

- The preferred location for EMDF (CBCV Site 7c) is 0.8 miles and 1.1 miles respectively from two (2) heavily populated residential areas in Oak Ridge; is located over a shallow groundwater table; is surrounded by surface tributaries; and receives an average annual rainfall of over 50 inches. The site has not been sufficiently characterized to ensure its suitability for an engineered hazardous waste landfill. The Proposed Plan should include final characterization data for public review.

  Response: Please see the response to the first bullet.

- The Proposed Plan notes the intent to request waiver of applicable CERCLA and TSCA regulations that restrict how and where hazardous waste landfills are constructed. The preferred location for EMDF – in its current state – does not meet regulatory requirements; therefore, waivers should not be requested.

  Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

  A Toxic Substances Control Act of 1976 (TSCA) waiver for two parts of TSCA 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

  - **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the Oak Ridge Reservation (ORR). Compliance with the Resource Conservation and Recovery Act of 1976 Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance**

requirements for PCB waste disposal for the landfill supports the U.S. Environmental Protection Agency determination that the remedy is protective of human health and the environment.

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The Environmental Management Disposal Facility (EMDF) site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.**

An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

- The Proposed Plan does not mention if waste minimization or waste reduction techniques will be implemented, monitored, or reported to meet any desired set of goals. Reducing the volume of waste should be a primary goal.

  Response: The volume reduction techniques such as mechanical size reduction were only considered for large-scale application for the Hybrid Disposal Alternative. They are not specifically under consideration for large-scale application for the selected remedy. However, any project generating waste can consider implementing these technologies prior to shipping the waste to the EMDF. The ROD does include a commitment to waste minimization. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the Environmental Management Waste Management Facility, provided characterization allows this path. The waste disposal hierarchy will also be applied for EMDF waste disposal.

- Demolition of Y-12 facilities will generate a large volume of mercury-contaminated waste. The Proposed Plan does not present mercury treatment and disposal technologies that allow the waste to meet land disposal restrictions.

  Response: The scope of the disposal decision does not include technologies such as treatment or size reduction that a project may need to use to meet the waste acceptance criteria (WAC). Those technologies will be selected through the generating project's decision documents. Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in the EMDF.

- The Proposed Plan does not present a definite plan to build wastewater treatment and interim storage facilities at EMDF. Neither does the plan discuss anticipated volumes, contaminants, discharge limits, storage capacity needs, or cost estimates. Definitive, long-term wastewater management plans should be included for public review.

  Response: Waste characterization and WAC for EMDF are not presented in the Proposed Plan. This ROD provides information on wastewater treatment, WAC, and discharge limits. The details of wastewater treatment will be developed as part of the design.

- Waste characterization and waste acceptance criteria for EMDF are not presented in the Proposed Plan. This information should be available for public review and comment well in advance of any construction planning for EMDF.

  Response: RI/FSs for disposal facilities sometimes contain placeholder WAC, as was done for the EMDF. The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the ORR indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

  With submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

- History supports that additional chemically and radiologically contaminated areas – currently not in EM's lifecycle baseline – will be identified for cleanup and waste disposal in the future. If large-volume waste streams (i.e., mercury contaminated debris) are not shipped offsite for disposal, then plans to build a 3rd hazardous waste landfill within Oak Ridge must be anticipated in the future.

  Response: All scope currently identified as being remediated under CERCLA is anticipated to be covered by the EMDF capacity. At this time, there is no information to suggest a third disposal landfill would be needed.

- Property values in Oak Ridge already underperform those in adjacent communities, and new residents avoid locating here due to the City's stigma of being "hot" with radioactivity. The Proposed Plan should address these concerns with an aggressive approach for truly removing waste from the ORR.

  Response: The National Environmental Policy Act of 1969 values discussed in the RI/FS and summarized in the Proposed Plan and ROD include an evaluation of socioeconomic impacts. There are no impacts to the community identified for this decision.

This Proposed Plan is the only readily accessible document by which the public can evaluate DOE's preferred alternative of constructing a second hazardous waste landfill within the city limits of Oak Ridge. The public is being asked to evaluate the plan without access to a significant amount of supporting information that is omitted. Based on the information currently provided, I cannot support this plan.

Please revise the document to include more detailed information and reissue for a 2nd Public Comment Period.

Response: DOE thanks you for your participation in the public comment process. DOE has conducted additional work needed to support selecting a remedy in the ROD. DOE has worked with the other FFA parties to agree to a final list of ARARs, and a final approach for WAC and discharge limits. As these final elements did not change the essence of the disposal facility design nor change any of the protectiveness, effectiveness, implementability, or cost evaluation criteria, no additional public comment is required; however, with submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

Comment 167: Comment from Emily Strasser

I am concerned that the current plan is opposed by key experts and local leaders including TDEC, many city officials, and the local Sierra Club chapter. As TDEC demands, DOE needs to provide full and transparent details about exactly what kind of waste and how much it intends to put into the landfill before ANY plan is approved. Particularly, due to the already high prevalence of mercury in area waterways from legacy contamination, the DOE must be explicit about the amount of mercury that will be buried in the proposed landfill.

I share Council member Ellen Smith's view that none of the three proposed sites is acceptable for burying radioactive and hazardous waste due to complex groundwater systems that are likely to aid the spread of contamination into area waterways. The use of underdrains to lower the groundwater level around the proposed site is an unacceptable solution; underdrains may provide routes for waste to leak, and if they fail, may cause the landfill to become less stable and more vulnerable to water contamination. With the state's high level or precipitation, the area's porous geological formation, and complex groundwater system, it is ill-suited for such a landfill.

My family has longtime ties to Oak Ridge (my grandparents moved there in 1943), and owns land on Watts Bar Lake that we hope to share with generations to come. In order to protect the long-term future of the area, I urge the DOE to not to go ahead with this risky and dangerous plan.

Response: The U.S. Department of Energy thanks you for your participation in the public comment process. Remedial Investigations/Feasibility Studies for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for the Environmental Management Disposal Facility (EMDF). The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this Record of Decision (ROD). Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as applicable or relevant and appropriate requirements (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of

human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, Federal Facility Agreement parties-approved primary document, the WAC Compliance Plan. Mercury disposal is also specifically addressed in this ROD (see Sect. 2.12.2.3).

The design of the facility does not use underdrains to lower the water table beneath the waste. A groundwater field demonstration is planned to follow this D2 ROD, and the results of the study will inform the final design of the facility in maintaining a 15-foot separation between the bottom of waste and the groundwater table.

Comment 168: Comment from Sidney W. Jones, Ph.D., P.E., P.G

Part 1: Thank you and the Department of Energy for the opportunity to comment on this proposal for a new radioactive and hazardous waste landfill in Oak Ridge. Given the information currently available to me, I support the choice of the hybrid alternative rather than the preferred alternative put forth by the Department of Energy (DOE) in this Proposed Plan. The hybrid alternative proposes that a disposal facility be located in Bear Creek Valley adjacent to the Environmental Management Waste Management Facility (EMWMF) between tributaries to Bear Creek. The hybrid alternative also provides for significant quantities of waste to be shipped offsite.

My conclusion is based on a thorough reading of the administrative record and a fairly extensive knowledge of the types of contamination present in future waste that might be generated by CERCLA activities on the Oak Ridge Reservation (ORR). It is informed by my familiarity with the locations in Bear Creek Valley that are discussed in this Proposed Plan and by decades of accumulated knowledge about solute transport in groundwater and surface water, derived in part from conducting, interpreting, and modeling quantitative tracer tests in Oak Ridge and throughout Tennessee. It is also the result of first-hand experience with problems that occurred over a period of nearly two decades at the EMWMF, some of which are documented in Attachment 1 to these comments.

I offer these observations, which I believe are supported by the comments that follow:

(1) Additional on-site disposal capability is likely to benefit clean-up efforts on the Oak Ridge Reservation. However, as presented in the Proposed Plan, the preferred alternative exaggerates the necessary capacity of the proposed landfill and the estimated cost savings.

(2) The hybrid alternative includes a landfill that would be located between the current CERCLA waste disposal facility and Bear Creek Burial Grounds. The site has already been used as a borrow area for EMWMF, and its use for waste disposal would not significantly expand the overall footprint of brownfields in Bear Creek Valley.

(3) The smaller volume of the on-site CERCLA landfill would encourage DOE and their contractors to implement better waste management strategies, including waste minimization, volume reduction, strategic use of existing ORR landfills already permitted by the Tennessee Division of Solid Waste Management, and efficient use of off-site facilities.

Response: The Hybrid Alternative is a combination of onsite and offsite disposal, thereby using a smaller onsite landfill. However, due to the large volumes of waste that were to be disposed offsite under this alternative, the major reasons for not selecting the total offsite disposal alternative were still an issue. The transportation risks are considered unacceptably high and the costs for disposal would limit the amount of remediation work that could be accomplished.

Additionally, once the smaller landfill was full, the remediation effort could be stopped if there were any issues with either transporting waste across the country or with any of the offsite disposal facilities.

Comment 168.1: General Comment: The Proposed Plan and the administrative record that is currently available to the public do not provide a sufficient basis for choosing a preferred alternative. The waste generation forecasts and the cost estimates are questionable, and very little relevant information is given on waste characteristics or the limitations that will be imposed on waste acceptance. There is very little hydrologic data at sites that would be used for DOE's preferred alternative or for the hybrid alternative, and there is not consistent information on which rules will be used to regulate operations and closure of the facility. Since the Department of Energy (DOE) asserts that much more information will be available when the Record of Decision is written, DOE should solicit public comment at that stage.

Response: The U.S. Department of Energy (DOE) has conducted additional work needed to support selecting a remedy in the Record of Decision (ROD). DOE has worked with the other Federal Facility Agreement (FFA) parties to agree to a final list of applicable or relevant and appropriate requirements (ARARs), and a final approach for the waste acceptance criteria (WAC) and discharge limits. As these final elements did not change the essence of the disposal facility design nor change any of the protectiveness, effectiveness, implementability, or cost evaluation criteria, no additional public comment is required; however, with submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

Comment 168.2: In specific comments below, quotations from the Proposed Plan are in bold type [note – DOE has changed the bold text to *italics* to not be confused with DOE responses], and proceed in the same succession as the text or figure is found in the document. Some acronyms may be used without explicit definition in the same context as used by DOE in the Proposed Plan, such as EMDF, EMWMF, FFA and ORR.

Page 1. Under the initial description of the Proposed Plan, DOE claims:

> *"Onsite disposal facilitates timely cleanup of the ORR by providing a cost-effective, protective disposal option. An onsite disposal facility within Central Bear Creek Valley protects human health and the environment and achieves or waives all applicable or relevant and appropriate requirements (ARARs), while obtaining the best balance of the remaining CERCLA remedy selection criterion. This Proposed Plan includes a summary explanation of proposed waivers.*"

As discussed in more detail in the comments that follow, the RI/FS and administrative record do not provide waste acceptance criteria (WAC) for the proposed facility or any reliable description of the future waste streams. The reader of the Proposed Plan cannot, without this information, verify that a facility with a 2.2 million cubic yard capacity will be needed. There is general information in the administrative record on the characteristics of possible sites that provide evidence to support the choice of Central Bear Creek Valley over other locations for a facility with a capacity of approximately 2 million cubic yards. However, the DOE preferred alternative utilizing the Central Bear Creek Valley location might not be the optimum choice for balancing CERCLA remedy selection criteria if the volume of waste to be disposed at a new facility turns out to be significantly less than 2 million cubic yards. If more detailed waste characterization and segregation allows significantly more wastes to be disposed at DOE's permitted landfills on Chestnut Ridge or if protective waste acceptance criteria prevent disposal of large volumes of waste in Oak Ridge, the capacity demand for a new CERCLA disposal facility might be reduced to the point that either the Hybrid or Off-Site option would be the better alternative.

Response: The Hybrid Alternative is a combination of onsite and offsite disposal, thereby using a smaller onsite landfill. However, due to the large volumes of waste that were to be disposed offsite under this alternative, the major reasons for not selecting the total offsite disposal alternative were still an issue. The transportation risks are considered unacceptably high and the costs for disposal would limit the amount of remediation work that could be accomplished. Additionally, once the smaller landfill was full, the remediation effort could be stopped if there were any issues with either transporting waste across the country or with any of the offsite disposal facilities.

Comment 168.3: Page 5. In Paragraph 1 of the WASTE CHARACTERIZATION AND VOLUME section, DOE states:

> *"The final capacity assumed to be needed for completion of the ORR cleanup is estimated at 2.2 million cubic yards."*

This is based on the inventory of waste streams to be generated from remediation of soils and demolition of contaminated facilities listed in Appendix A of *The Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge Tennessee*, *2017*, although the Proposed Plan does not state this explicitly. The estimate of capacity needed was not revisited as DOE submitted 5 drafts of the RI/FS over the five years from 2012 to 2017, although regulatory comments (available in the administrative record) questioned the validity of the approach used.

The questions that were raised primarily concerned (1) whether DOE's waste hierarchy scheme was properly applied, and whether waste included in the EMDF capacity demand could be disposed at permitted landfills on the ORR with minor additional characterization and waste handling costs, (2) whether volume reduction techniques had been properly considered, and (3) why the estimated volume was then increased by 25 percent.

The Proposed Plan discusses this additional 25 percent volume in terms of conservatism in the third paragraph of the WASTE CHARACTERIZATION AND VOLUME section:

> *"Uncertainty is accounted for in the waste volume estimates by adding a straight percentage (25 percent, increase only to be conservative) to the projected volumes."*

DOE's response to regulatory comments was to revisit their analysis of volume reduction and reiterate their commitment to the waste hierarchy and waste minimization. However, because there are not suitable sites for a waste disposal facility with a large, contiguous footprint in Bear Creek Valley or elsewhere on the Oak Ridge Reservation, the volume of the waste buried needs to be minimized, even if this increases costs. A facility with a smaller footprint can be designed further from surface streams and avoid areas with high water tables or steep slopes, resulting in a more stable landfill over time. DOE seems to be preoccupied with cost estimates alone, perhaps not understanding the inevitable trade-off between cost and long term effectiveness that results from the constraints of unfavorable site characteristics.

Response: Please see the response to the previous comment regarding the project volume of waste being evaluated for final disposition as part of this decision.

Comment 168.4: Page 5. In Paragraph 2 of the WASTE CHARACTERIZATION AND VOLUME section, DOE states:

> *"Projections of future waste streams are based on available data for wastes disposed at EMWMF combined with available information on the facilities and environmental media yet to be remediated."*

The use of wastes disposed at EMWMF to project future waste characteristics is unlikely to result in an accurate estimate of radiological and chemical contamination in future waste streams. The primary two causes for error due to extrapolation of EMWMF waste characteristics to EMDF waste streams are (1) most waste disposed in EMWMF was generated at ETTP, and will have different contaminants of concern than the wastes streams projected for EMDF, which will primarily be from Y12 and ORNL, and (2) the characterization data for many radionuclides present in EMWMF is quite sparse and the inventory of these isotopes is almost certainly underrepresented because the development of waste acceptance limits and protocols at EMWMF was fundamentally flawed and only corrected in an inconsistent and ad-hoc manner by individual waste generation projects.

DOE continues:

> *"An estimate of the amount of radiological and chemical contamination that may be in future waste streams was developed from information about future remedial actions. Information from remedial investigations of soil, scrap, and sediment contamination and information from building sampling efforts were used along with process knowledge of activities that occurred in the buildings."*

This may be the case, but the RI/FS cited above as the basis for this Proposed Plan uses only the characteristics of wastes disposed at EMWMF to estimate the radiological and chemical contamination in waste streams. The waste inventory analyzed in the D5 RI/FS, cited above, was not updated from the original RI/FS that was based on EMWMF disposal records up to 2012. The RI/FS inventory does not represent the characteristics of wastes disposed over the last third of the operational history of the EMWMF. Thus, the administrative record does not contain any estimates of amounts of radiological and chemical contamination developed from information about future remedial actions or even from waste streams disposed at EMWMF for the last half dozen years. If DOE has developed such information, it should be made available to the regulatory authorities and the public before a decision on a preferred alternative is selected.

The third paragraph mentions the use of Waste Handling Plans:

> *"Future CERCLA documents (e.g., Waste Handling Plans) will address the management of the projected wastes for each cleanup activity. These Waste Handling Plans are reviewed and approved by all three FFA parties for consistency with ARARs and other requirements."*

This statement could lead the reader of the Proposed Plan to believe that State and EPA approval was required for disposal of wastes generated from individual clean-up activities. However, Waste Handling Plans are usually approved prior to any detailed waste characterization, and final approval of each waste stream has not, historically, required approval of the regulators. In practice, either the contractors generating the waste or entities that subcontract from the waste generator have been in charge of final approval of individual waste lots at EMWMF, setting up a potential conflict of interest. In certain cases where wastes were inappropriately disposed of in EMWMF (see Attachment B [Attachment 2]), it seems probable that the waste acceptance process, in addition to a confusing set of waste acceptance criteria, contributed to the

root causes of the inappropriate disposal. At any future disposal facility operating under CERCLA authority, the waste acceptance methodology employed at EMWMF should not be replicated, but replaced with a protocol that requires final approval of waste lots for disposal by representatives employed directly by the three FFA parties, DOE, EPA, and TDEC.

Response: Please see the response to the previous comment regarding the project volume of waste being evaluated for final disposition as part of this decision. DOE disagrees with the comment regarding inappropriate disposal of waste in the Environmental Management Waste Management Facility (EMWMF). DOE works to continuously improve its efforts involving the cleanup mission at the Oak Ridge Reservation (ORR) through lessons learned. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the EMWMF, provided characterization allows this path. The waste disposal hierarchy will also be applied for the Environmental Management Disposal Facility (EMDF) waste disposal. DOE has a mature and robust process for the characterization of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste generated from remedial actions at the Oak Ridge National Priorities List (NPL) Site. Plans for remedial actions including waste disposal are subject to approval by the regulatory agencies prior to the implementation of work at the Oak Ridge NPL Site. The potential for waste material to be inappropriately disposed of onsite is minimal.

Comment 168.5: Page 6. In the paragraph of the BASELINE RISK SUMMARY section, DOE concludes:

> *"While cleanup decisions for the remediation sites have been made or will be made in separate, individual CERCLA decision documents, the decision being addressed in this case is the disposal of the projected volume of waste to be generated by these actions. Therefore, a conventional baseline risk assessment does not apply to this evaluation."*

This approach precludes a comparison between the risks posed by leaving contaminated material in place and the risks posed by burying the material. Should the contaminants responsible for the hazard decay or degrade to innocuous levels over the time frame during which the landfill might effectively isolate these contaminants from the environment, then disposal, either on-site or off-site, would evidently offer significant advantages over leaving the material in place. However, many of the contaminants present at hazardous concentrations in remediation waste in Oak Ridge will not decay or degrade to nonhazardous levels under ambient conditions and have already survived for many decades. In the case where the contaminants of concern do not degrade or decay, as with mercury and other heavy metals, or in the case where radioactive daughters may actually increase the hazard over time, as with uranium, the isolation afforded by even a well-constructed shallow surface disposal facility will be temporary in a humid environment like Oak Ridge. There are potential sources of remediation waste on the Oak Ridge Reservation where a comparison between the long-term effectiveness and costs of a no-action alternative with the on-site disposal alternative, using similar assumptions about land-use controls and consistent scenarios for exposure, would be useful to decision makers.

Response: Decisions regarding specific remedial actions will be made in separate CERCLA evaluations focused on the specific waste streams requiring remediation. It is in those documents where a comparison between the long-term effectiveness and costs of no action (leaving in place) versus excavation and disposal will be provided.

Comment 168.6: Page 8. In the NO ACTION ALTERNATIVE section, DOE states:

> *"Under this alternative, no comprehensive site-wide strategy would be implemented to address the disposal of waste resulting from any future CERCLA response actions at the ORR after EMWMF capacity is reached. Future waste streams from site cleanup that require disposal after EMWMF capacity is reached would be addressed at the project level."*

DOE Order 435 requires that Oak Ridge develop, document, implement, and maintain a Site-Wide Radioactive Waste Management Program. This requirement would presumably result in a site-wide strategy for disposal of radioactive waste that was generated by CERCLA actions as well as waste generated from ongoing operations.

> **Response: The text in the Proposed Plan was intended to indicate that under the No Action alternative, the Radioactive Waste Management Program would not include consistent site-wide waste disposal decisions. Waste disposal decisions would be made at the project level. While the Manual that supports the referenced DOE Order (DOE M 435.1-1) does require developing a site-wide radioactive waste management program, it also states "DOE waste shall be treated, stored, and in the case of low-level waste, disposed of at the site where the waste is generated, if practical; or at another DOE facility. If DOE capabilities are not practical or cost-effective, exemptions may be approved to allow use of non-DOE facilities…"**

Comment 168.7: Page 8. The final sentence in the NO ACTION ALTERNATIVE section is:

> *"This alternative provides a baseline for comparison with the action alternatives and is required under CERCLA and NEPA."*

The No Action Alternative should have been developed in more detail. In reality, the options for disposal of CERCLA generated waste under the No Action Alternative would default primarily to (1) burial of waste generated by demolition actions at the site of generation, (2) disposal of waste at permitted landfills on the Oak Ridge Reservation, and (3) disposal of waste at permitted offsite landfills, including those permitted for disposal of hazardous and radioactive waste. A more thorough evaluation of possible waste streams generated through future CERCLA actions should have been made to arrive at some estimate of the volumes that would need to be disposed by each of the means described above. The risks and costs associated with the optimal combination of these disposal options would have provided a much better baseline for comparison with other alternatives.

> **Response: The definition of the No Action Alternative under both CERCLA and the National Environmental Policy Act of 1969 (NEPA) is that no further action of any kind is taken. Under the No Action Alternative there would be no site-wide strategy implemented to address the disposal of future CERCLA waste, and the evaluations mentioned in the comment would be made at the project level. DOE has evaluated the No Action Alternative consistent with CERCLA and NEPA guidance and no future evaluation is needed.**

Comment 168.8: Page 8. In the ONSITE DISPOSAL ALTERNATIVES section, the third paragraph states:

> *"Data gathering has begun consistent with the approved Field Sampling Plan, and DOE issued a "Pre-published Technical Memorandum #1", summarizing the results of the first round of data gathering. A preliminary review of this Technical Memorandum #1 indicates that the conceptual design of the EMDF as presented in the RI/FS and this Proposed Plan*

may need to be revised to accommodate the new information on site hydrology and to satisfy the threshold CERCLA criteria."

This statement indicates that the selection of the preferred alternative at this stage is premature based on the initial site characterization data. In addition, as noted in the comments above, the selection of the preferred alternative is premature based on the lack of waste characterization data. If DOE has data on the characteristics of either the waste or the various proposed sites that is not in the administrative record that support their choice of a preferred alternative, they should make this available to the public and the regulatory agencies. After a review of the approximately one month of water level data and other site characterization data in Technical Memorandum #1, I could find no basis for establishing the seasonal high water table. A water table map is required to show that the facility can meet regulatory siting requirements, and is typically the first step in developing the areal footprint and base elevations of a landfill.

Response: There are hundreds of wells in Bear Creek Valley with decades of data. This extensive data set was used to support conclusions in the Remedial Investigation/Feasibility Study (RI/FS). During preparation of the Proposed Plan, DOE began more site-specific characterization efforts at the request of the other FFA parties. The additional site characterization for Central Bear Creek Valley evaluating geologic and hydrogeologic conditions was conducted in two phases. The first phase, with the referenced eight well pairs (16 wells) monitored for over a year as well as monitoring results from other existing wells in Bear Creek Valley to supplement the general understanding of the site, was used to support identification of a preferred location in the Proposed Plan and the selection of the location in this ROD. Analysis of the first phase data confirmed DOE's understanding of the site. Since then, data from 16 more wells, 32 borings, and 17 test pits were obtained as part of a second phase of characterization completed to support the design. The design, as it progresses, will be modified as needed to consider the new data. Technical Memoranda presenting the results of the initial evaluation can be found in the Administrative Record. Water table maps in wet and dry conditions are part of the final Technical Memoranda.

Comment 168.9: Page 9. In the Waste Acceptance Criteria section, first paragraph, DOE states:

"In addition to siting and designing the facility to minimize environmental impacts, DOE proposes to conservatively evaluate all wastes before acceptance to confirm their eligibility for disposal in the onsite facility."

The administrative record shows that DOE efforts to develop waste acceptance criteria through site specific risk assessments, based primarily on a scenario of a future resident using water resources in Bear Creek Valley, were not successful. The limiting concentrations of contaminants in waste that were derived from the analysis varied significantly from one version of the RI/FS to the next. The effort to derive WAC is presumably ongoing, as DOE states on page 12, that:

"The final WAC will be attached to the ROD prior to signature and will be one of many factors used by DOE to assure protection of human health and the environment."

Prior to selection of a preferred alternative, defensible preliminary WAC should have been developed and the projected waste inventory for the proposed landfill screened against those WAC to better estimate the airspace required to dispose of those waste that were suitable for on-site disposal. DOE is apparently assuming that the volume that cannot meet WAC will be negligible, but given the levels contamination from mercury, uranium, and fission products in some of the waste streams listed in the RI/FS, this assumption needs justification.

Response: RI/FSs for disposal facilities sometimes contain placeholder WAC, as was done for the EMDF. The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the ORR indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

Comment 168.10: Page 9. In the Waste Acceptance Criteria section, first paragraph, DOE continues:

> *"The existing landfill, EMWMF, is operating under controls provided by the WAC. These WAC can be found in the Attainment Plan for Risk/Toxicity-Based Waste Acceptance Criteria at the Oak Ridge Reservation (DOE 2001) which can be found in the Administrative Record. While the EMDF WAC will be developed independently of the EMWMF WAC, the existing WAC provide examples of what encompasses a disposal facility WAC."*

The EMWMF WAC, cited above, provides an excellent example of how not to develop waste acceptance limits at a disposal facility. The WAC supplied by the site-specific risk assessment in the EMWMF RI/FS and an addendum to that RI/FS only limited concentrations of 12 radionuclides and 23 hazardous chemicals. No concentration limits were imposed by the risk assessment on mercury, beryllium, arsenic, or cadmium, and none were imposed on radium isotopes, fission products such as cesium 137 and strontium 90, or the Curium isotopes. These hazardous metals and isotopes are known to be contaminants of concern on the Oak Ridge Reservation. These results imply that no significant risk to human health or the environment would result if, for example, the entire EMWMF were filled with mercury, arsenic, or radium. Since no restrictions were imposed on the physical or chemical state of mercury, the 2-million-cubic-yard EMWMF would have easily held all the mercury estimated to have been mined throughout history on Earth. Of course the inventory of mercury on the ORR was never more than a small fraction of this amount, but such conclusions should have been immediately suspect and initiated another risk assessment effort.

These WAC were also based on a volume weighted sum-of-fractions of concentrations of the contaminants, disconnecting both the mean concentration and total inventory of a given contaminant in the facility from the actual risk posed by the hazardous constituent. In the case of risk to water resources in Bear Creek Valley, any averaging of concentrations should be based on contaminants weighted by mass rather than volume. Except for limits for technetium 99, contaminant concentrations at EMWMF were effectively dictated by RCRA rules that were incorporated as ARARs into the EMWMF Record of Decision or by limits negotiated with the regulators. These negotiated limits were not based on a site-specific risk assessment, and the site-specific risk assessment for EMWMF was clearly not credible, so the question of whether CERCLA threshold criteria will be met at EMWMF remains open. If the process for the

development and enforcement of waste acceptance limits at EMDF is as flawed as that at EMWMF, then the claim that CERCLA threshold criteria will be met cannot be defended and the preferred alternative should not be implemented.

Compliance with waste acceptance criteria at EMWMF was also difficult to audit because of the use of averages and the several different types of limits that were negotiated without specifying details of implementation. For example, there was confusion over whether administrative WAC should apply as limits on a specific waste package or on an entire waste lot. Several ad hoc to deal with these issues were developed over time, but were never codified in the WAC attainment plan for EMWMF.

Response: DOE disagrees that the EMWMF WAC and WAC process is flawed. The EMDF WAC considered lessons learned from operating EMWMF and from any advances made in understanding the last 20 years.

The regulatory compliant design, operation, and closure of the onsite disposal facility, coupled with DOE's compliance with all regulatory requirements concerning mercury, will help to ensure that the new disposal facility is protective of human health and the environment over the long term. For West End Mercury Area remediation projects with EMDF-bound waste streams, DOE will take all practical measures to remove mercury before waste generation and send that mercury offsite to treatment/storage/disposal facilities. Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in the EMDF.

Comment 168.11: Page 11. *"Figure 7. Central Bear Creek Valley EMDF site plan."*

The conceptual design of the landfill for the preferred alternative as depicted here and in the administrative record has disposal cells oriented perpendicular to the general slope of the topography. This would seemingly require either a very complicated geometry for the liner or stepping down abruptly from one phase of landfill construction to the next, thus wasting significant amounts of airspace. Stepping abruptly down from one phase of landfill construction to the next would also potentially make clay compaction more time consuming and create more stress in geomembranes due to folding, while a complex geometry for the landfill floor would complicate the design of an adequate leachate collection system. DOE should discuss their conceptual design with an engineer who has had landfill design experience.

Response: The ROD contains a Preliminary Design that has been developed by engineers with extensive landfill design experience along with input from the current landfill operations personnel. It also has the cells oriented perpendicular to the general slope of the topography. The design optimizes the use of airspace for waste disposal and does not require very complicated geometry or stepping down as suggested in the comment.

Comment 168.12: Page 12.

> *"The purpose of WAC is to allow the disposal of only those wastes that could be protectively managed within the facility and ensure protection of human health and the environment. Wastes that do not meet the WAC will require offsite disposal or receive treatment."*

None of the risk assessment efforts in the administrative record have resulted in limits on mercury inventory in waste to be disposed at the proposed landfill. Without limits based on the site-specific risk assessment required by CERCLA, the hazardous waste regulations that restrict land disposal of mercury will serve as

default limits. This has been the case throughout the operational life of EMWMF, as the hazardous waste rules were if adopted as applicable to this remedial action. If the hazardous waste rules are adopted at the proposed disposal facility as anticipated, they may indeed prove adequate to protect groundwater resources from most hazardous constituents. However, a credible site-specific risk assessment should be made for contaminants that undergo significant bioaccumulation in surface water environments. Bioaccumulation creates a potentially important pathway for future risk to human health and the environment that was not considered to be relevant when land disposal restrictions were developed. In particular, future impacts due to disposal of mercury and PCBs should be considered in detail, as they will certainly be present in ORR waste and as the receiving streams for future releases from the proposed facility are already impacted by these hazardous chemicals.

DOE modeling as described in the administrative record assumes that mercury and other contaminants are adsorbed on mineral surfaces in a soil matrix rather than in debris generated from building demolition. Because of such simplifications, several of which are discussed in subsequent comments on WAC development, development of credible waste acceptance limits for mercury in a matrix of construction debris remains critical to ensuring that the preferred alternative will protect human health and the environment. The proposed waste inventory given in the RI/FS includes over 300,000 cubic yards of demolition material from the West End Mercury Area (WEMA) at Y-12. It is anticipated that some significant portion of this debris will be contaminated with elemental mercury. To date DOE has offered little information on the anticipated volume of WEMA debris that will require treatment under the 40 CFR 268.40 treatment standards for high mercury content wastes.

With the exception of Appendix C in the D3 draft of the RI/FS, the administrative record has little information on DOE's plans for disposal of mercury-bearing waste at the proposed landfill. The preferred technical approach presented in the D3 draft is encasement of debris at the landfill in large concrete vaults (30 feet × 30 feet × 10 feet). On this scale, the encasement material would be unlikely to contact much of the waste, and would primarily serve to provide an additional hydraulic barrier layer to infiltrating water. Such large vaults, unless they were well reinforced, ideally placed, and properly supported so that cracking under tensile stresses resulting from differential settling or unequal loading was minimized, would be considerably less durable than barrier layers of plastic and clay in in the landfill cap and liner. Even if this approach provides better hydraulic isolation of the waste, the long-term effectiveness would not be equivalent to that provided by encapsulation on a smaller scale. For waste encapsulated in smaller containers, much better contact with waste surfaces would be achievable. If the encasement material adhered well to the waste surfaces, hydraulic isolation would be greatly improved, and if the encasement material reacted to immobilize the contaminant chemically, leachability would be reduced. The administrative record has no information that would permit a useful comparison between the efficacies of their preferred technical approach and other approaches to treatment, and DOE has not indicated in this Proposed Plan or elsewhere whether or not their approach has been modified.

Response: The regulatory compliant design, operation, and closure of the onsite disposal facility, coupled with DOE's compliance with all regulatory requirements concerning mercury, will help to ensure that the new disposal facility is protective of human health and the environment over the long term. For West End Mercury Area remediation projects with EMDF-bound waste streams, DOE will take all practical measures to remove mercury before waste generation and send that mercury offsite to treatment/storage/disposal facilities. Mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in the EMDF.

Comment 168.13: Page 12.

> *"The final WAC will be attached to the ROD prior to signature and will be one of many factors used by DOE to assure protection of human health and the environment."*

As DOE acknowledges, waste acceptance criteria are a factor used to protect human health and the environment. Given the humid environment, shallow water table, steep slopes, and rapid groundwater flow velocities in Oak Ridge, appropriate limits on waste acceptance are the most feasible way to limit future releases of contaminants to the environment from a landfill located in Bear Creek Valley. Unfortunately, neither the Proposed Plan nor the administrative record provide reliable information concerning what limits might be placed on waste acceptance at the proposed facility.

In fact, DOE does not even suggest strategies for the development and implementation of waste acceptance limits in the Proposed Plan. A review of the administrative record reveals that waste acceptance criteria for a new disposal facility were originally discussed in a 2011 Focused Feasibility Study comparison analysis with the EMWMF WAC for sites near Highway 95. In succeeding drafts of the *Remedial Investigation/ Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge Tennessee*, the final (D5) draft of which is referenced in this Propose Plan, it is evident that DOE has continued to use the same approach taken for EMWMF WAC development.

The results are, predictably, no more defensible than those for the EMWMF analytic WAC discussed in a previous comment. For example, the carcinogenic risk would limit concentrations of the uranium 235 isotope to about 65,000 pico-Curies per gram (pCi/g) per the first draft, about 95,000 pCi/g per the third draft, and about 3000 pCi/g per the fourth draft. These are all higher than the EMWMF analytic WAC of 1500 pCi/g, which was considered to be unacceptably high by regulators, resulting in an administrative WAC of about 1000 pCi/g for uranium isotopes at EMWMF. The risk due to chemical toxicity gave a calculated limit for the uranium concentration of about 400,000 mg/kg in the first draft, about 100,000 mg/kg in the third draft, and less than 100 mg/kg in the fourth draft. Risk calculations frequently resulted in a range of two to four orders of magnitude in the preliminary WAC published in the various drafts, leaving the public with no idea what amounts of hazardous and radioactive constituents DOE considers to be appropriate for onsite disposal.

These preliminary WAC proposals would allow up to 40 percent by weight of the waste to be uranium. This could result in up to about a million metric tons of uranium in a 2-million-cubic-yard facility filled with waste having the density of soils or demolition rubble. This is not only far more uranium than is present in sources of future remediation waste on the Oak Ridge Reservation, but represents about one third of all uranium that has been mined worldwide to date. Clearly the risk modeling is disconnected from reality and could hardly be called "conservative" when the models conclude that such large quantities of uranium could be buried in a shallow land disposal facility without creating a future risk to human health and the environment.

Response: Please refer to the response to earlier comment regarding the presentation of the final WAC for the EMDF.

Comment 168.14: Page 13.

> *"A process – to be reviewed and approved by DOE, EPA, and TDEC that ensures the wastes generated by CERCLA response action projects meets the EMDF WAC – will be developed before operation of the facility begins."*

As stated in the comments above, the Proposed Plan discusses the EMWMF WAC. The Plan then assures the reader that a WAC will be developed for EMDF prior to opening the facility to receive wastes. As noted in the previous comment, review of the administrative record reveals that "preliminary" WAC were developed for the D1, D3, and D4 drafts of the RI/FS, assuming a site in East Bear Creek Valley adjacent to EMWMF, and the results do little to convince the reader that DOE will establish protective limits on waste acceptance. Although these "preliminary" WAC differ significantly between drafts of the RI/FS, primarily because of differences in the assumed location of the point of compliance to ensure protection of groundwater, the same suite of models and many key assumptions were retained from the development of the EMWMF analytic WAC and were used in all subsequent WAC development efforts.

Given this history, it seems probable that DOE will rely on many of these same models and assumptions to develop WAC for EMDF. Given some of the absurd results produced by this methodology, the validity of both the software and the assumptions used needs to be examined. The models have certain assumptions that are implicit in the way the algorithms describe the physical and chemical processes of contaminant release and transport over time. Other assumptions, such as the selection of exposure scenarios, points of exposure, and input parameters to the models are explicit. The following is a list of the more significant factors that were common to all the WAC development efforts and that appear to result in unrealistic waste acceptance limits:

(1) DOE assumes for the purposes of evaluating post-closure risk to human health and the environment that the only future mechanism for contaminants to be released from the facility, or for humans to be exposed to hazardous and radioactive substances disposed in the facility, to be through transport in water that migrates through the facility and the liner. While this is perhaps the most likely scenario for release of soluble substances, this will not necessarily be the case for chemicals and isotopes with low solubility. Releases through erosion followed by sediment transport or dispersion in the atmosphere and intruder scenarios should also be evaluated, even if they are only deemed to be realistic in the distant future. Likewise, undetected cap failure or lack of timely maintenance leading to bath tubbing and leachate outbreaks through berms is possible. Use of a single scenario for future contaminant release results in the conclusion that no risk will ever be posed by filling the entire facility with highly concentrated hazardous and radioactive substances, so long as they have very low solubility.

(2) Infiltration rates through the facility were assumed to be limited to one centimeter per year for one thousand years post-closure. This may be achievable, but it links the waste acceptance criteria to long-term performance of the cap and berms, and implies a very long-term commitment to monitoring performance as well as to maintenance of the cap and berms. DOE has not offered a plan as to how one would establish through monitoring that infiltration rates remain less than or equal to the assumed value over such time periods. It would seem more prudent to assume that infiltration rates return more quickly to values that approximate the natural recharge rates in Bear Creek Valley, which are roughly an order of magnitude greater than one centimeter. Wastes that could not be left in place safely as the site returns to natural conditions would then be shipped off-site to facilities in arid regions that would require much less monitoring of performance and would be much less costly to maintain.

(3) Release rates of contaminants from the waste were calculated using the assumption of equilibrium partitioning between the waste and infiltrating water. While this assumption simplifies the calculation of release rates, it may lead to quite unrealistic values of contaminant concentrations in leachate. In general, the equilibrium assumption results in higher initial concentrations of contaminants in leachate than would be anticipated if the release of contaminants from the waste were modeled more using more realistic chemical and physical processes. This, in turn, would result in a higher calculated risk to groundwater resources. In fact, for some contaminants of concern that were monitored in leachate at EMWMF, measured concentrations would seem to be significantly and consistently less than those that would have been predicted from assuming equilibrium between the waste and water.

The partition coefficients used were generally taken to be representative of equilibrium between clay-rich soils and water. Because more than half of the waste matrix is expected to consist of demolition debris, including some equipment as well as large quantities of concrete rubble and structural steel, these partition coefficients may not be appropriate. For certain key contaminants that will be present in much of the Y-12 demolition waste, including uranium and mercury, the release rate from demolition debris is likely to be significantly higher than that from a clay-like waste form. Thus the use of an equilibrium model to describe partitioning from soil-like waste into the fluid phase may lead to either values in leachate that are unrealistically high or low, resulting in some of the proposed EMDF WAC being unnecessarily stringent while WAC for other contaminants will not be protective.

Because of the abundant data available from monitoring of landfill wastewater at EMWMF, DOE had an opportunity to test the equilibrium model against actual measured values, and to adjust the model or replace it with another, such as a mass transfer limited approach to contaminant release. While the contaminant inventory of waste disposed at the EMWMF has not, unfortunately, been adequate to use for derivation of release rates for many isotopes and hazardous chemicals, it would seem to be adequate to give valuable bounding information concerning the release rates of many problematic contaminants, including uranium, from both soil-like waste and debris. The fact that DOE did not to use these data to ground their assumptions in reality raises doubts concerning DOE's ability or commitment to accurately model facility performance.

(4) The travel time through the vadose zone was computed using an overly simple approach. The Hydrologic Evaluation of Landfill Performance (HELP) model was used in some cases to inform the parameterization of the calculations, but the actual computation of travel time treated the liner system, constructed buffer, and underlying residuum as a single saturated (or nearly so) and homogeneous medium. All effects due to geometry, those resulting from pooling on the low end of the sloping liner or those from the discrete nature of failures in the liner system, were completely ignored. Mechanical dispersion was ignored, and solutes were assumed to be instantaneously adsorbed throughout the vadose zone. These assumptions all contribute to underestimation of initial breakthrough times for contaminants reaching the water table by at least an order of magnitude, and perhaps several orders of magnitude. For isotopes with relatively short half-lives (decades) and innocuous daughters, this may result in the model showing that all the contaminant is gone before it can reach the water table, whereas a more realistic travel time would result in some of the contaminant migrating into groundwater before it had all decayed. Similarly, the risk of hazardous chemicals that degrade over a few decades under environmental conditions might be underestimated. Even for isotopes with long half-lives or refractory hazardous chemicals, like mercury, the time frame for migration to groundwater using the simplified modeling approach taken by DOE might be so long (millennia) that it would be argued that any future risk is irrelevant and waste with high concentrations of the contaminant can be disposed in the facility and pose no problem. A more realistic travel time might reveal earlier risks to water resources or human health.

(5) DOE assumes that transport in groundwater can be modeled by one-dimensional advection and dispersion through porous material with equilibrium partitioning onto the solid matrix and average velocities obtained from porous media flow models such as MODFLOW/MODPATH. Several tracer tests have been performed on the Oak Ridge Reservation, including some in Bear Creek Valley and similar rocks in Melton Valley. The tests results differ, mainly depending on whether they were conducted in predominantly clastic or carbonate lithology and whether they were forced gradient or natural gradient tests, but they all (with a single exception) show rapid first arrival times for tracer. In particular, the models for the EMWMF RI/FS and EMDF RI/FS drafts predicted travel times for conservative solutes of decades over a flowpath travelled by a tracer in one to two days. Along these rapid flowpaths, contaminant retardation due to partitioning onto solids is expected to be minimal, but the model would predict travel times of millennia for solutes that are highly adsorbed on minerals. DOE has abundant results available to use for checking, parameterizing, and potentially modifying the

groundwater transport model, but has so far failed to do so. This suggests questionable competence or commitment on the part of DOE and their contractors to develop a protective WAC for EMDF.

Response: Please refer to the response to earlier comment regarding the presentation of the final WAC for the EMDF.

Comment 168.15: Page 13.

"Wastewater Management. The operation of the onsite disposal alternative at the Central Bear Creek Valley Site 7c will generate wastewaters in the form of leachate and other landfill wastewater (waters that come into contact with the waste) that will likely require treatment prior discharge into surface water."

DOE's operation at EMWMF has been plagued by excessive generation of wastewater. To facilitate ease of operation and rapid disposal of large quantities of demolition debris, DOE has sometimes allowed the working face of the landfill to fill one or more of the cells. Best management practices to separate "clean" stormwater that had no contact with the waste from leachate and contaminated stormwater were implemented only after a decade of operations. In general, DOE prioritized rapid disposal and ignored waste management rules and guidance that direct waste management operations to minimize wastewater generation. In 2002, the facility actually flooded, with wastewater washing over a berm and entering Bear Creek. During the 2005 time frame, concentrations of strontium 90 discharged from EMWMF to Bear Creek, a stream which loses flow directly to groundwater, were two orders of magnitude higher than the maximum contaminant level for strontium 90 stipulated by EPA. While wastewater management at EMWMF has significantly improved over the past decade, this is almost certainly due to regulatory pressure rather than a renewed DOE commitment to honor the spirit of the antidegradation statements in the Clean Water Act. DOE should make more effort to minimize wastewater generation at a future facility.

Response: As described in this ROD, Phase I construction on the EMDF will include numerous engineering features to manage surface water and wastewater and will consider all lessons learned from 20 years of operation at EMWMF (such as aggressively deploying rain shed covers on completed portions of the landfill).

Comment 168.16: Page 13.

"Landfill wastewater from EMDF would be staged and sampled. If sampling results indicate that water quality complies with the RAOs and ARARs (e.g., CERCLA discharge limits) to be agreed to by EPA, DOE, and TDEC, then the water would be directly discharged without treatment to Bear Creek."

Based on experience at EMWMF, CERCLA does not provide a clear way to determine wastewater discharge limits from a waste disposal facility. At EMWMF, no wastewater regulations were incorporated as ARARs into the Record of Decision. After nearly two decades of operation during which landfill wastewater has been discharged into a small tributary of Bear Creek, there is still disagreement between DOE and the regulatory agencies concerning numerical discharge limits and the point of compliance where the limits should be applied. Of the contaminants of concern present in EMWMF waste, certain hazardous chemicals, chiefly pesticides, and some fission products which are mobile in water, may arguably have "CERCLA discharge limits" imposed to protect human health and the environment that are on the same order as practical detection limits, complicating matters further. It seems probable that the EMWMF will close without the issue of discharge limits having been resolved, and without a modification of the ROD to address the legal status of wastewater discharges that occurred over the life of the facility.

To avoid a similar impasse at a new disposal facility, the FFA parties might opt for technology-based standards rather than numerical limits for a variety of contaminants of concern (COCs). This would require that all wastewater be treated rather than staged and tested for particular COCs prior to treatment or release, as described above. This approach would incentivize DOE to minimize wastewater generation and would be consistent with the statewide requirement that wastewater be treated at all municipal and industrial landfills.

Response: The ROD contains ARARs for wastewater management; the FFA parties will agree to the wastewater discharge limits prior to operation of the facility.

Comment 168.17: Page 13.

> *"The Administrative Record for the management and discharge of this wastewater is not yet complete, and the evaluation of alternatives to address wastewater management in a D2 Focused Feasibility Study is currently under dispute between the Agencies. The ROD will describe CERCLA and NCP-compliant discharge requirements for wastewaters from the EMDF."*

CERCLA regulations were intended to expedite clean-up of hazardous substances that pose a threat to human health and the environment. CERCLA was not designed to provide a regulatory basis for either disposal of waste or discharge of wastewater. There is thus little guidance available for how to develop "CERCLA discharge limits," leading to much opportunity for dispute among the FFA parties and the possibility that discharge limits will be less protective than those at a facility permitted for disposal of hazardous and radioactive waste. The Focused Feasibility Study (FFS) dispute should be resolved and the EMWMF ROD should be amended to include ARARs for wastewater management prior to submission of the EMDF ROD to regulators.

Response: The ROD contains ARARs for wastewater management; the FFA parties will agree to the wastewater discharge limits prior to operation of the facility.

Comment 168.18: Page 14. *"Key ARARs."*

The list of ARARs has varied from one draft of the RI/FS to the next. ARARs for wastewater management at the proposed facility as well as for EMWMF are in the Focused Feasibility Study discussed above rather than in the EMDF RI/FS. The dispute on the FFS must be resolved before a complete set of ARARs can be established for an onsite disposal alternative.

Response: The dispute over the Focused Feasibility Study has been resolved prior to issuing this ROD. The ROD contains ARARs for wastewater management.

Comment 168.19: Page 14.

> *"Action-specific ARARs affect how EMDF will be designed and operated. Key aspects of the RCRA, TSCA, and state radioactive waste regulations are used to determine how to ensure long-term protectiveness of EMDF, both through the design and during operations and closure."*

Regulations that prescribe design and operational requirements for a landfill are typically understood to be for ensuring the short-term effectiveness of waste containment. Rules that are specifically aimed at ensuring long-term effectiveness of land disposal of waste are those that stipulate geologic and hydrologic requirements for the site. Siting requirements and guidance for land disposal units of radioactive, hazardous,

and toxic waste have much in common. They generally require or express a strong preference for sites that have low topographic relief and other characteristics that minimize erosion. They express a preference for sites that can be readily monitored and will not be altered by demographic changes or human activities nearby. Sites with a shallow water table are undesirable. Streams, floodplains, wetlands, and groundwater recharge and discharge areas should be avoided.

Despite the obvious shortcomings of sites on the Oak Ridge Reservation, DOE has not fully acknowledged in this Proposed Plan or in the administrative record that locations in Bear Creek Valley and elsewhere on the Oak Ridge Reservation are inadequate when evaluated against standards for land disposal units. While DOE asserts that robust landfill design will lead to effective long-term isolation of radioactive and hazardous constituents in the waste, any design sufficient to compensate for the intrinsic deficiencies of Oak Ridge sites would be expected to raise disposal costs to levels that would not be competitive with cost for disposal at offsite facilities. The design for the EMWMF liner and berms met the minimum requirements for a hazardous waste landfill, but had no additional protective features. Given that a drain was constructed under the landfill to lower the water table and remove groundwater that formerly discharged within the facility footprint and that liner penetrations rather than sumps were used to remove leachate from the facility, it could be argued that EMWMF as currently constructed does not actually meet the design standards intended for hazardous waste landfills.

Response: EMDF will be a permanent CERCLA waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge NPL Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this ROD. The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 168.20: Page 14.

> *"TSCA requires that there be no hydraulic connection between the site and standing or flowing surface water and that the bottom of the landfill liner system or natural in-place soil barrier of a chemical waste landfill be at least 50 feet above the historical high water table (40 CFR 761.75[b][3]). Construction of a disposal facility anywhere in Bear Creek Valley would not meet this requirement. A TSCA waiver from this requirement will be required under that statute for all of the onsite alternatives."*

This discussion of waivers gives the impression that locations in Bear Creek Valley all have such similar characteristics with respect to proximity to surface water and groundwater that they cannot be differentiated on this basis. In fact, the necessity for a waiver and the degree to which such a waiver can be justified at the various locations depends on the landfill footprint as well as the location. In the administrative record, DOE argues that regulatory waivers or exemptions should be granted based on the existence of an

engineered liner and a buffer, conflating again those features that primarily contribute to effective short-term isolation of waste constituents with those that are primarily effective over longer times.

Response: DOE believes that the justification for a waiver based on the liner and buffer zone is similar for most of the onsite disposal locations considered. That is because the engineered features of the facility are used to demonstrate that the level of protection provided by the design is greater than that provided by the siting criteria. The differences in ARAR waiver justifications between the various sites are relatively minor compared to some of the other criteria.

Comment 168.21: Page 14.

> *"A state radioactive waste disposal rule (TDEC 0400-20-11-.17[1][h]) requires that the hydrogeologic unit used for disposal shall not discharge groundwater to the surface within the disposal site. At each alternative location in Bear Creek Valley, groundwater discharges to the surface within the proposed disposal site and will not meet this requirement."*

Here DOE again gives the impression that all sites in Bear Creek Valley are equal for the purposes of meeting TDEC radioactive waste disposal rules. Although none of the locations would likely meet all TDEC requirements for siting a radioactive waste landfill (these are identical to the requirements of the Nuclear Regulatory Commission), the ability to meet TDEC rules varies significantly from one location to the next. For example, TDEC comments on D3 draft of the RI/FS concerning the location proposed in East Bear Creek (see Figure 4 of this Proposed Plan) make a convincing argument that only two or three of ten specific siting requirements listed in TDEC 0400-20-11-.17[1] would be met. For the footprint that DOE proposes in Central Bear Creek Valley, it would seem that perhaps only two or three of the ten requirements would not be met. With a smaller footprint in this or some other optimal location, perhaps only one or two TDEC siting requirements would not be met.

TDEC 0400-20-11-.17[1](b) requires that the site be capable of being characterized, modeled, analyzed, and monitored. DOE does not discuss this requirement in the Proposed Plan. However, TDEC comments on all RI/FS drafts provide numerous arguments that the site cannot be modeled, or at least that two predictions critical to landfill performance cannot accurately be made through groundwater modeling. These are (1) elevation of the seasonal high water table and (2) the velocity with which solutes will transport in groundwater. There have been numerous attempts to model groundwater in Bear Creek Valley and in the similar geologic setting of Melton Valley that have under-predicted both the seasonal high water table as well as first arrival times of tracers and real contaminants. While reasons for the inadequacies of modeling transient flow and contaminant transport in fractured rocks are now fairly well understood, models that can correctly make predictions useful for landfill design and risk assessment in such hydrogeologic settings are still not available. It would seem that TDEC 0400-20-11-.17[1](b) would require a waiver anywhere in East Tennessee. Such a waiver might be justified, but not without sufficient data and calculations to place reasonable bounds on parameters needed for landfill design and performance assessment.

Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

A TSCA waiver for two parts of TSCA 40 *CFR* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of*

paragraph (b) of this section are not met." **The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.**

- **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the ORR. Compliance with the Resource Conservation and Recovery Act of 1976 Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the U.S. Environmental Protection Agency determination that the remedy is protective of human health and the environment.**

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.**

An exemption to TDEC 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

Comment 168.22: Page 16. *"Volume Reduction."*

For the purposes of computing clean fill requirements for construction debris, DOE uses a fill/debris ratio of 2.26. This value was taken from a 2004 capacity assurance report for EMWMF. Since the compaction ratio for debris is assumed to be 2.01, the net result is that construction debris after compaction and stabilization with fill occupies about 10 percent more volume than the waste as generated. One would assume that good waste placement and compaction practices at the landfill could surely lower the fill requirement to no more than that necessary to compensate for the void reduction during compaction. The 2004 fill/debris ratio should be updated based on more recent data from EMWMF, which has implemented practices to reduce the use of clean fill over the last decade. In addition, the assumed fill ratio for debris should be validated against that at other facilities using waste minimization strategies and size reduction technologies that might be applicable at the proposed landfill.

The evaluation of the feasibility of size reduction techniques was also carried out assuming that the final waste form for equipment and heavy structural steel was equivalent to construction debris, and that fill requirements would be identical to that given in the 2004 report. It seems much more likely that if material were properly size-reduced, this fill ratio could be significantly lowered. This assumption of a generous fill requirement, compounded with the 25% uncertainty added to the total facility capacity, accounts for most of the difference between the estimated 1.5 million cubic yard as-generated waste volume and the 2.2 million cubic yard proposed facility. Assuming good disposal practices at the landfill, the lower number of 1.5 million cubic yards rather than the proposed 2.2 million cubic yard capacity would seem to provide a reasonable upper bound for the size of a facility that could accommodate future waste disposal needs in Oak Ridge.

Response: No information has been provided in the comments to justify changing the assumed volume capacity requirements for the new landfill. However, EMDF is being designed so it can be constructed in three phases, any of which can be closed/capped if the additional capacity is not

required. It is prudent to plan for the maximum expected waste volume given the challenges of siting new CERCLA disposal facilities.

Comment 168.23: Page 17.

> *"All remediation alternatives must be evaluated against the nine CERCLA evaluation criteria. The first two criteria (overall protection of human health and the environment and compliance with ARARs) are threshold criteria and must be met by any alternative considered for selection in the ROD."*

As pointed out in numerous previous comments, the administrative record that supports alternative evaluation is inadequate to demonstrate that CERCLA threshold criteria are likely to be met for any but the offsite alternative.

Response: The Administrative Record for this decision is complete when the ROD is finalized, including finalization of the Responsiveness Summary addressing all public comments received. DOE disagrees with the comment. As clearly presented in the ROD, the selected remedy meets the CERCLA threshold criteria and provides the best balance of all other CERCLA evaluation criteria.

Comment 168.24: Page 20. *"STATE ACCEPTANCE."*

This section makes it clear that the State of Tennessee cannot determine that the preferred alternative will meet CERCLA threshold criteria as described in the previous comment. Given the evident deficiencies in the administrative record that supports this Proposed Plan, it should not have been issued by DOE at this time. Given the concerns expressed by the State, TDEC's agreement to settle a dispute with DOE over issuance of the Plan in 2017 now seems premature.

Response: All State acceptance concerns voiced in the Proposed Plan are addressed by this ROD, including the completion of the Administrative Record.

Comment 168.25: Page 23.

> *"The DOE believes that the Central Bear Creek Valley site can be used for construction of a fully protective disposal facility of sufficient size to support completion of planned Oak Ridge Reservation cleanup activities. DOE believes site characterization activities completed to date indicate that with proper site development and facility design, the proposed facility can safely isolate disposed wastes from the environment."*

A statement of belief on the part of DOE would carry more weight if it were supported by a consistent, reliable technical evaluation. The various versions of the RI/FS and other supporting documents do not provide the basis for such an evaluation. Approximately twenty years ago, DOE expressed a similar belief with regard to EMWMF, but failed to:

(1) collect sufficient data on site geology and hydrology to permit optimum design of the landfill,

(2) build a facility that could meet the regulatory siting requirements in the Record of Decision that authorized its construction,

(3) collect sufficient usable background water quality data to develop an adequate groundwater monitoring program,

(4) anticipate wastewater management needs,

(5) develop and implement credible waste acceptance limits,

(6) optimize use of facility capacity by waste minimization and volume reduction.

Why should the public accept the notion that DOE's beliefs are grounded in reality? See Attachment 1 for additional details concerning problems at EMWMF, and on lessons learned with that disposal facility that should be incorporated into plans for a future on-site landfill for CERCLA waste.

Response: DOE is confident in the technical information available to support the selected remedy. DOE does not agree that the capacity of EMWMF has been wasted or that operations at EMWMF have been mismanaged. Since EMWMF began operations in 2002, about 200,000 waste shipments have been made safely to the facility and approximately 80 percent of the landfill capacity has been used to date. DOE has sanctioned independent reviews or audits of the EMWMF operations from experts in the construction and operation of disposal facilities, DOE-Headquarters, and the environmental regulatory agencies. Results of the independent reviews have identified no immediate concerns with the performance of the facility and have confirmed that operations are being conducted following all ARARs.

Comment 168.26: Page 23.

> *"DOE agrees with the State that remediation of mercury residuals remaining at the Y-12 site is a priority for the Oak Ridge cleanup program. While the vast majority of the mercury retrieved during site remediation will be isolated and stored for off-site disposal, some residual levels of mercury associated with building rubble, soils and drained equipment are proposed for onsite disposal."*

To date, DOE has not offered even a general plan for how they might isolate the vast majority of mercury remaining in building structures prior to or during demolition. DOE has stated that less than about 150,000 cubic yards of material generated by demolition of four WEMA buildings at Y-12 will be contaminated with mercury, but has given no indication of the volume of material that might require treatment under the 40 CFR 268.40 treatment standards for high mercury content wastes. DOE has not offered a plan for segregation of these high mercury content wastes (> 260 milligrams/kilogram mercury). Mercury in elemental form is present in WEMA buildings, and estimates of mercury spills in buildings range in the hundreds of kilograms. A Union Carbide task force in 1983 provided a "very rough guess" of 60,000 pounds of mercury lost to building structure. This quantity could contaminate over 50,000 cubic yards of concrete at concentrations above the 260 milligram per kilogram limit of the standard. Such waste would require thermal treatment before it could be disposed at a landfill.

Response: Plans for segregating mercury prior to and during demolition are the responsibility of the generating project and are not addressed in this disposal decision. However, mercury in the elemental liquid form is sent offsite for disposal. All attempts are made to remove this liquid elemental mercury from the waste prior to disposal. In addition, hazardous mercury waste (D009) is prohibited from disposal in the EMDF.

Comment 168.27: Page 23.

> *"It is important to recognize this contamination is currently proximate to ground and surface water resources, and in a largely uncontrolled setting. The objective of the onsite disposal proposal is to remove contamination from this setting and place it in an engineered facility that eliminates ongoing environmental impacts."*

While this is certainly true, the environmental impact of moving debris that is lightly contaminated with mercury to an engineered disposal facility would be minimal compared with the impact of isolation, segregation, and removal of elemental mercury or other forms of high mercury content wastes. The key to reducing mercury impacts from WEMA is to deploy a strategy that allows for identification of mercury hot spots during characterization, isolates these hot spots so that the mercury is not mixed into clean material during the demolition process, and minimizes releases to soil and water during demolition and waste removal. Given the difficulty of these tasks, it is not surprising that DOE has provided few details as to how they might be achieved, but they are nevertheless much more critical to protection of human health and the environment from mercury impacts than authorization of another on-site waste disposal facility.

Response: Plans for remediating mercury from the West End Mercury Area are not addressed in this disposal decision.

Comment 168.28: Page 23.

> *"Use of underdrains at disposal facilities is an engineering approach employed by multiple disposal facilities in the East Tennessee region as a means of enhancing landfill stability and performance."*

Based on my knowledge of landfills in East Tennessee, many are constructed on ridges formed in the Knox formation. While this is not ideal, as the Knox formation is known to be karstic, there would be few problems with proximity to surface streams in this setting. TDEC refuted this assertion at a meeting sponsored by the Sierra Club in Oak Ridge, providing evidence that there was perhaps only one other drain that was comparable to the one under EMWMF at landfills of all types throughout the entire state.

Response: Although considered in the evaluation of the alternatives in the RI/FS, DOE's selected remedy has no reliance on permanent underdrains to intercept the groundwater table.

Comment 168.29: Page 26.

> *"DOE will be responsible for maintaining, reporting, and enforcing, as necessary, land use controls. DOE will retain ultimate responsibility for the integrity and protectiveness of the remedy."*

The long-term burden of enforcing land-use controls in perpetuity does not seem to enter the cost–benefit analysis that DOE has made between onsite and offsite alternatives. The ORR is in a populated area, and DOE has had difficulty preventing intrusion of the public into secure areas. The population around the ORR is projected to grow faster than the population around the offsite facilities identified in this Proposed Plan. TDEC (NRC) siting criteria include Rule 040020-11-.17(1)(c), which states;

> "Within the region where the facility is to be located, a disposal site should be selected so that projected population growth and future developments are not likely to affect the ability of the disposal facility to meet performance objectives."

One of the performance objectives in TDEC rules is protection of individuals from inadvertent intrusion. DOE has argued that this performance objective is not relevant and appropriate and should not be considered an ARAR for the purposes of this CERCLA action, because they will control land use. However, land-use controls would almost certainly be less costly and more effective at the offsite locations, which are in arid areas more distant from population centers.

Response: The design of the EMDF will include appropriate controls to protect individual from inadvertent intrusion as required by ARARs. DOE has clearly presented information in the ROD regarding the design of the EMDF and the institutional controls that will be put in place to ensure the long-term protectives of the facility.

Part 2 (from November 7, 2018 public meeting): I am Sid Jones. I don't live in Oak Ridge, and I don't own any property around the reservation, so I don't know whether I'm much of a stakeholder or not. I also really don't have a position on what DOE is proposing here, because they hadn't given us that much information yet, as Brian Paddock was saying. If they want good public input, come back, you know, later and ask, after you've got some waste acceptance criteria or some preliminary waste acceptance criteria. Come back after you've really got a water table out there at the site. You know, come back with better information and ask the public then.

So I really kind of just showed up not so much to make comment, but to share some insight that I have on Oak Ridge radioactive waste management. A few of my retired colleagues and I, we put together some information, really, on how onsite disposal of CERCLA waste has been going here historically, and I brought in a few copies to distribute, if anybody wants them. Some of you folks have already seen this. I probably didn't bring enough copies.

And I just kind of want to conclude with kind of a big-picture statement. It seems to me that Oak Ridge Environmental Management, they've been kind of occupied with reducing the visual footprint. You know, it's a pretty big task just to keep the demolition going, keep the money flow going, keep the workflow going, and deal with health and safety. And I think they've done, you know, a reasonable job on that. But I think maybe they have kind of lost – they've sort of not really examined how effective some of these actions may be, particularly effective long term in terms of protecting the health and environment and reducing releases to the environment.

And I'm glad to see, you know, so many people here tonight. I'm probably the only person in the room that read pretty much all of the administrative record, because I date back even before some of the contractors who were writing more recent ones. So I just encourage everybody to – I've got stuff to distribute that basically verifies some of what Mr. Paddock was saying about problems with the first facility. I think we solved a lot of problems with the first facility over time, but we don't want to set ourselves up for having to do that again in an ad hoc manner. I'm going to go to the back of the room and hand stuff out.

Response: DOE thanks you for your participation in the public comment process.

Comment 169: Comment from Axel C. Ringe, Tennessee Chapter Sierra Club

Thank you for the opportunity to comment on the Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste (the Proposed Plan)[1] on behalf of the 140,000 members and supporters of the Tennessee Chapter of the Sierra Club.

The Sierra Club does not support the preferred alternative for establishment of a new hazardous/toxic/ radioactive waste disposal facility (EMDF) on the Oak Ridge Reservation (the Onsite Disposal Alternative) for the following reasons:

1. DOE has not provided sufficient information on some significant aspects of the analysis of alternatives to allow informed comment by the public. Accordingly, we ask that the public comment period be extended to allow time for DOE to provide information on the following topics and give the public time to review and comment on the new information:
    a) Details of waste acceptance criteria and requirements for waste characterization prior to acceptance.

b) Full details of the comparative analysis of costs for the Onsite and Offsite alternatives.

c) The specific waivers of regulatory requirements that would be requested for each of the Onsite options and the rationale for each requested waiver.

d) Treatment technologies that have been evaluated or are planned to (1) reduce waste volume in the disposal facility and (2) immobilize any mercury waste prior to disposal.

Response: The U.S. Department of Energy (DOE) has conducted additional work needed to support selecting a remedy in the Record of Decision (ROD). DOE has worked with the other Federal Facility Agreement (FFA) parties to agree to a final list of applicable or relevant and appropriate requirements (ARARs), and a final approach for the waste acceptance criteria (WAC), and discharge limits. As these final elements did not change the essence of the disposal facility design nor change any of the protectiveness, effectiveness, implementability, or cost evaluation criteria, no additional public comment is required; however, with submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

2. DOE's preferred site in Central Bear Creek Valley (CBCV) and the West Bear Creek Valley (WBCV) option would add to the inventory of contaminated land on the Oak Ridge Reservation by putting waste in a clean area that is a greenfield.

Response: DOE believes that multiple sites in Bear Creek Valley can support construction of a protective landfill for wastes planned for onsite disposal. Protectiveness will be assured through a combination of facility engineering, restrictions on waste acceptance, and long-term monitoring and maintenance. The site selected in the Central Bear Creek Valley for the Environmental Management Disposal Facility (EMDF) provides a controlled location within the Oak Ridge National Priorities List Site and is located in an area that is not being considered for reindustrialization or reuse. The Central Bear Creek Valley Site is in the same valley as the existing Environmental Management Waste Management Facility (EMWMF), along with several other Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) areas in the Bear Creek Valley. The site allows waste to be placed between two tributaries and offers hydrologic separation from Pine Ridge. The slope of the Central Bear Creek Valley Site is not as steep as other sites considered, thereby minimizing the need for surface water diversion. Based upon strong State preferences related to site hydrology, the FFA parties have agreed to use of the Central Bear Creek Valley site.

3. We believe that DOE would not need to be seeking a new landfill at this time if the existing EMWMF had been managed properly. Specifically, if waste had been characterized before disposal to determine the best disposal path, much less waste would have been placed there.

Response: DOE does not agree that the capacity of EMWMF has been wasted or that operations at EMWMF have been mismanaged. Since EMWMF began operations in 2002, about 200,000 waste shipments have been made safely to the facility and approximately 80 percent of the landfill capacity has been used to date. DOE has sanctioned independent reviews or audits of the EMWMF operations from experts in the construction and operation of disposal facilities, DOE-Headquarters, and the environmental regulatory agencies. Results of the independent reviews have identified no immediate concerns with the performance of the facility and have confirmed that operations are being conducted following all ARARs. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the EMWMF,

provided characterization allows this path. The waste disposal hierarchy will also be applied for EMDF waste disposal.

4. Based on available characterization data (noting that there is not yet enough hydrologic characterization of the CBCV site to support a decision), none of the candidate sites is suitable hydrologically. The presence of abundant surface and ground water would require significant engineering effort to manage, both through the operating period and after closure, relying on diversion structures, gravel drains, pipes, liners, and caps, that can be expected to fail in the long term, with life expectancy only of decades.

   Response: All disposal facilities depend on liners, caps, and water diversion features. The life expectancy, as demonstrated in several scientific journals, greatly exceeds hundreds of years. Continued maintenance is a key element of some aspects such as controlling erosional features on covers. DOE will maintain the disposal facility in perpetuity.

5. Proximity to residential areas would exclude these sites from consideration if the EMDF were being sited as a new radioactive waste disposal facility.

   Response: The EMDF location is in compliance with all ARARs associated with the proximity to residential areas. No waivers are being requested for these requirements.

6. The proposal to establish a landfill on a clean site and call it a "remedial action" is a misapplication of the CERCLA statute. This proposed landfill could not be built if it had to comply with the normal environmental regulations for landfills – even for ordinary municipal landfills. The landfill only becomes possible if DOE can use the special legal rules for CERCLA remedial actions to obtain exemptions from procedural requirements and to seek waivers of some substantive requirements. The special legal provisions of CERCLA were intended to facilitate rapid action to remove wastes from contaminated areas, not to allow establishment of new waste sites that operate for decades without being subject to regulatory oversight.

   Response: The disposal facility could be built under a permit. However, under CERCLA, the disposal facility is in compliance with all ARARs, and is only requesting one waiver and one exemption. All technical requirements must be met with the same rigor as under a permit. CERCLA does not require that administrative requirements such as specific documents be addressed. There are no special "legal rules for CERCLA actions" as suggested in the comment.

   The identification of permanent solutions for the onsite and offsite disposition of CERCLA waste has always been a fundamental part of the CERCLA process. CERCLA actions are not complete without all waste that has been generated having a disposal decision. The CERCLA process has been used to support decisions for many disposal facilities across the United States, some on previously disturbed sites and others on "greenfield" sites, including many disposal sites at CERCLA facilities (e.g., Oak Ridge, Hanford, and the Fernald and Portsmouth sites in Ohio). In many of these cases, a program-level evaluation of disposal needs has been conducted under CERCLA and a final decision on disposal to apply to CERCLA actions made. Agreements reached under the CERCLA framework are enforced by the State and U.S. Environmental Protection Agency.

We therefore offer the following recommendations:

1. More prescriptive rules and guidance from programs that are meant to regulate disposal of radioactive and hazardous waste should be incorporated into the CERCLA decision process.

Response: The ARARs are the prescriptive rules and regulations that govern siting, design, construction, operation, and closure of the landfill. These have been agreed to by the three FFA parties and are included in the ROD.

2. Before an alternative is chosen for on-site disposal, the site to be used for the landfill and the waste to be disposed should be characterized well enough to ensure it can be designed to protect human health and the environment.

   Response: There are hundreds of wells in Bear Creek Valley with decades of data. This extensive data set was used to support conclusions in the Remedial Investigation/Feasibility Study (RI/FS). During preparation of the Proposed Plan, DOE began more site-specific characterization efforts at the request of the other Federal Facility Agreement parties. The additional site characterization for Central Bear Creek Valley evaluating geologic and hydrogeologic conditions was conducted in two phases. The first phase, with the referenced eight well pairs (16 wells) monitored for over a year as well as monitoring results from other existing wells in Bear Creek Valley to supplement the general understanding of the site, was used to support identification of a preferred location in the Proposed Plan and the selection of the location in this ROD. Analysis of the first phase data confirmed DOE's understanding of the site. Since then, data from 16 more wells, 32 borings, and 17 test pits were obtained as part of a second phase of characterization completed to support the design. The design, as it progresses, will be modified as needed to consider the new data. Technical Memoranda presenting the results of the initial evaluation can be found in the Administrative Record.

3. Credible limits on the amount and concentration of hazardous chemicals and radionuclides that can be disposed in a landfill in Oak Ridge must be established and used to determine the volume of waste that should be buried on-site.

   Response: RI/FSs for disposal facilities sometimes contain placeholder WAC, as was done for EMDF. The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation (ORR) indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

We would support, after consideration and implementation of our recommendations above, the choice of the hybrid alternative rather than the preferred alternative put forth by DOE in this Proposed Plan. The hybrid alternative proposes that a disposal facility be located in Bear Creek Valley adjacent to the

Environmental Management Waste Management Facility (EMWMF) between tributaries to Bear Creek. The hybrid alternative also provides for significant quantities of waste to be shipped offsite.

Also, we support and incorporate the comments by Sidney W. Jones, Ph.D., P.E., P.G. and AFORR by reference.

1 Att. ##, U.S. Dep't of Energy, *Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste* (Sept. 2018) [hereinafter "Proposed Plan"]; Att. ##, U.S. Dep't of Energy, *EMDF Public Comment Period Ends*, Dec. 10, 2018, https://www.energy.gov/orem/events/emdf-public-comment-period-ends.

Response: DOE thanks you for your participation in the public comment process. The Hybrid Alternative is a combination of onsite and offsite disposal, thereby using a smaller onsite landfill. However, due to the large volumes of waste that were to be disposed offsite under this alternative, the major reasons for not selecting the total offsite disposal alternative were still an issue. The transportation risks are considered unacceptably high and the costs for disposal would limit the amount of remediation work that could be accomplished. Additionally, once the smaller landfill was full, the remediation effort could be stopped if there were any issues with either transporting waste across the country or with any of the offsite disposal facilities.

Responses to comments from Sidney Jones and Advocates for the ORR are included in this Responsiveness Summary.

Comment 170: Comment from Sandra K. Goss

I write on behalf of Tennessee Citizens for Wilderness Planning, an Oak Ridge-based environmental advocacy organization, about the proposed hazardous waste landfill on the Oak Ridge Reservation.

TCWP has a long time interest in the Oak Ridge Reservation. In the 50+ year history of the organization, many TCWP members (including its founders) have worked at labs and offices on the reservation. Much of the reservation is unspoiled and represents an important part of East Tennessee's dwindling stock of large habitat acreage.

TCWP has sponsored several informational programs about the history, programs, flora and fauna of the reservation and educational outings on Freels Bend, and advocated for conservation management of the Black Oak Ridge Conservation Easement.

We advocate the use of brown fields in the reservation for the proposed waste dump. Given that the proposed sites are on unspoiled land, and that very little information has been made available to the public, we urge that more information be provided about the proposed sites.

Further, mitigation needs to be provided if the proposed landfill is sited on the Oak Ridge Reservation. We strongly urge development and execution of a holistic planning process for the reservation. Every other Manhattan Project site has had such a plan. Tennesseans deserve to have this natural resource used as efficiently as possible. A reservation-wide planning process is an important step toward wise land usage on the reservation.

The reservation has several special, unspoiled areas that are worthy of permanent protection from development and despoliation. It is hoped that a reservation-wide planning process would identify these areas and enable their conservation.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates the desire to keep Oak Ridge and the surrounding area in a natural state to the degree possible. DOE believes that multiple sites in Bear Creek Valley can support construction of a protective landfill for wastes planned for onsite disposal. Protectiveness will be assured through a combination of facility engineering, restrictions on waste acceptance, and long-term monitoring and maintenance. The site selected in the Central Bear Creek Valley for the Environmental Management Disposal Facility (EMDF) provides a controlled location within the Oak Ridge National Priorities List Site and is located in an area that is not being considered for reindustrialization or reuse. The Central Bear Creek Valley Site is in the same valley as the existing Environmental Management Waste Management Facility, along with several other Comprehensive Environmental Response, Compensation, and Liability Act of 1980 areas in the Bear Creek Valley. The site allows waste to be placed between two tributaries and offers hydrologic separation from Pine Ridge. The slope of the Central Bear Creek Valley Site is not as steep as other sites considered, thereby minimizing the need for surface water diversion. Based upon strong State preferences related to site hydrology, the Federal Facility Agreement parties have agreed to use of the Central Bear Creek Valley site. From the alternatives within Bear Creek Valley considered for locating the EMDF, DOE considered brown field sites first, but ultimately the Central Bear Creek Valley site provided the most beneficial attributes in total over those other sites.

Comment 171: Comment from Marian Varner

I would like to give my comments regarding the proposed landfill in the DOE reservation in Oak Ridge, TN. As a long-time Oak Ridge resident, I understand that various radioactive wastes that have been produced on DOE land must be cleaned up and disposed of. However, the proposed landfill does not seem to be a good longterm solution to this problem. As I understand it, the groundwater in the proposed site is high enough that any containment system of reasonable cost is likely to fail at some time in the future. Residential areas are close enough that they would be affected by the contamination caused by such a failure.

I also understand that the usual environmental regulations for this landfill would be waived, by using the special rules for Superfund sites. It would be much better if the landfill would abide by the standard environmental laws, since those laws have been enacted to provide protection to nearby areas.

I hope that DOE will reconsider this project and find a new site that would be better suited for this waste.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE believes that multiple sites in Bear Creek Valley can support construction of a protective landfill for wastes planned for onsite disposal. Protectiveness will be assured through a combination of facility engineering, restrictions on waste acceptance, and long-term monitoring and maintenance. The site selected in the Central Bear Creek Valley for the Environmental Management Disposal Facility (EMDF) provides a controlled location within the Oak Ridge National Priorities List Site and is located in an area that is not being considered for reindustrialization or reuse. The Central Bear Creek Valley Site is in the same valley as the existing Environmental Management Waste Management Facility, along with several other Comprehensive Environmental Response, Compensation, and Liability Act of 1980 areas in the Bear Creek Valley. The site allows waste to be placed between two tributaries and offers hydrologic separation from Pine Ridge. The slope of the Central Bear Creek Valley Site is not as steep as other sites considered, thereby minimizing the need for surface water diversion. Based upon strong State preferences related to site hydrology, the Federal Facility Agreement parties have agreed to use of the Central Bear Creek Valley site. From the alternatives within Bear Creek

Valley considered for locating the EMDF, DOE considered brown field sites first, but ultimately the Central Bear Creek Valley site provided the most beneficial attributes in total over those other sites.

Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

A Toxic Substances Control Act of 1976 (TSCA) waiver for two parts of TSCA 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this Record of Decision (ROD) to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

- **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the Oak Ridge Reservation. Compliance with the Resource Conservation and Recovery Act of 1976 Subtitle C landfill requirements (identified as applicable or relevant and appropriate requirements) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the U.S. Environmental Protection Agency determination that the remedy is protective of human health and the environment.**

    - **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/ slumping.**

An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

Comment 172: Comment from Leonard A. Abbatiello

I would like to record my comments about the proposed EMDF Waste Burial Site which you are proposing to build here in Oak Ridge. Oak Ridge has long accepted the burden of being a nuclear waste dumping ground without effective community involvement and adequate community compensation.

I am unequivocally against any future local burdens without adequate federal financial compensation. Oak Ridge has carried special burdens for many years and it must stop!

Over the years, Oak Ridge was initially created and rose to the challenge to eliminate the national threat of Nazi tyranny. It did so without regard for those local citizens who paid the greatest price – the local

residents. The City of Oak Ridge was created by "The Atomic Energy Community Act of 1955". It is the only document that provides for the special payments; federally owned property is tax exempt, for the special burden that the presence of the AEC/DOE facilities created for our local governments. The presence of a contaminated, nuclear waste sites aura has significantly impacted our ability to attract clean industry and develop a normal tax base. Today, the DOE facilities pay a miniscule PILT based upon its value as a clean, undeveloped agricultural woodlands environment. The SNS Facility is even sales tax exempt from all purchases without any sunset provisions. You are now proposing an expanded nuclear waste burial site within the close proximately of residential homes creating an image for Oak Ridge far different than that of a clean woodlands environment. The DOE PILT should be renegotiated to pay the difference between the reality of a nuclear waste burial ground and a pristine woodlands environment capable of some type of development. There are provisions within the AECA 1955 foundation document to renegotiate the basis of the PILT payment and provide us equitable compensation while reducing DOE management costs and fostering improved community relations!

Attached you will find a July 19, 2004 letter to the then DOE Secretary of Energy, Mr. Spenser Abraham, from the then Tennessee Senators William H Frist and Lamar Alexander addressing this very issue. This letter was never answered. Expansion of our nuclear waste burial sites within Oak Ridge should not be even considered until DOE addresses the issues of past broken promises, failed self-sufficiency programs and inadequate land transfers which burden our citizens. The current DOE annual PILT payment equates to less than 1/16 of the payment any normal industry would make to our host County and City.

Propose to renegotiate the PILT under the AECA of 1955 we might consider a properly designed, sited and managed EMDF that reflects the needs of DOE and needs and responsibilities of the community. Oak Ridge citizens continue to carry an unacceptable financial burden because of the presence of the DOE facilities and their inherent characteristics. Your arguments are that it is cheaper to bury here rather than transport elsewhere, but such a comparison does not consider the image impact that a radioactive nuclear waste burial site has on marketing that community. The presence of radioactive waste impact physical health, financial, and image induced which all have inhibited normal commercial/industrial expansion here in Oak Ridge.

The DOE's record of continued stonewalling, poor community involvement, ignoring responsible local governments and its documented failure to respond to Congressional authority are all reprehensible. I expect DOE to expand the waste burial site without valid consideration of its real impact on this community as it has done previously! But, you can do better!

Anderson County and Oak Ridge should not consider any nuclear waste burial site expansion until DOE answers the July 19, 4004 Letter of our Senators Frist and Alexander and offers a competitive PILT payment to us, the host City and County.

I believe that renegotiation of the basis of the PILT would be beneficial to both DOE and the host communities. DOE could benefit by achieving simplified internal management methods and the host communities through fair PILT revenues and improved communication channels.

United States Senate
WASHINGTON, DC 20510

July 19, 2004

The Honorable Spencer Abraham
Secretary
Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Mr. Secretary:

We are writing on behalf of the City of Oak Ridge and Anderson and Roane counties regarding their efforts to work with the Department of Energy to achieve financial self-sufficiency.

The Department has long pursued a national policy of helping our nation's nuclear cities achieve financial self-sufficiency. The Atomic Energy Community Act of 1955 provided special payments to our nation's nuclear cities to mitigate the special burdens created by the presence of large federal facilities that severely impacted basic infrastructure and service capabilities and withdrew significant lands from the local tax base. Various arrangements between the federal government and the nuclear cities have been tailored over the years to address the aforementioned burdens, but such efforts have fallen short in Oak Ridge. The Department's continued control of significant lands in Oak Ridge has imposed greater burdens on the remaining taxable base and discouraged economic growth and development.

In 1985, a new agreement was signed between the Department and the City of Oak Ridge and Anderson and Roane counties with the hope and expectation that financial self- sufficiency might be achieved. The 1985 agreement specifically provided for lump-sum payments and the transfer of 10,405 acres termed "self-sufficiency parcels." The communities accepted lump sum payments in exchange for a commitment from the Department to transfer land for the purposes of establishing a local tax base sufficient to provide the revenues necessary to supplant federal annual assistance payments. Today, 18 years later, many aspects of this agreement remain unrealized. The lands identified in the 1985 agreement have not been transferred to the local governments; and, accordingly, the anticipated enhanced tax base to achieve self-sufficiency has not been realized. In fact, only 23 percent of the self-sufficiency parcels have been transferred by the federal government to the City of Oak Ridge and Anderson and Roane counties.

In light of the continued difficulties experienced by these Tennessee communities, the following language was included in the Fiscal Year 2004 Energy and Water Appropriations bill.

"The Committee is aware of concerns expressed by the City of Oak Ridge and Anderson and Roane counties in the State of Tennessee regarding the level of financial assistance provided by the Department of Energy. As a Manhattan Project atomic energy community, the Department has a special relationship with Oak Ridge. Although the area receives modest support from the Department as part of the Payment in Lieu of Tax program, economic development has been severely limited by extensive Federal ownership of lands, aging infrastructure, and disproportionately high local tax rates. Unfortunately, Oak Ridge has not achieved the level of self-sufficiency envisioned by the Atomic Energy Community Act of 1955. The Committee urges the Department to work with city and county officials to develop a plan to help the Oak Ridge community achieve financial self-sufficiency."

In February of this year, during the Senate Energy and Natural Resources Committee's hearing on the Department's fiscal year 2005 budget, Senator Alexander submitted a written inquiry asking how the Department planned to help the Oak Ridge community achieve financial self-sufficiency. The Department's response, received on May 4th, provided detailed information about previous efforts to help these communities achieve self sufficiency, but failed to address the critical question of how the Department would work with the city and counties to provide meaningful assistance in the future.

The Oak Ridge community believes that the land currently controlled by the Department should produce tax benefits of $280 per acre, which is comparable to similarly sized Tennessee industrial communities. To reach this goal, we specifically request that the Department develop a viable self-sufficiency plan that may include the transfer of lands identified in the 1985 agreement that have not yet been transferred, the resumption of special assistance payments, or other proposals developed by the Department. We very much hope that the Department will produce a solution or develop a process to resolve this matter by the end of this year or early next year.

The Oak Ridge community strongly supports the Department and its contractors. Tennessee takes great pride in the contributions made by the Oak Ridge National Laboratory and the Y-12 National Security Complex and treasures its relationship with the Department. We thank you for your attention to this matter and look forward to working with you in the weeks and months ahead.

Sincerely,

William H. Frist

William H. Frist, M.D.
Majority Leader
United States Senate

Lamar Alexander

Lamar Alexander
United States Senate

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. Pursuant to Federal statute, DOE may receive applications from certain state and local governments for payments in lieu of taxes (PILT), and reach agreement to make payments not to exceed the value of taxes that would have been payable for such real property in the condition in which it was acquired. The Oak Ridge Reservation was acquired in 1942 and 1943 and was predominantly assessed for tax purposes as agricultural property. DOE has current PILT intergovernmental agreements with the City of Oak Ridge as well as Roane and Anderson Counties, which have all demonstrated self-sufficiency over time; those annual agreements define the terms and conditions of PILT payments. Comprehensive Environmental Response, Compensation, and Liability Act of 1980 remedial action decisions cannot play a role in the determination of PILT payments.

Comment 173: Comment from A. Harriet McCurdy

I am currently a resident of Oak Ridge, and I attended an information session about the planned landfill at the Heritage Center. That evening I was impressed by comments that pointed out how limited the information was about how the landfill would be operated. I have since learned that the proposed site is on land that has yet to be contaminated. Aren't there contaminated sites that could be used?

My father was among the early workers in Oak Ridge, as he came in 1943. He died of a rare form of cancer that was so linked to that early work that his medical expenses were covered by the Department of Labor. He worked his entire live in the development of peaceful uses of nuclear energy and reactor design and development. In all the best ways, he was an engineer.

I am writing to call your attention to a well written position on the current discussion. I certainly do not oppose the current cleanup of the old plant sites, but I would like the powers that be to reconsider this proposed location.

I have attached a letter [see Comment 117] that says better than I can why I believe that DOE needs to reconsider its current location for the landfill. While I do not support military solutions to problems, I know all too well how that is the first option considered by my country. Please give equal consideration to the natural world and do not locate this planned landfill on "green" land.

Thank you for opening this process up to citizen comment.

Response: The U.S. Department of Energy thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic

Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 174: Comment from the Southern Environmental Law Center

Please find attached [see below] comments submitted on behalf of the Southern Environmental Law Center, the Advocates for the Oak Ridge Reservation, the Tennessee Chapter of the Sierra Club, and Tennessee Citizens for Wilderness Planning. Attachments to the letter are available at the following ShareFile link: https://southernenvironment.sharefile.com/d-sa90ed36f6de48079.

Thank you for the opportunity to comment on the Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste (the Proposed Plan).[1] Because the U.S. Department of Energy's decision to tarnish existing greenfields by constructing a new landfill for its hazardous and radioactive waste[2] could have substantial long-term effects on the communities near and downstream from the Oak Ridge Reservation, the Southern Environmental Law Center, Advocates for the Oak Ridge Reservation, the Tennessee Chapter of the Sierra Club, and Tennessee Citizens for Wilderness Planning raise the following concerns:

(1) The Central Bear Creek Valley location is not an "onsite" location as contemplated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and therefore the Department must comply with the permitting requirements of all applicable local, state, and federal laws.

Response: Through execution of the Record of Decision (ROD), the Federal Facility Agreement (FFA) parties have agreed that managing Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)-generated waste from the areal extent of contamination on the Oak Ridge National Priorities List (NPL) Site benefits from the creation, operation and closure of additional onsite disposal capacity to facilitate the effective Oak Ridge NPL site restoration, and that the preferred alternative provides a location that is in very close proximity to various areas of contamination on the Oak Ridge Reservation. As the commenter has pointed out, the proposed location lies roughly equidistantly between the vast majority of CERCLA-generated waste generating projects that support the overall Oak Ridge NPL Site restoration; given the Oak Ridge NPL Site's distinctive ridge/valley geography, the preferred alternative presents a location that the FFA parties agree provides the best balance of hydrology, geology, location, and future land use.

As the U.S. Environmental Protection Agency noted in responding to comments on the definition of onsite (see 55 FR 8689, 8690 [3/8/1990]), the permit exemption provided by CERCLA for onsite activities is more broadly available than the more restrictive boundaries of the CERCLA facility, and should enable use of adjacent areas necessary for the implementation of response actions to be consistent with the purposes of CERCLA. Alternatively, the various operable units that make up the site logically relate to one another within the boundaries of the Oak Ridge NPL Site; the site is broader than each operable unit, and is instead comprised of all those operable units combined. Finally, and notwithstanding the previous rationales, the FFA parties agreed to the preferred alternative after the State of

Tennessee advocated for the preferred alternative as a more desirable location when compared to previously identified locations that would utilize already disturbed areas from previous industrial activities. The FFA parties have agreed to authorize this remedial activity consistent with the requirements of CERCLA, have agreed to an onsite remedial activity that is protective of human health and the environment and will meet (or waive) applicable or relevant and appropriate requirements (ARARs) that would otherwise have been substantively required by permits.

(2) Even if the proposed landfill were "onsite," the Department must provide meaningful opportunity for public comment and therefore must provide comment periods after the Department concludes its characterization of the proposed landfill location and again when the Department seeks to obtain the necessary regulatory waivers.

Response: The U.S. Department of Energy (DOE) has conducted additional work needed to support selecting a remedy in the ROD. DOE has worked with the other FFA parties to agree to a final list of ARARs, and a final approach for the waste acceptance criteria, and discharge limits. As these final elements did not change the essence of the disposal facility design nor change any of the protectiveness, effectiveness, implementability, or cost evaluation criteria, no additional public comment is required; however, with submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

I. The Department must comply with all applicable local, state, and federal permitting requirements because the proposed landfill location in Central Bear Creek Valley is not "onsite" under CERCLA.

The Department has incorrectly identified its proposed landfill location as "onsite,"[3] which would imply that the Department need not comply with federal, state, and local permit requirements.[4] However, the proposed landfill location would not be "onsite" as contemplated by CERCLA.

The U.S. Environmental Protection Agency (EPA) defines "onsite" as "the areal extent of contamination and all suitable areas *in very close proximity* to the contamination *necessary* for implementation of the response action"[5] and has rejected an interpretation that the bounds of legal ownership or the CERCLA definition of "facility"[6] should determine whether a location is "onsite."[7]

Rather than being "in very close proximity" to the contamination, the Department's Proposed Plan would allow the construction of a landfill at a location that is (1) currently designated for recreational and future unrestricted use;[8] (2) located approximately 1.3 miles from the Oak Ridge National Laboratory, 3.9 miles from the East Tennessee Technology Park, and 2 miles from the Y-12 National Security Complex;[9] and (3) located, by contrast, approximately 0.8 miles from a residential area, the Country Club Estates.[10] Moreover, the Advocates for the Oak Ridge Reservation[11] and the State of Tennessee[12] have raised concerns that the proposed landfill location would not be suitable (or at least has not been proven suitable) to remediate and provide a permanent solution for the CERCLA waste at Oak Ridge Reservation.

Therefore, because the proposed landfill location would not be "onsite" as contemplated by CERCLA, the Department must comply with the permitting requirements of federal, state, and local law prior to issuing a record of decision and prior to constructing the proposed landfill.[13]

Response: See the full response regarding "onsite" under (1) above.

II. Even if the proposed landfill were "onsite," the Department must provide meaningful opportunities for public comment when the Department concludes its characterization of the proposed landfill location and again when it seeks to obtain all necessary regulatory waivers.

Even if the proposed landfill were "onsite" within the meaning of CERCLA, the Department has not satisfied its obligation to provide for meaningful opportunity for public comment. Under CERCLA, the Department must provide sufficient information to the public so concerned citizens have a meaningful opportunity to comment.[14] Prior to finalizing a record of decision on the Proposed Plan, the Department must offer a meaningful opportunity for public comment, which must include all relevant information about the proposed landfill location and the Department's regulatory obligations. As the Department itself recognizes in the Proposed Plan, there are significant informational gaps, including an unfinished characterization of the proposed landfill location[15] and proposed waivers for three applicable or relevant and appropriate requirements (ARARs) from the Toxic Substances Control Act and Tennessee law.[16] Therefore, the Department must reopen the public comment period both (1) if and when it finishes characterizing the proposed landfill location and (2) if and when it seeks to obtain regulatory waivers.[17]

CONCLUSION

The Department must not cut out public involvement or seek to use an inapplicable regulatory process when planning to construct a new hazardous and radioactive waste site in a currently uncontaminated greenfield at the Oak Ridge Reservation.

Based on the concerns raised above, we ask that before seeking to finalize a record of decision on the Proposed Plan, the Department (1) obtain all applicable federal, state, and local permits; and (2) provide meaningful opportunities for public comment when the public receives sufficient information about the characterization of the proposed landfill location and the Department's regulatory obligations.

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[1] Att. 1, U.S. Dep't of Energy, *Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste* (Sept. 2018) [hereinafter "Proposed Plan"]; Att. 2, U.S. Dep't of Energy, *EMDF Public Comment Period Ends*, Dec. 10, 2018, https://www.energy.gov/orem/events/emdf-public-comment-period-ends.

[2] Proposed Plan, at 5–6.

[3] *Id.* at 8–9.

[4] 42 U.S.C. § 9621(e)(1); 40 C.F.R. § 300.440.

[5] 40 C.F.R. § 300.5 (emphasis added). *See* Att. 3, EPA, National Oil and Hazardous Substances Pollution Contingency Plan, 53 Fed. Reg. 51,394-01, 51,406 (Dec. 21, 1988) (giving examples of locations that may be considered "onsite").

[6] 42 U.S.C. § 9601(9); 40 C.F.R. § 300.5.

[7] *In re U.S. Dep't of Energy*, No. RCRA-10-99-0106, 2000 WL 341006, at *9 (EPA ALJ Feb. 9, 2000). *See* Att. 4, EPA, National Priorities List, 83 Fed. Reg. 46,408, 46,409 (Sept. 13, 2018) ("[W]here there are uncontaminated parts of the identified property, they may not be, strictly speaking, part of the 'site.'").

[8] Proposed Plan, at 26 (explaining that the preferred alternative will require a change from existing recreational designation to "DOE-industrial use designation").

[9] *Id.* at 7, fig. 3. We calculated this approximate distance using Figure 3's scale.

[10] *Id.* at 24.

[11] Att. 5, Comments from Virginia H. Dale, Advocates for the Oak Ridge Reservation, to John Michael Japp, U.S. Dep't of Energy, Dec. 3, 2018.

[12] Proposed Plan, at 21–23. *See* Attachment A: TDEC Comments *in* Att. 6, Letter from Randy Young, Tenn. Dep't Envt. & Conservation, to John Michael Japp, U.S. Dep't of Energy, Feb. 1, 2018.

[13] *See* Proposed Plan, at 16 (describing requirements applicable to offsite disposal).

[14] 42 U.S.C § 9617(a); 40 C.F.R. § 300.430(f)(3).

[15] Proposed Plan, at 6, 21.

[16] *Id.* at 18.

[17] 40 C.F.R. § 300.430(f)(3)(ii)(B)

Response: DOE thanks you for your participation in the public comment process. With submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is addressed within the D2 ROD.

Comment 175: Comment from Todd Waterman

Part 1 (from November 7, 2018 public meeting): I came to – I came here to a PR event – was that September 13th? Is that correct? Sorry. Oh. It was the one before that, that you hosted. You explained to me that, at that time, it would cost us $800 million to ship all of this stuff out west, where you acknowledged it would be a much better place to store it, where it would be much more stable. It's very arid out there, unlike here. And you said that – you know, you talked about all the CO2 that that would generate, all of those hundreds of thousands of truckloads and all the traffic fatalities that that would entail, and I later asked you – you had a slide on that earlier, in the early part of your show, and I later asked you if it wouldn't make a lot more sense just to ship it by rail, and you said, "Oh, of course we'd ship it by train." But it didn't sound like you really had a plan figured out very well at that point. What was the plan?

DOE Representative: If we were to rely exclusively on outside disposal, the plan would involve a mixture of truck and rail traffic. For the long haul, from somewhere in Oak Ridge to its western disposal sites, it would be a train arrangement.

Mr. Waterman: Right.

DOE Representative: We would use trucks to get it to the train in Oak Ridge somewhere.

Mr. Waterman: Right. But there wouldn't be many highway facilities,

DOE Representative: That would –

Mr. Waterman: It's on a dedicated road within the reservation, right?

DOE Representative: Right. What we've done in the past is always use roads that we've built specifically for this propose on the reservation.

Mr. Waterman: Yeah and that makes a lot of sense.

DOE Representative: And trains from there. You know, there are transportation risks associated with trains, and there's transportation risks associated with trucks. We do have a pretty successful record on our transportation, but there are statistical probabilities associated with any transportation mode.

Mr. Waterman: I also asked you about the cost of shipping all that stuff out to places where it could be more safely stored long term. And you acknowledge that it would more expensive long term to keep it here, but you also said that the DOE has a yearly budget, and so you needed to do something that was cheaper short term. But that's sending an awfully big bill to us and our children and our grandchildren, I mean, forever,

which is how long you said this would have to be maintained for. That's a very long time. And if it costs more to maintain it here than it would in a place where they actually wanted it, then, you know, that you know, would end up costing us much, much more long term, would it not?

DOE Representative: The $800 million figure is the difference in cost between managing it locally, the material that would be kept here versus being shipped out west. The $800 million more out west. So it's not – it is more expensive to get it out west. There's no avoiding the cost of transporting it out there.

Mr. Waterman: Even multiplying the cost of maintaining it here forever times infinity?

DOE Representative: Right. I'm not an economist, but you have to get into discount values and time value of money and all that stuff, but it is more expensive to take it out west because of the unavoidable cost associated with transportation. It's true that in either location you have to maintain it. And it's true, as somebody commented, that we're in the business of managing sewage out west and here. We will be doing both, but those costs that are unavoidable.

Mr. Waterman: Okay. Thank you.

Mr. Waterman: I would just like to second what Brian said. Today, the day after election day, when many of us are exhausted by a long campaign season, including several of our public servants who are here today, probably several more who would be here if they weren't exhausted, it would make a great deal of sense to extend the comment period. I, for one, was completely involved in the campaigns until the early hours of this morning. I didn't have time to put together any kind of rational comment, and I would appreciate having time to do that. Thank you.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. Please see the response above provided verbally by the DOE representative in the November 7, 2018 public meeting. DOE received and granted two separate requests to extend the original comment period – one by another 45 days and the second by an additional 30 days. Therefore, the comment period was for 120 days.

Part 2: There is far too much public confusion on this controversial landfill. The DOE has withheld vital information on what wastes the landfill would actually contain, seeking approval before establishing waste acceptance criteria; exaggerated the costs and hazards of shipping it to existing DOE hazardous waste landfills like the one in Utah's salt desert; and scheduled a hearing the day after the election, when our lawmakers, our most concerned citizens, and the media were sure to be exhausted by the campaigns and too preoccupied to have properly researched the issue. The Anderson County Commission's belated awareness of the landfill issue is proof of that.

As a non-scientist, I'm struck that the scientists best qualified to understand DOE's EMDF proposal are those most skeptical of DOE's ability to properly and responsibly plan and manage this landfill despite clearly having inadequately planned and mismanaged the WMDMF. Those scientists include renowned retired Tennessee Department of Environment and Conservation (TDEC) groundwater contamination expert and triple PhD Sid Jones; his fellow TDEC retiree Dale Rector; retired ORNL hazardous waste expert Ellen Smith (also of Oak Ridge City Council); Robert G. Kennedy and fellow members of the Oak Ridge Environmental Quality Advisory Board (EQAB); prominent retired ORNL climate scientist and Nobel Laureate Virginia Dale; retired ORNL nuclear waste disposal expert Jan Berry; Sierra Club Tennessee Environmental Chair and retired DOE scientist Axel Ringe; and others.

Those scientists are joined in their criticism of the EMDF plan by TDEC itself, which is demanding DOE address seven issues with the current plan before it will grant a permit for it; long-time SOCM and Sierra Club environmental attorney Brian Paddock; prominent City of Oak Ridge officials; City Council Members; and several Anderson County Commissioners. They and many others of us believe unless DOE can adequately address our many valid concerns, much if not all of the contaminated waste should be shipped to DOE's existing Western landfills, where it would

a) be welcome

b) be far away from populated areas

c) be much less likely to contaminate groundwater, and

d) require much less monitoring and maintenance thanks to the arid conditions there.

Remedial CERCLA Actions are required to "use permanent solutions and treatment technologies *to the maximum extent possible*." The Feasibility Study's Balancing Criteria require "*long-term effectiveness* and *permanence*." "Permanent" means forever, as David Adler acknowledges. Over time, the unlikely becomes inevitable. Over time, EMDF's plastic and clay liners are certain to fail, particularly with their drain piercings. Tests show plastic liners are unlikely to last more than decades, even without earthquakes. And the Bear Creek Valley's high water table, high rainfall, floods, earthquakes, and karst all make it very vulnerable to potentially irreversible and/or costly environmental damage. No one can argue that DOE's arid Western hazardous waste landfills are less vulnerable, more permanently suitable locations. Thus CERCLA Remedy Selection requires DOE identify that maximally permanent solution as its "preferred alternative."

The EMDF proposal has not met CERCLA's Modifying Criteria of either "state [TDEC] acceptance" or "community acceptance." Indeed, local citizens' opposition to the proposal seems limited only by how aware of it they are and how well they understand the threat it poses to our environment, our reputation, our property values, and our ability to attract new business and jobs. In contrast, community acceptance is virtually guaranteed for DOE's Western landfills: they're asking for the hazardous waste, we're asking to be rid of it.

The far greater likelihood, and ultimate inevitablity, of failures, leakage, and contamination in our wet, unstable, and vulnerable environment here versus in DOE's established Western landfills also mean much more intensive and costly monitoring over "forever" here than there, in violation of CERCLA's cost criterion. Those failures would also open up EMDF's Natural Resources Damage Trustees to costly lawsuits, the cost of which we taxpayers would bear.

Oak Ridge and DOE have made vital contributions to our region, our nation, and our world. But sadly Oak Ridge is left with a legacy of contamination and a bad reputation for contamination which negatively impacts our image and our property values. DOE thus has an obligation to its host to help it rid itself of that harmful reputation. That cannot be done by continuing to move contamination around and repackage it in this inherently vulnerable location. That can only be done by getting rid of the contamination itself. Sid Jones summed it up well:

In order to put some of the stuff they want to put here on-site, they not only need to maintain restrictions on the property but they also need to maintain the final landfill cover. There is a lot of rain to deal with, and erosion, and earthquakes. Forever is a long time, and maintenance costs on a steep slope near (or over) streams and near the water table in an active seismic zone and right next to a town have just got to be a lot more than in the desert. Pulling contaminated buildings down and burying the material without adequate waste characterization and separation and without proper assessment of future risks is how you ***make*** a Superfund site, not how you clean one up.

Response: DOE thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

In further response to the comments posed in Part 2 above, please see detailed responses to citizens the commenter references at Comments 168 (Jones); 163 (Rector); 118 (Smith); 132 (Kennedy); 161 (EQAB); 117 (Dale); 182 (Berry); and 169 (Ringe).

Comment 176: Comment from City of Oak Ridge

On June 7, 2018, Mr. Adler transmitted a copy of the subject Proposed Plan to the City for review. The document has been reviewed by the City's Environmental Quality Advisory Board (EQAB) and by the City's independent technical consultant, The Ferguson Group. Copies of these reports are attached for your review.

Aside from the serious technical concerns that must be addressed, the proposed plan lacks any analysis related to Community Acceptance, one of the nine criteria upon which federal law requires CERCLA decisions to be based. Many of these issues were identified in the City's *Community Impact Assessment*, completed in September 2015, discussed in several public meetings, and transmitted to the DOE for consideration and incorporation into the CERCLA review. We believe this is a serious oversight.

The City appreciates the opportunity to review and respond to the draft document during its development. However, with many questions arising on topics ranging from mercury disposal to site characterization, I cannot recommend supporting a new nuclear waste disposal facility in our community without detailed clarifications to questions outlined in the attached report relating to mercury treatment waste disposal transport out West and concrete explanation of the exemptions requested and their impacts upon the Oak Ridge community. As City Manager, I am assessing a project that will impact generations of Oak Ridgers for decades to come.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE has provided responses to each of the comments submitted by

The Ferguson Group and the Environmental Quality Advisory Board in this Responsiveness Summary.

The purpose of the Proposed Plan is to provide a summary of the technical evaluation contained in the Remedial Investigation/Feasibility Study to facilitate a formal public review of the proposed remedy. DOE issued the Proposed Plan for formal public review and comment on September 7, 2018. The Proposed Plan clearly states on the first page that all opinions and comments on the proposed remedial action are invited. Because it is issued at the start of the public comment period, the Proposed Plan would not provide any "analysis related to Community Acceptance." As required by Comprehensive Environmental Response, Compensation, and Liability Act of 1980 regulations, DOE has carefully reviewed all comments submitted on the Proposed Plan prior to issuing this Record of Decision (ROD). This Responsiveness Summary contains DOE's formal responses to all public comments received on the Proposed Plan. An additional discussion on community acceptance is included in this ROD, Sect. 2.10.9, that discusses how public input on the proposed remedial action was considered in the selection of the final remedial action presented in the ROD.

Comment 177: Comment from John Shaw, Chair, Roane County Environmental Review Board

The Roane County Environmental Review Board (RCERB) would like to thank you for the opportunity to review the DOE document titled *Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste, September 2018*. The RCERB is very interested in the establishment of the proposed Central Bear Creek Valley (CBCV) storage site since it is located within the boundaries of Roane County.

The RCERB found that the identified document provided sufficient detail to fully understand the planned actions, construction details, monitoring, and long-term responsibilities for the proposed waste storage site. However, we did find some areas of the document that need additional review and/or clarification. These areas are:

1. The discussion on Page 9 of the *Waste Acceptance Criteria* (WAC) identifies where an example of a WAC (i.e., EMWMF) can be found but does not directly reference what is anticipated to be included in the CBCV waste site WAC. Has a preliminary/draft WAC been defined for the CBCV waste site yet? Will it be made available for public review and comment prior to final approval?

   Response: Remedial Investigations/Feasibility Studies (RI/FSs) for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for the Environmental Management Disposal Facility (EMDF). The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this Record of Decision (ROD). Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as applicable or relevant and appropriate requirements (ARARs) (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation (ORR) indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils)

and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, Federal Facility Agreement (FFA) parties-approved primary document, the WAC Compliance Plan.

2. On Page 13 also in the WAC section, it is noted that "A process – to be reviewed and approved by DOE, EPA, and TDEC that ensures the wastes generated by CERCLA response action projects meets the EMDF WAC – will be developed before operation of the facility begins." Will this process be made available for public review and comment prior to enactment?

   Response: Please see the response to item 1 of this comment response. With submittal of the D1 ROD, the FFA parties have recommended additional public engagement. That effort allows for additional public comment that is within the D2 ROD.

3. On Page 13 under the *Wastewater Management* section, the Administrative Record is noted as not yet complete. Will the Administrative Record for the management and discharge of this wastewater be open to public review and comment prior to final approval?

   Response: Pursuant to Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) regulations, the Administrative Record for the decision regarding the disposition of CERCLA waste at the Oak Ridge National Priorities List (NPL) Site is not complete until the ROD is signed and all files supporting the final decision have been submitted to the Administrative Record. However, the information and files contained in the Administrative Record are available to the public at any time including prior to the finalization of the ROD and after the final ROD has been issued and the Administrative Record has been closed.

4. On Page 14 under *Key ARARs* section, a TSCA waiver and a TDEC rule exemption (radioactive waste disposal) are indicated as required. These are mentioned again in the *Compliance With ARARS* section. Will the public have a chance to review what is being requested in these variances and provide a chance for comment prior to final approval?

   Response: Information about the needed waiver can be found in the ROD. A separate opportunity to review the waivers, once they have been identified in the Proposed Plan, is not required under CERCLA. Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

   A Toxic Substances Control Act of 1976 (TSCA) waiver for two parts of TSCA 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

   - **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information**

that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the ORR. Compliance with the Resource Conservation and Recovery Act of 1976 Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the U.S. Environmental Protection Agency determination that the remedy is protective of human health and the environment.

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/ slumping.**

An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

5. Under the *Volume Reduction* section (Page 16), "mechanical size reduction of waste" is identified as method considered for any planned volume reduction. What "mechanical" methods are being considered?

   Response: The volume reduction techniques such as mechanical size reduction were only considered for large-scale application for the Hybrid Disposal Alternative. They are not specifically under consideration for large-scale application for the selected remedy. However, any project generating waste can consider implementing these technologies prior to shipping the waste to the EMDF.

6. On Page 18 under the *Long-term Effectiveness and Permanence* section, a cover is identified for installation over the waste site that will "reduce the likelihood of inadvertent intrusion by humans by increasing the difficulty of digging or drilling into the landfill". No indication of signage or perimeter barrier was mentioned in the write-up. Are these planned for use as well?

   Response: The use of barriers and signs around the EMDF to limit access and prevent inadvertent intrusion or disturbance of the facility is described in both Table 5.1 of the RI/FS Report and this ROD (Table 2.10).

7. The concerns resulting from hydrologic conditions and proximity to groundwater require further data collection efforts to determine the suitability of the landfill design and placement. On Page 6 under Site Characteristics (and discussed on Page 8), it states that "Pre-published Technical Memorandum #1 has been submitted based on hydrologic data collection from March and April. It is unknown what this Technical Memorandum #1 concludes or includes other than the assumption that further data collection efforts are to be taken to further characterize Site 7c during both "wet" and "dry" seasons. More information should be included in this Proposed Plan as to the findings and results contained in this Technical Memorandum, particularly in relation to the location of groundwater (e.g., water table) under (depth from proposed bottom of the landfill and current surface) and near the proposed landfill. The Tennessee Department of Environment and Conservation (TDEC) has voiced these same concerns. TSCA requires the liner system or in-place soil barrier be at least 50 ft above the historically high water

table. It appears only about 13 ft of buffer/liner is proposed to separate waste from groundwater (Figures 8 and 9). Page 14 discusses the need for a waiver since no facility in Bear Creek Valley would meet this requirement. What evidence is being provided to EPA that the landfill will not present "unreasonable risk of injury to health or the environment" from PCBs, mercury, etc.?

Response: Section 2.2.1 of this ROD describes the groundwater monitoring that has been conducted to date at the EMDF site. There are hundreds of wells in Bear Creek Valley with decades of data. This extensive data set was used to support conclusions in the RI/FS. During preparation of the Proposed Plan, the U.S. Department of Energy (DOE) began more site-specific characterization efforts at the request of the other FFA parties. The additional site characterization for Central Bear Creek Valley evaluating geologic and hydrogeologic conditions was conducted in two phases. The first phase, with the referenced eight well pairs (16 wells) monitored for over a year as well as monitoring results from other existing wells in Bear Creek Valley to supplement the general understanding of the site, was used to support identification of a preferred location in the Proposed Plan and the selection of the location in this ROD. Analysis of the first phase data confirmed DOE's understanding of the site. Since then, data from 16 more wells, 32 borings, and 17 test pits were obtained as part of a second phase of characterization completed to support the design. The design, as it progresses, will be modified as needed to consider the new data. Technical Memoranda presenting the results of the initial evaluation can be found in the Administrative Record.

DOE will not update the Proposed Plan when additional data is collected. Pursuant to CERCLA regulations, the Proposed Plan is prepared and issued one time to the public to facilitate public review of the proposed remedy. Upon submittal to the public for comments on the preferred alternative, the Proposed Plan is considered complete. DOE then evaluates the comments and the ROD is issued, identifying the selected alternative. The ROD also provides responses to each of the public comments received. As additional monitoring data is collected on the EMDF site, it will be included in the Administrative Record and will be available to the public. It is also presented to the regulators to support their decision making.

8. The plan states all onsite remediation activities implement recycling and segregation of waste at the generator site to identify non-hazardous/non-radioactive waste that may be disposed of in DOE industrial landfills. It also states projected volumes of industrial waste are not contained in this analysis. Reports have been made that much non-hazardous/non-radioactive waste has been disposed of in the EMWMF (i.e., waste that could have been disposed of in DOE industrial landfills), partially contributing to the EMWMF reaching capacity sooner than expected. More explanation is needed how segregation will be performed to prevent "clean" waste from being disposed of at the EMDF and using up available space.

   Response: Waste segregation and volume reduction is a very high priority for DOE in the planning and implementation of all remedial actions at the Oak Ridge NPL Site. DOE is committed to the reduction of waste volumes going to the EMDF through waste segregation and maximizing recycling. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the Environmental Management Waste Management Facility, provided characterization allows this path. The waste disposal hierarchy will also be applied for EMDF waste disposal.

In addition, we identified an editorial correction. In the Wastewater Management section, the first sentence needs to have a "to" included so that it reads "treatment prior to discharge".

The RCERB would also like to be added to the Environmental Management Program mailing list in order to receive progress update information for the Oak Ridge Reservation. Please send these updates to John Shaw, 174 Country Club Road, Rockwood, TN 37854.

Again, we thank you for the opportunity to provide comments on this document. If you have any questions about the comments provided, please feel free to contact us for further clarification.

Response: DOE thanks you for your participation in the public comment process. Also, as requested, DOE has added the Roane County Environmental Review Board to the mailing list.

Comment 178: Comment from John Hoffelt

I am responding to the Request for Public Comment regarding the Proposed Plan for the Environmental Management Disposal Facility (EMDF) in the Bear Creek Valley, Oak Ridge Reservation, Tennessee. The U.S. Department of Energy (DOE) published the Proposed Plan for the EMDF on September 7, 2018 and requested public comments by October 26, 2018 (now extended to December 10, 2018). The full name of the Proposed Plan is "Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste."

The Proposed Plan documents that The State of Tennessee does not approve of the Remedial Investigation and Feasibility Study (RI/FS - last draft dated February 8, 2017). DOE issued the Proposed Plan despite not collecting supportive data or obtaining an approved RI/FS on which to base the Proposed Plan. With this action, DOE circumvents and short-circuits the CERCLA process and intent by issuing a plan that (1) is not based on substantive evidence documented in a peer-reviewed and agency-accepted Feasibility Study and (2) is not supported by the State of Tennessee.

CERCLA, and its implementation by the U.S. Environmental Protection Agency, clearly expects that the RI/FS process be used to gather information sufficient to support an informed decision regarding risk management and a selected remedy. A Proposed Plan is supposed to be developed and based on information and results provided in the RI/FS (see 42 U.S. Code Chapter 103, Section 121, (f)(E)(ii); Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, EPA/540/G-89/004; and "About the Superfund Process, RI/FS", www.epa.gov/superfund/about-superfund-cleanup-process#tab-4). Because DOE circumvents and short circuits this process, it is evident that DOE has selected a predetermined outcome (which may be arbitrary and capricious) based on convenience and ease of implementation rather than on rigorous scientific scrutiny of site characterization data and remedial options (including waste types, volumes, and treatment technologies).

In the Proposed Plan, DOE anticipates obtaining waivers of applicable or relevant and appropriate requirements for waste disposal sites. This fact shows that the proposed site may not withstand scientific scrutiny for protection of human health and the environment. Furthermore, the Proposed Plan lacks any consideration of waste reduction or treatment options, which may provide relief from the need to dispose of the entire waste volume and may result in a better expenditure of funds and allocation of resources.

DOE should (1) gather sufficient site characterization data to determine whether the disposal site in question (Central Bear Creek Valley) meets the requirements for mixed-waste disposal and (2) consider waste reduction and treatment alternatives before proposing a plan for onsite burial of the waste.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. There are hundreds of wells in Bear Creek Valley with decades of data. This extensive data set was used to support conclusions in the Remedial Investigation/Feasibility Study. During preparation of the Proposed Plan, DOE began more site-specific characterization

efforts at the request of the other Federal Facility Agreement parties. The additional site characterization for Central Bear Creek Valley evaluating geologic and hydrogeologic conditions was conducted in two phases. The first phase, with the referenced eight well pairs (16 wells) monitored for over a year as well as monitoring results from other existing wells in Bear Creek Valley to supplement the general understanding of the site, was used to support identification of a preferred location in the Proposed Plan and the selection of the location in this Record of Decision. Analysis of the first phase data confirmed DOE's understanding of the site. Since then, data from 16 more wells, 32 borings, and 17 test pits were obtained as part of a second phase of characterization completed to support the design. The design, as it progresses, will be modified as needed to consider the new data. Technical Memoranda presenting the results of the initial evaluation can be found in the Administrative Record.

The Hybrid Disposal Alternative includes both an onsite and offsite component for the disposal of Oak Ridge National Priorities List Site Comprehensive Environmental Response, Compensation, and Liability Act of 1980 waste. The alternative was designed to significantly reduce the footprint of the Environmental Management Disposal Facility for onsite disposal. Due to the limited capacity of the onsite disposal element of this alternative, a size-reduction facility to reduce disposal volumes had to be added to the onsite portion of the Hybrid Disposal Alternative. This helped reduce the costs of the offsite disposal aspect of the alternative. For the Onsite Disposal Alternative, use of a size reduction facility would increase the costs of the alternative with no improvement in long-term protectiveness.

Comment 179: Comment from Wendy Robinson (from November 7, 2018 public meeting)

Thank you for the opportunity to speak. I'm Wendy Robinson. I've met both of you before. I'm here because my parents live on Tuskegee Drive in Oak Ridge, and I've lived here most of my life.

The residents I believe that Dave mentioned that were about 1 kilometer from the EMDF are my parents, and there are about 10 households on that street. And that's a concern, obviously, because I think the recommended distance is 2 kilometers, but that's just a detail, and I'm not a scientist.

But my main concern is the well water issue. Those residents are on well water. And, you know, they realize the site is probably going to happen. And we all support Oak Ridge and that's a definite. But I think the request on the table would be just to ask DOE to be reasonable about making these residents whole and maybe just supply a waterline to their house for city water. That's all I have. I think the residents have expressed that, but we just wanted to make that clear again. Thank you.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE has evaluated groundwater conditions at the selected site through several phases of characterization efforts and has determined that the design of the Environmental Management Disposal Facility will be protective of human health and the environment both during construction and operation and throughout the post-closure period. DOE collected multiple years of groundwater data from the selected site prior to the finalization of this Record of Decision. Existing and new data from hundreds of wells in Bear Creek Valley support the conclusion that any contamination in the valley cannot reach residential areas based on flow directions. The site selected for this disposal facility is located such that a groundwater divide exists between the site and the nearest residents, meaning the groundwater flows away from the nearest residents and does not pose a threat to residential groundwater wells.

The law requires groundwater monitoring around any disposal facility so any unlikely releases would be identified quickly. The law also requires those releases to be remediated. There is no credible threat to any nearby water users.

Comment 180: Comment from Carolyn Hay Krause

Thank you for the opportunity to comment on the Environmental Management Disposal Facility proposed for construction in Bear Creek Valley in Oak Ridge for the purpose of burial of radioactive and chemical wastes removed from the ORNL and Y-12 sites in the decade of the 2020s.

I know and respect Ellen Smith and Robert Kennedy. I am concerned about Ms. Smith's comments that the new landfill could threaten the integrity of the groundwater and wetlands at whatever Oak Ridge site is selected. I am concerned that the Department of Energy and Mr. Kennedy do not agree on the relative costs of disposing of the wastes in Oak Ridge versus shipping them to a safe disposal site in a dry western state. I think DOE should do more to assure the public that DOE's assertions are correct and honest and that the concerns of Ms. Smith, an environmental scientist who has worked on impact statements, and Mr. Kennedy, a highly competent engineer and computer scientist, are invalid.

I also think that if a decision is made to put the proposed landfill in Oak Ridge, DOE, EPA, and the State of Tennessee should own up to the public that the landfill is not risk-free. There will still be risks that hazardous substances could leave the landfill and enter local water sources, that the costs of disposal in Oak Ridge could exceed the estimates, and that the public perception of Oak Ridge as a clean, safe place to live could be jeopardized, reducing property values and tax revenues to the City of Oak Ridge. That being the case, I believe that DOE should provide the city with a substantial annual payment (like the payment in lieu of taxes in past years) to compensate for the harms these risks could entail.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

In direct response to concerns regarding the threat to groundwater and cost of offsite disposal, DOE additionally offers:

DOE has evaluated groundwater conditions at the selected site through several phases of characterization efforts and has determined that the design of the EMDF will be protective of human health and the environment both during construction and operation and throughout the post-closure period. DOE collected several full years of groundwater data from the selected site prior to the finalization of this ROD and has agreed to perform a further groundwater field demonstration to support final design of the facility. In addition, groundwater and surface water will be monitored during operation and after closure of the EMDF to demonstrate contamination is not being released from the landfill.

Regarding the offsite disposal costs compared to onsite disposal costs, a more recent independent evaluation was undertaken as described in this ROD (see Sect. 2.14). This more recent evaluation confirmed the conclusion that offsite disposal is approximately double the cost of onsite disposal, the major difference being the cost to transport the waste from Tennessee to western states.

Comment 181: Comment from Myron Iwanski

I appreciate the progress that DOE has made in cleaning up its properties in Oak Ridge. However the proposed landfill has some long term consequences for our community and believe there are several issues that need to be resolved before the project is approved.

I served on Anderson County Commission, representing Oak Ridge for 24 years, including time as County Mayor and as County Trustee. In November, 2015 County Commission unanimously approved the attached resolution expressing two areas of concern that have not been fully addressed:

1. The need to resolve the issues raised by the City of Oak Ridge, EPA and the State of Tennessee.
2. The need to consider local impact funding to offset the financial and environmental burdens this project will place on the City of Oak Ridge and its two Counties.

I would like to see the issues satisfactorily addressed.

EXHIBIT
C

Anderson County, Tennessee
Board of Commissioners
RESOLUTION NO. 15-11-563

A RESOLUTION REQUESTING THE DEPARTMENT OF ENERGY TO FURTHER RESEARCH AND PROVIDE ADDITIONAL COMMUNITY AND ENVIRONMENTAL INFORMATION REGARDING ITS PROPOSAL TO BUILD A NEW LANDFILL OR EXPANSION OF THE EXISTING FACILITY TO ACCOMMODATE RADIOACTIVE AND HAZARDOUS WASTE GENERATED BY ONGOING REMEDIATION EFFORTS.

WHEREAS, the Department of Energy is considering expanding its current disposal site or possibly the construction of a new low-level nuclear waste landfill to accommodate radioactive and hazardous waste generated by continued clean-up efforts on the reservation; and

WHEREAS, the proposed DOE Environmental Management Disposal Facility has raised several community concerns; and

WHEREAS a number of these concerns were identified in the Ferguson Group's study report entitled, Community Impact Assessment of the U.S. DOE Proposed Environmental Management Disposal Facility in Oak Ridge, Tennessee; and

WHEREAS the USEPA and Tennessee Department of Environment and Conservation are reviewing the DOE proposal and have identified concerns regarding the proposed sites; and

WHEREAS, many concerns have been identified that need additional research to satisfy growing community sentiments.

NOW, THEREFORE, BE IT RESOLVED, by the Anderson County Board of Commissioners meeting in regular session this 16th day of November 2015 that we respectfully request the Department of Energy to address and further research environmental and community impact concerns with the proposed Environmental Management Disposal Facility in Oak Ridge and report its findings and corrective measures to the community and local governments.

BE IT FURTHER RESOLVED, that we respectfully request the Department of Energy to consider local impact funding to offset the financial and environmental burdens imposed on the City of Oak Ridge and Anderson County. We further authorize the County Clerk to distribute a copy of this Resolution to the Department of Energy, members of the United States Congressional delegation and members of the Tennessee General Assembly representing the interests of Anderson County and Oak Ridge.

Steve Emert
Steve Emert, Chairman

Terry Frank, County Mayor

ATTEST:

Jeff Cole
Jeff Cole, County Clerk

ANDERSON COUNTY TENNESSEE

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the

environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Pursuant to Federal statute, DOE may receive applications from certain state and local governments for payments in lieu of taxes (PILT), and reach agreement to make payments not to exceed the value of taxes that would have been payable for such real property in the condition in which it was acquired. The Oak Ridge Reservation was acquired in 1942 and 1943 and was predominantly assessed for tax purposes as agricultural property. DOE has current PILT intergovernmental agreements with the City of Oak Ridge as well as Roane and Anderson Counties, which have all demonstrated self-sufficiency over time; those annual agreements define the terms and conditions of PILT payments. CERCLA remedial action decisions cannot play a role in the determination of PILT payments.

Comment 182: Comment from Jan Berry

1. In Legal Environmental Assistance Foundation v. Hodel (1984)*, United States District Court, E.D. of Tennessee ruled that the DOE, with the Y-12 plant as the case in point, must comply with RCRA and the CWA. The actions that DOE has proposed under CERCLA and the exceptions that DOE proposes to the CERCLA's applicable requirements, do not comply with the spirit of the referenced court order, because DOE has entered into formal Dispute Resolution Agreement(s). Explain how the "Proposed Plan" complies with CERCLA as well as the supporting laws and regulations under RCRA and CWA.

   *https://law.justia.com/cases/federal/district-courts/FSupp/586/1163/1903257/

   Response: Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the substantive requirements of all applicable or relevant and appropriate environmental requirements (ARARs) must be met unless a waiver can be justified and approved by the regulatory agencies. This includes Resource Conservation and Recovery Act of 1976 (RCRA) and the Clean Water Act (CWA). The U.S. Department of Energy (DOE) is only requesting a waiver from two Toxic Substances Control Act of 1976 (TSCA) requirements on the basis that the planned design is more protective than the requirement. RCRA and CWA will be met with no waivers.

2. Site characterization data is being collected on hydrologic conditions underlying the proposed Central Bear Creek Valley Site 7c disposal site under both wet and dry conditions. Include the all site

characterization data in DOE's Proposed Plan and the conceptual design of the disposal site before the Record of Decision (ROD) is prepared.

Response: There are hundreds of wells in Bear Creek Valley with decades of data. This extensive data set was used to support conclusions in the Remedial Investigation/Feasibility Study (RI/FS). During preparation of the Proposed Plan, DOE began more site-specific characterization efforts at the request of the other Federal Facility Agreement (FFA) parties. The additional site characterization for Central Bear Creek Valley evaluating geologic and hydrogeologic conditions was conducted in two phases. The first phase, with the referenced eight well pairs (16 wells) monitored for over a year as well as monitoring results from other existing wells in Bear Creek Valley to supplement the general understanding of the site, was used to support identification of a preferred location in the Proposed Plan and the selection of the location in this Record of Decision (ROD). Analysis of the first phase data confirmed DOE's understanding of the site. Since then, data from 16 more wells, 32 borings, and 17 test pits were obtained as part of a second phase of characterization completed to support the design. The design, as it progresses, will be modified as needed to consider the new data. Technical Memoranda presenting the results of the initial evaluation can be found in the Administrative Record.

3. ARAR identification is required by CERCLA. Requirements are established by law to protect human health and the environment. DOE has apparently, prematurely sought and been granted CD-1 from DOE Headquarters before proposed DOE exceptions to known requirements are evaluated by the TDEC and EPA Region IV. DOE must follow known requirements and procedures without exception and include these established requirements in the Proposed Plan.

Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

A TSCA waiver for two parts of TSCA 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

- **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the Oak Ridge Reservation (ORR). Compliance with the RCRA Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the U.S. Environmental Protection Agency determination that the remedy is protective of human health and the environment.**

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The Environmental Management Disposal Facility (EMDF) site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley**

can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.

An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

4. Establishing waste acceptance criteria is essential to completing a conceptual design of the proposed facility and establish a strategy for off-site disposal. TDEC is authorized to independently verify DOE modeling. This modeling must use waste acceptance criteria as a key input. DOE must establish waste acceptance criteria and include these criteria in the Proposed Plan.

   Response: RI/FSs for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for the EMDF. The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the ORR indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

5. DOE has not yet conducted a Performance Assessment, Composite Analysis, or Preliminary Disposal Authorization Statement according to information provided during the public information meeting. DOE must assess the performance of the proposed disposal facility for radionuclides according to DOE Orders and provide this assessment to state and federal regulators before completing the Proposed Plan and entering into a ROD.

   Response: DOE-Headquarters has granted a preliminary disposal authorization statement under DOE Order 435.1 based on an approved Performance Assessment and Composite Analysis.

6. Mercury contamination of waste is a key concern. DOE must limit or eliminate mercury disposal to prevent further contamination of fish and the ecosystem in nearby streams and creeks. The waste acceptance criteria, discussed in comment #4, must include an analytical limit for mercury co-contamination. The methods of detection and the actions required should waste exceed the specified limit must be established. DOE must establish waste acceptance criteria for mercury.

Response: WAC have been established for mercury. In the Administrative WAC, as agreed by the FFA parties, hazardous mercury (D009 under RCRA) waste is prohibited from disposal in the EMDF.

7. DOE must comply with CERCLA and Clean Water Act laws to protect human health and the environment. DOE must establish discharge limits and include these limits in the Proposed Plan before entering into a ROD.

   Response: DOE is complying with CERCLA and the CWA. The FFA parties will agree to the wastewater discharge limits prior to operation of the facility.

Comment 183: Comment from Martin McBride

Part 1 (from November 7, 2018 public meeting): Thank you. Martin McBride. Retired from DOE and living in Oak Ridge here. Oak Ridge is a beautiful city. And I think it's worth mentioning the elephant in the room in all of this discussion, which is one of the reasons that the waste is coming here is because nobody else in East Tennessee is willing to take it. Now, that has a significant economic connotation to it. The waste is not a neutral entity in terms of the Oak Ridge economy. It's a drag on the Oak Ridge economy. And what my two cents' worth is, I think you folks should take the lead in analyzing what you can do to help the Oak Ridge economy.

One of the reasons that we can't get the same money, $8 million a year, that Los Alamos puts in its schools is DOE does not understand how to justify that to Congress. And one of the reasons it doesn't understand how to justify it is that DOE tends – and I myself have been guilty of this – to overlook the economic impacts on the local communities.

But if we rack those things up, number one, there's a whole bunch of things that you – your program can do, not only to help us directly, but to set the example for the other programs to help them. You guys are all very, very busy, and so if you help break through on some of these areas, they'll see how to do it, and they'll go ahead and do it too, and now you have a better relationship, you have an active partnership.

On the other hand, if you continue on this path, which I read at least one of your economic studies, and it was a regional study. The only problem with that is you're not storing the waste all over the region where your economic benefit is. It totally ignored the city. If you actually focus on the city and the things you can do to help, then you will get this partnership. If you don't, if you just bulldoze past the city's economy, overlooking it, you're going to burn out a lot of goodwill here. And that goodwill then means that the UPF project doesn't have any goodwill, the nuclear programs at ORNL are not going to have that goodwill. And it's just there's a lot of bad things that potentially could happen down the road, depending on how sensitive you are and how much leadership you're willing to show here. So I think it's really important.

I've got a whole list of items and suggestions which I will write up and submit to you. I'll also put it in a newspaper column for other people to see. I just think these things are easy to do, most of them don't cost a dime, and they're things that would make it clear that you are a partner with the community, not just somebody coming in to exploit the fact that we're willing to take the waste and nobody else is.

Additional Comment from Martin McBride: I would just like to second the comments made by Mr. Watson and Ms. Smith. I was in a meeting not too long ago over in Knoxville, a training session. After the training session, a group of folks were sitting around talking, maybe three or four people sitting in a group near me, and the discussion was who – why wouldn't you want to live in Oak Ridge, and their consensus was because they didn't want to live near all the nuclear waste, particularly on the west end of Oak Ridge. I live on the west end of Oak Ridge. I don't share their concerns, but that is part of the bad publicity that the nuclear

presence unfortunately generates. And I think the idea that you're starting from a neutral economic spot by putting a waste site here in this community is a false idea, which is why I, again, urge you to look for ways to partner economically with the City so we kind of balance this stuff out. Thank you.

Part 2: As I said at the public meeting, EM has the opportunity to be a real leader here---helping the nuclear programs of the other DOE program offices in the bargain.

Newspaper Column: Will DOE Under Secretary Dabbar and Assistant Secretary White Balance the Economic Burden on Roane and Anderson Counties Of DOE Nuclear Waste---Saving Taxpayers 800 Million Dollars?

In the years following the Three Mile Island accident, nuclear officials of my generation stood in front of the American public and promised two things---that future operations would be: (a) safe and (b) not economically burdensome to local communities.

It's important that DOE keep these promises.

Alienating neighbors next to your nuclear site---especially neighbors who have loyally supported nuclear operations through the years---makes absolutely no sense. It hurts the nation.

Leadership from DOE's Under Secretary Paul Dabbar and Assistant Secretary Anne White can help the department become a friend-and-neighbor to the 130,000 people in Roane and Anderson Counties---and save about $800 million dollars. That's the estimated cost should DOE's proposed nuclear waste storage expansion---slated for Oak Ridge---need to be relocated.

Both Admiral Hyman Rickover (creator of America's Nuclear Navy) and the Reverend Martin Luther King, Jr. believed that having the courage to face reality was the first important step in solving tough problems. Officials in DOE headquarters, unfortunately, have had trouble facing the harsh truth that their important nuclear activities---while vital to the nation---can carry a substantial economic burden for local communities.

DOE's proposed storage area will create an economic burden for Roane and Anderson County residents, their children, grandchildren, great-grandchildren, and so on forever. The department needs to come to grips with this reality.

There are a variety of interesting options DOE could take to ease this burden, assisting local home-owners, businesses, and the area's great local school systems. Several would cost little or nothing and substantially increase public trust and support.

Over the last few decades, DOE's nuclear programs have gradually disconnected from the residents who live near the Oak Ridge site. Some years ago, this same type of disconnect cost DOE a major nuclear site in Colorado, the Rocky Flats site. A loss of local public support forced that plant to close, impacting the nation's defense and sending a multi-billion-dollar bill to American taxpayers.

The Anderson County Commission has formally requested a three-month extension of DOE's comment period on the waste area expansion. I hope the department will remember the Rocky Flats experience and use the three months to carefully consider the impact of its waste decision on future Oak Ridge nuclear operations.

DOE created the city of Oak Ridge. Yet consistently, the city has been forced to maintain one of the highest property tax rates and one of the highest per-capita city debt rates in Tennessee. What does this say about the wisdom of hosting DOE nuclear facilities---at any location?

For the good of DOE's future nuclear missions, Under Secretary Dabbar and Assistant Secretary White need to balance the economic burden on Roane and Anderson Counties from expanding DOE's nuclear waste storage area. The current DOE proposal does not do so and should be revised.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE has made extensive effort to ensure meaningful community involvement throughout this nearly decade-long process of selecting a remedy for final disposition of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste at the Oak Ridge National Priorities List Site consistent with the U.S. Environmental Protection Agency and Tennessee Department of Environment and Conservation-approved EMDF Community Outreach Plan. Large-scale outreach began in 2015 and has continued to the present. City and county officials received tours and briefings. The Oak Ridge Office of Environmental Management (OREM) hosted numerous community meetings, and there was substantial media outreach on the topic. OREM also proactively reached out to numerous community groups to provide presentations about the Environmental Management Disposal Facility. DOE released the Proposed Plan to the City of Oak Ridge before the start of the formal public comment period. In addition to providing notices to the paper, every household in Oak Ridge received a flyer requesting input to the public comment process. The original comment period was 45 days but was extended to 120 days at the request of the public. DOE has made every effort to ensure there has been meaningful public input and will look for opportunities for future public involvement as the project proceeds.

Pursuant to Federal statute, DOE may receive applications from certain state and local governments for payments in lieu of taxes (PILT), and reach agreement to make payments not to exceed the value of taxes that would have been payable for such real property in the condition in which it was acquired. The Oak Ridge Reservation was acquired in 1942 and 1943 and was predominantly assessed for tax purposes as agricultural property. DOE has current PILT intergovernmental agreements with the City of Oak Ridge as well as Roane and Anderson Counties, which have all demonstrated self-sufficiency over time; those annual agreements define the terms and conditions of PILT payments. CERCLA remedial action decisions cannot play a role in the determination of PILT payments.

Comment 184: Karl L. Chance, P.E.

I dislike public speaking, so I appreciate the opportunity to include my comments in written form. I would also like to commend Mr. Brian Henry and Mr. David Adler on their composure and attempts to provide answers to specific questions at the public meeting.

Since several of the people who provided verbal comments at the public meeting included a brief summary of their background, I will do the same. I have resided in Oak Ridge since 1969 (I live in one of the so called "Alphabet Houses" that were constructed as part of the Manhattan Project). I grew up here. I am a product of the Oak Ridge School system. I am a Professional Engineering registered, and in good standing, in the State of Tennessee. I have a variety of experience including the design, construction, and permitting of landfills and landfill caps in various locations across North America.

As full disclosure, I am employed by AECOM (since 2005) and I am currently supporting UCOR at the EMWMF and the ORRLFs. I am aware of the EMDF but I am not assigned to support the EMDF project.

I attended the public meeting as a city resident and my comments are my own as a city resident.

Below are the comments that I wish to make in (no particular order):

1. If I recall correctly, Mr. Adler indicated that it would be beneficial for disposal operations to begin at the EMDF before disposal operations were completed at the EMWMF – an overlap of waste disposal operations. Later Mr. Adler indicated that disposal operations at the EMWMF were currently scheduled to end in 2020 (if I heard correctly). Mr. Adler also indicated that the ROD for the EMDF was anticipated in 2019.

   Mr. Adler indicated that the EMWMF is filled to approximately 75% of its design capacity after 16 years of operation. Doing the simple math, if the waste disposal rate continues at the same rate overall rate the remaining 25% of the capacity would take approximate 5.3 years, meaning the EMWMF would be filled in 2023 (provided the waste disposal rate does not increase or decrease).

   a. Based on the forecasted waste generation quantities, what is the anticipated date when the EMWMF will be filled to capacity?

   b. Considering the time frame for the remaining life of the EMWMF 2020-2023, is there enough time to address public comments, finalize a design, secure regulatory approval, prepare a RFP, solicit bids, award a construction contract, construct the facility (and infrastructure), and get approval to accept waste prior to the filling of the remaining airspace in the EMWMF?

   c. Follow on question: Is there any consideration to trying to streamline the process?

      Response: The Environmental Management Waste Management Facility (EMWMF) is expected to be filled in the late-2020s time frame depending on many factors including funding levels for cleanup, types of waste, and sequencing of cleanup work. The Environmental Management Disposal Facility (EMDF) schedule for design and construction now currently does not allow for an overlap of operations.

      Numerous streamlining techniques have been evaluation to streamline the process. However, because of the interest in this decision by the regulators and by the public, it is anticipated that the time planned will be needed to ensure sufficient communication and input is provided.

1. The EMDF is following the CERLCA process (similar to the EMWMF). It is my understanding that the CERCLA process includes the requirement to meet the substantive regulatory requirements (meaning that it must comply with the regulatory requirements) without going through the full regulatory process. So the EMDF, being an engineered landfill, it would have to comply with the landfill regulations but would not get a Landfill Permit. Again, it is my understanding that the CERCLA process was established to streamline the process to provide a faster route to protect human health and the environment.

   Has DOE considered that it might be simpler (and perhaps faster) to just apply for a hazardous waste permit for a disposal landfill from the Tennessee Department of Environment and Conservation, Division of Solid Waste Management?

      Response: Yes. The alternative suggested in the comment has been considered. However, the permit would be for a low-level (radioactive) waste and hazardous waste facility necessitating several permits from the state under the Resource Conservation and Recovery Act of 1976 and from the Nuclear Regulatory Commission. These permitting processes are very lengthy. In addition, any federal action must evaluate environmental impacts under the National Environmental Protection Act. For a project of this size, a

large Environmental Impact Statement would need to be developed. While this documentation is similar to a Remedial Investigation/Feasibility Study under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), due to different requirements, this effort would still require time to implement. There would also be much less involvement from the U.S. Environmental Protection Agency (EPA). To dispose of waste generated under CERCLA, EPA will need to approve the disposal location. By allowing EPA to work with the U.S. Department of Energy (DOE) through the design and construction, they will gain the detailed information they need to be assured that radioactive material can be safely disposed.

So, as the commenter states, CERCLA offers up the most efficient pathway and is the appropriate regulatory process to use because any CERCLA remediation effort is not complete until the waste is contained, treated, or disposed. CERCLA offers the same level of protection as the permitting process, but the administrative steps are streamlined.

2. If I recall correctly, it was stated during the public meeting that the EMDF is a 70 acre site. This generally would include the required buffer area around the actual waste disposal area that is not actually contaminated.
   a. What is the area of the actual limits of waste of the facility?
   b. What is the area of the contaminated sources (degrading buildings, exposed contamination areas, etc.) that are anticipated to be disposed of in the EMDF?
   c. Is the final disposition of the contaminated source locations to be "greenfield" (non contaminated) or "brownfield" (suitable for industrial re-use).
   d. What is the anticipated reduction in the contamination footprint?
   e. Would it be fair to say, that even if the foot was equal to the EMDF site (70 acres) that by placing it in a condition that is slower to degrade (an engineered landfill) than its current condition, it would represent a reduction in the health risk?

Response: The area encompassed by the limits of waste (i.e., the line area of the landfill) is approximately 23 acres.

Because the soil characterization efforts of the Oak Ridge National Laboratory (ORNL) and Y-12 National Security Complex (Y-12) have not been completed to define areas of contamination requiring excavation, the only acreage that can be provided is an approximate acreage of the buildings that will be demolished; most of the waste is thought to be able to be disposed in the EMDF. Over 55 acres of building debris would be consolidated in 23 acres of landfill. Additional acreage of contaminated soil would also be disposed in EMDF, reducing risk to human health and the environment significantly at both facilities.

The proposed Central Bear Creek Valley site is for the most part an undeveloped area. Once the final disposal facility is located in the area, the Record of Decision designates the area of the Central Bear Creek Valley site where the EMDF is located as a waste management area. The designations of the future remediated areas in general are brown field. They can be reused by DOE for industrial uses. Those areas at Y-12 and ORNL will be under DOE control for future DOE uses.

The reduction in the contamination footprint is significant, especially considering the contamination is currently sprinkled throughout Y-12 and ORNL footprints in various

hundreds of facilities and would be consolidated in a single contiguous area when disposed of. Please see the response above to 2b.

1. Similar to Question 5 but as it relates to the EMWMF:
   a. What is the area of the EMWMF facility (including the buffer area)? What is the area of the actual limits of waste?
   b. What is the area of all the contaminated sources of the waste that went into the EMWMF (i.e., Bone Yard –Burn Yard, IHP, degrading contaminated buildings such as K-25, K-27, K-29, etc.)?
   c. Is the final disposition of the contaminated source locations to be "greenfield" (non contaminated) or "brownfield" (suitable for industrial re-use).
   d. What is the actual reduction in the contamination foot print?

Response: The area of the limits of waste at EMWMF is 28 acres. This permanent disposal area allowed the remediation and subsequent consolidation of over 165 acres at the East Tennessee Technology Park (ETTP) and 13 acres of the Boneyard Burnyard in Bear Creek Valley through the removal of contaminated buildings and buried waste. More acreage at ETTP and minor buildings at ORNL and Y-12 were also remediated, but because the final sampling to guide ETTP soil excavation is not complete, a total acreage remediated could not be provided. The final acreage will be over 200 acres remediated.

Most of the sites remediated and disposed in EMWMF are considered brown field sites, suitable for industrial reuse. Most of the sources remediated were located at ETTP. ETTP is being reindustrialized and industries are moving onto the site, bringing economic benefits to Oak Ridge and the surrounding area. A few of the remediated sites are located within ORNL and Y-12 and they are not being released for future use other than by DOE. However, they were remediated to industrial use levels.

1. What is the geologic formation that underlays the proposed site location? Is this formation considered a karst formation? If so, is it a karst formation that is highly susceptible to dissolution erosion or has low susceptibility to dissolution erosion?

Response: The proposed EMDF site is underlain by bedrock of the Conasauga Group, including the Maryville Formation and Nolichucky Shale. At the proposed site, these formations are predominantly shales, siltstones, and mudstones, with some interbedded limestone. These are not karst-forming bedrock formations and these have very low potential for dissolution erosion.

2. The geomembrane portion of the liner system is a high density polyethylene (HDPE) product.
   a. How long is this product expected to perform as designed?
   b. Is this a conservative estimate (meaning it probably will be effective a lot longer but the expected effectiveness is not over estimated)?
   c. Are there any recent studies that show that the effectiveness of the product is substantially longer than previous projections?

Response: The high-density polyethylene (HDPE) in the cover and liner systems is assumed to perform as designed for the first 100 years after facility closure in the

performance modeling. The HDPE is then assumed to degrade from 100 to 200 years after facility closure. The performance modeling takes no credit for HDPE from 200 years after closure.

The EMDF Performance Assessment assumes a life of 100-200 years. This is very conservative with respect to the current status of research on HDPE liner service life. Recent research by Tian, Benson, and Tinjum "Antioxidant Depletion and Service Life Prediction for HDPE Geomembranes Exposed to Low-Level Radioactive Waste Leachate," *Journal of Geotechnical & Geoenvironmental Engineering* (2017) estimates service live of greater than 700 years.

The assumption of a 100- to 200-year performance life for the geomembrane liner systems used in the modeling is very conservative, as evidenced by the experimentally determined lifetime of greater than 700 years.

1. I realize that it is late in the process to consider alternative products but have you considered other geomembrane materials, specifically a bituminous geomembrane?

   Response: Bituminous geomembranes were not considered due to the prevalence of HDPE geomembranes in both municipal solid waste landfills and low-level and mixed waste landfills. Due to many favorable attributes including wide-scale use across many industry groups, broad experience with the product in manufacturing and installation, and the previously noted long-term performance characteristics, HDPE is the material best suited to the EMDF location and expected leachate.

2. The liner system also includes a compacted clay liner. How long is the compacted clay liner portion of the liner system expected to perform as designed?

   Response: The clay liner is not assumed to degrade because conditions at that depth are not expected to vary to a point that would cause desiccation of the clay. However, after active leachate management is discontinued (assumed at 100 years after facility closure), the liner system is assumed to release leachate at a rate equal to average cover infiltration.

3. If I recall correctly, it was stated in the public meeting (or on one of the slides) that the EMDF is greater than 1 mile from the nearest residential area. Looking at a map it would appear that Greystone Drive is the closest residential area and appears to be approximately 3,500 feet away from the EMDF. It is possible that I misheard the distance and it was intended to be "more than 1,000 meters" which would be about 3,300 feet.

   Response: Using the measurement tool from the Google maps applications, the distance from Greystone Drive to the approximate northern limit of the EMDF disposal cells is 4200 ft. A portion of developed site would be greater than a mile away, so the discussion you heard was generalized to that location.

4. There were a couple of comments regarding the groundwater table. I am aware that there is a difference of opinion regarding the groundwater levels under the EMWMF and that some of that may be prompting the comments regarding the EMDF site and preliminary design. Some of the landfills that I have been associated with use soil material that has to be removed from future cell areas to get to those cell base grades, as daily cover. As the soil is removed the groundwater table is lowered in that area, most likely due to a drop in the surcharge weight as the soil is removed. My comment is has the groundwater table been evaluated based on the removal of overburden soils that will be done as part of

the construction and then again based on the final grades, including the cap, to estimate where the groundwater table is projected to end up. I realize that this is a very complex model that would need to take into account the seasonal changes, precipitation, current groundwater flows, etc. My question involves only the impact from the surge charge weight of the current over burden that will be removed and the weight of the landfill liner, waste, and cap materials.

Response: Modeling of groundwater conditions at the site has been performed as part of the Performance Assessment and more detailed groundwater modeling is ongoing for the design development process. A groundwater model has been developed using the program MODFLOW, and has been calibrated against onsite groundwater and surface water data gathered as part of the design process. This model provides an important tool which allows consideration of aspects of landfill development through construction, filling, and closure conditions. The position of the groundwater table beneath the site is influenced by many factors including localized precipitation and surface water infiltration; regional groundwater recharge and flow; surface water flows in nearby creeks; and topography, soil, and rock conditions beneath the landfill through its development life cycle. For this location within the Central Bear Creek Valley, groundwater closest to the landfill is influenced most by surface water infiltration and creek groundwater boundaries formed by North Tributary (NT)-10 and NT-11.

The predicted groundwater levels for design take into account reduced recharge resulting from the changes in topography, installation of liner systems, and surface water controls. These changes will remove groundwater mounding due to local recharge and result in a more uniform groundwater surface beneath the landfill footprint.

The effect of surcharge loads, such as large fills that are greater than the existing topographic conditions, is accounted for as part of the settlement and stability analyses that will be conducted as part of the landfill design.

Comment 185: Comment from Ron Woody

Part 1: I am writing on behalf of the Oak Ridge Reservation Communities Alliance (ORRCA) to request that DOE extend the comment period by 45 days. Such an extension is necessary to allow ample time for ORRCA members to review the proposed plan and discuss at their next meeting, scheduled for December 4th. DOE did not have a representative at ORRCA's September 4th meeting, and members were unaware of the decision to issue a proposed plan until the public notice was published on September 10th.

As elected officials, we have a duty to protect the health and safety of our citizens. The proposal to bury an additional 2.2 million cubic yards of radioactive and mercury-contaminated hazardous waste in our jurisdictions is an extremely complex and serious issue, especially given the groundwater contamination we already face.

Part 2 (from November 7, 2018 public meeting): I'm Ron Woody. I'm a Roane County executive and represent the Roane County constituents, a lot of them, and I notice when I go to a lot of meetings, of source, the – very few of Roane Countians are downstream. We have some in Oak Ridge/Roane County that are still upstream of this and of the Clinch River.

I'm an accountant. I'm not an engineer. I do not know much about landfills, other than we operate one in Roane County that's closed. And from that closed landfill, we've had the experience, of course, rainfall penetrating from the top, water coming up from the bottom. We started out with a leachate collection system with a tanker truck. We've gone to the tanks similar to what you all have here, and now we're going to have

to build a pretreatment facility on a landfill that's been closed, goodness, probably 20 or 25 years. So I know some of the basics about landfills, and I know you want to keep the water out of it.

We are downstream of all Oak Ridge. And that's always concerned us. So we are a stakeholder. We've had issues back during the Manhattan Project era, and then post-Manhattan, I know. And I'm really advocating to clean up the site. I appreciate the work that's been done at ETTP. I know it will help us to get what I would consider the landfill, which is in the air right now, in the ground. But, please, as you do your work, remember us. We are – I've thought before if Knoxville was downstream instead of Kingston, you know, would we be having these discussions like we are now. We – we're in a unique position.

And I hate to say this, I hate to keep bringing it up, but your sister organization, TVA, you know, we are dealing with the problem that happened in 2008 in the ash spill. It's back in the media today. And we find out today, as the court case has – the jury has come back, that we were not treated like we had felt we were being treated by a government agency. I'm from the government. I'm here to help you. I mean, I work for the government. I understand some of this, but as we go through this process – I appreciate you all extending the time, too, so folks like myself can make some public comment because we have a lot of other activity going on in our community.

So let's, if we're going to do it, and we're going to it here, I say let's do it right. Let's work on the leachate system. You know, we went from the collection, hauling it off, to now we have to pump it off. So we go directly into a, you know, municipal wastewater system. So there's a lot of concerns that I still have representing Roane County's 52,000 residents. And just to say it again, you know – and I've said this in a couple of venues – as Tennessee has grown in population, Roane County has shrunk in our population. Part of it is probably due to perception, part of it may be due to reality, the perception of what happened to us at the TVA Kingston ash spill, and also the perception since two of these three facilities of DOE are, of course, located in Roane County, and we're downstream of all of it.

We know the importance of the cleanup mission. We also know that we have 54 to 58 inches of rainfall a year. We do not want any of the waste to escape these landfills and seep down to us and on down to Chattanooga.

The good thing about the Nevada sites – I was out there a number of months ago – is ---------- [cut off based on time constraint; elected to not continue comment]

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE received and granted two separate requests to extend the original comment period – one by another 45 days and the second by an additional 30 days. Therefore, the comment period was for 120 days.

The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and

the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 186: Comment from Mike Siford (from November 7, 2018 public meeting)

My name is Mike Siford. I'm not – I'm just a resident of Oak Ridge. I'm not any big technical. I'm a computer guy. But my question is that you have this liner system, that you have this rock – the rock, soil and clay liner, and you have a geo deposit, and whatever else it is. I don't know. Has this been tested? I mean, have you set up a test on this for, you know, the extremes that it can withstand? Has anybody tested this theory? I mean, seems to me that you just put a bunch of ground stuff together and stuffing the waste in the middle of some stuff, and then you're just capping it off. It doesn't seem like anything has really been tested or anything has been looked at. I mean, like I said, I'm not – you know, some of these scientists here are, you know, far above my knowledge, but it just looks like, you know, something that you would do at a racetrack whenever you're trying to get rid of all the oil and transmission fluid.

DOE Representative: So, yes there's a lot of testing that goes on. These engineering methods have been tested in a range of environments. And, actually, as the facility is built, if built, tests are done to assure the quality and performance of the different liners as they're put down. So there's a lot of testing that goes on in these types of facilities when they're built. We're not taking waste oil and liquids. This is purely dry material that would be allowed to be put into the facility. You've got a basic approach to doing this. It's something that's been done a lot. And, again, as the different systems are put in place, they're tested to make sure they perform as expected prior to continuing with the work.

Response: The U.S. Department of Energy thanks you for your participation in the public comment process. Please refer to Section 6.2.2.4.3 of the Remedial Investigation/Feasibility Study Report for more detailed information on the liner system that will be constructed as part of the Environmental Management Disposal Facility.

Comment 187: Comment from John Christian, President, Operational Waste Management, Energy*Solutions*

Energy*Solutions* is a privately owned decommissioning and radioactive waste disposal company headquartered in Salt Lake City, UT. Our cornerstone facility is the Clive Utah Disposal Facility which has supported the U. S. Department of Energy offsite low-level waste disposal needs for more than 20 years, including enabling the accelerated closure of the DOE Rocky Flats, Fernald, and Mound sites.

Energy*Solutions* is prepared to support accelerated closure of the DOE-EM's Oak Ridge Reservation by immediately beginning the receipt and disposition of low-level radioactive wastes as well as receipt, treatment and disposition of radioactive mercury wastes rather than await the permitting and construction of an onsite landfill. The Energy*Solutions* Clive disposal facility has sufficient capacity to treat and dispose of all the Oak Ridge estimated wastes. When coupled with Energy*Solutions*' rail equipment and transload

operations in Oak Ridge, Energy*Solutions* can safely and quickly remove the contaminated wastes from Tennessee and dispose of the waste in an arid and licensed landfill.

Energy*Solutions* has carefully studied the DOE CERCLA RI/FS reports comparing onsite and offsite waste disposal options. Based on existing Energy*Solutions* contractual pricing with other DOE sites, our technical experience with waste densities, and quoted railroad costs, Energy*Solutions* is confident that it can support the DOE with offsite disposal at significantly lower costs than estimated by DOE for offsite disposal.

Energy*Solutions* request that DOE-EM and the local stakeholders consider a larger role for offsite disposal as a means to accelerate closure of the site, shorten the project schedule, and reduce the overall project economics.

We are prepared to have detailed technical discussions of our previous experience which forms the basis of our comments.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process and appreciates the information provided above regarding offsite disposal of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste from the Oak Ridge National Priorities List Site.

In response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the Record of Decision contains more information about the recent evaluation of the offsite disposal costs.

The selection of DOE's preferred alternative was not based on cost alone. The key other factors were the increased transportation risks to communities across the country and the ability to ensure a safe disposal facility with uninterrupted service to support the needed cleanup in Oak Ridge for the decades required. These other factors were considered by DOE to be very important to local and cross-country communities.

Comment 188: Comment from Anderson County Board of Commissioners

At the December 3, 2018, meeting of the Anderson County Commission, a motion was made and passed by an overwhelming majority of commissioners, to request the Department of Energy to extend the comment period for the proposed Environmental Management Disposal Facility (EMDF) by 90 days. The information that was presented at last night's meeting brought us to the realization of the importance of this proposal to the future impact on our citizens and our governments. More time is needed for our County to research and obtain more details to formulate our comments and questions. We respectfully submit our request for a ninety day extension, and hope for a positive reply.

Response: The U.S. Department of Energy received and granted two separate requests to extend the original comment period – one by another 45 days and the second by an additional 30 days. Therefore, the comment period was for 120 days.

Comment 189: Comment from David Carlson, President and Chief Operating Officer of Waste Control Specialists

Waste Control Specialists (WCS) is pleased to provide comments on the subject document, hereinafter "proposed plan." We believe that the preferred remedy – the development of a new disposal cell at Central Bear Creek Valley – should be re-evaluated in light of the availability of existing commercial disposal options such as the WCS facility in Andrews, Texas. As DOE is fully aware, our facility houses both a landfill fully permitted under the Resource Conservation and Recovery Act (RCRA), subtitle C, which can accept low activity radioactive waste up to approximately 10% of the Class A limit and a Federal Waste Disposal Facility (FWF) designed, permitted, and constructed for the disposal of Class A, B and C Low-Level Radioactive Waste (LLW) and Mixed Low-Level Waste (MLLW). Both facilities are directly accessible via our onsite rail spur.

During our review of the proposed plan and associated documents, it is clear that utilization of our facility was not fully considered. In the summary table of alternatives (Appendix A), it is noted with approval that the use of "offsite facility locations in arid environments reduce the likelihood of contaminant migration, and fewer receptors exist in the vicinity of EnergySolutions and NNSS than near the ORR." Clearly this same factor exists with respect to the WCS facilities in Andrews.

If DOE had conducted a fuller exploration of our facilities, we could have provided a more realistic picture of offsite disposal costs. The proposed plan states that the cost of offsite disposal would be in a range of $675-$767 per cubic yard in present worth 2016 dollars. Our experience suggests that the true costs at WCS or other commercial disposal facilities would more likely fall in the range of $150-$300 per cubic yard (depending on soil and debris mix); transportation costs would be between $125 and $180 per cubic yard (all in 2018 dollars). As such, the "breakeven volume" as identified in the proposed plan extends significantly beyond the estimated 750,000 cubic yards and could well, given current uncertainties in total volumes to be remediated, extend through the lifetime of the program. At the very least, we believe the true cost of the offsite option at WCS compares favorably with the $276 estimated cost of the preferred alternative and provides the Department with a fully constructed, fully licensed, and readily available alternative.

It would appear that beyond cost, a significant factor motivating the Department to pursue an onsite option is the stated "significantly greater" risk to the public from injuries and/or fatalities resulting from transportation. Given the availability of transport directly to the WCS facilities by rail, these risks are significantly reduced. In addition, we do not believe that the transportation statistics that were used are truly indicative of the US experience with safe transportation of radioactive waste.

We appreciate that DOE has given significant time and attention to the challenges of siting, licensing and constructing its preferred alternative (evidenced by the collection and analyses of additional field data). As documented in The Ferguson Group September 4, 2015 report on earlier DOE plans, there are inherent challenges in designing a site within the ORR due to factors ranging from "the limitation of using the Superfund law and NCP regulation to determine the efficacy of siting a low-level nuclear and hazardous waste landfill" to "the highly complex nature of the fractured bedrock hydrogeology." Our experience with long term cell performance assessment modeling suggests that properly constructed and licensed facilities in arid climates can more clearly demonstrate that the facility, post closure, will not exceed points of compliance or have peaks beyond the period being analyzed.

In summary, we believe that the proposed plan fails to recognize that a mature and competitive commercial marketplace for disposal of DOE waste material has developed in the United States, a marketplace that has been encouraged by the Department. Should you desire, we would be happy to meet with you to discuss a bulk rate we could provide for the disposal envisioned by the proposed plan.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process and appreciates the information on the Waste Control Specialists Facility. In response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 cost range of +50/-30 percent accuracy. Section 2.14 of the Record of Decision contains more information about the recent evaluation of the offsite disposal costs.

Comment 190: Comment from Jerry Creasey

My name is Jerry Creasey, I live at 114 Orchard Lane in Oak Ridge, Tennessee. I am a retiree of the Y12 Plant.

I came to work at Y12 in the summer of 1968 and retired July 31, 1994. My daily work assignments during my first five years (1968-1973) where in Building 9201-5 (Alpha 5 East) I quickly became familiar with the mercury contamination of this building. Mostly from leaks from ceilings, standing mercury on pipes and beams eventually running off into the floor, and into the crawl space underneath, where mercury was accumulating into small puddles. To my knowledge Beta 4, Alpha 4, and Alpha 5, have not been demolished, and in my opinion are not only contaminated, but saturated with Mercury.

Some of the folks speaking at the public hearings and meetings have expressed it may be a good option to send such demolition materials to a more arid environment for storage in western states, if some of their concerns such as materials with mercury, cannot be corrected locally with the present proposal.

I believe the comments from the City of Oak Ridge Manager Mark Watson, City Councilwoman Ellen Smith, and EQAB President Robert Kennedy, as well as those of TDEC, and other members of the Oak Ridge City Council, are very valid concerns. I believe that you also agree that these are valid, and will do all you can to see they are addressed.

I respectfully request you will extend the deadline for comments on the proposed EMDF by 90 days, as recently requested by the Anderson County Commission.

Response: The U.S. Department of Energy received and granted two separate requests to extend the original comment period – one by another 45 days and the second by an additional 30 days. Therefore, the comment period was for 120 days.

Comment 191: Comment from Dale C. Strasser, MD

I am writing to express my concern of the proposed Onsite Disposal facility to be located at Central Bear Creek Valley. The experience of the TVA Fossil Fuel Plant spill in Kingston, TN serves as a sobering reminder of unintended consequences of land management and waste (of any variety) storage. As I understand this is a large and diverse amount of toxic waste. The geology of this area in East Tennessee is porous in unusual and hard to predict ways. I was born and raised in Oak Ridge in late 1950s through the mid 1970s and have been a local land owner since that time. My family and I spend extended vacations near Kingston. I share the reservations expressed by many others on this facility. If the facility is eventually build in the proposed area, I urge that all proper safety precautions be taken into account with the realization that the material will be around for a long, long time.

Response: The U.S. Department of Energy thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Comment 192: Comment from Gary Bertram

Which is ever safer to the State of Tennessee.

Response: The U.S. Department of Energy (DOE) appreciates your participation in the public comment process. DOE believes that the preferred alternative presented in the Proposed Plan provides an environmentally sound and cost-effective option for the disposal of Oak Ridge National Priorities List Site Comprehensive Environmental Response, Compensation, and Liability Act of 1980 waste.

Comment 193: Comment from George Proios

1. Could you please provide specifications for the geo-membrane proposed to be used, i.e, its composition, thickness, and if heat seams or other methods will be used to attach the various layers that will be used.

   Response: The specifications for all the geosynthetic materials will be developed during the preliminary design phase or the project. Consistent with the Remedial Investigation/ Feasibility Study (RI/FS) and Proposed Plan, the geomembrane proposed for use in the liner system is anticipated to be 60-mil thick, high-density polyethylene (HDPE) textured on both sides for improved resistance to sliding. HDPE liner seams are customarily heat fused using methods such as a double-wedge weld.

2. The diagram does not indicate any leachate collection system. Is one going to be installed.?

   Response: Leachate that percolates down to the primary geomembrane liner will be collected in the leachate drainage layer and then drained by gravity to pipes that penetrate the liner system to a network of collection pipes outside the disposal cells. The leachate drainage layer,

on the floor of the disposal cell, will be a hard, durable aggregate material such as river rock graded to provide a 12-in.-thick depth for collection and lateral transmission of the leachate. The pipe liner penetrations are engineered to ensure there is no leakage of the leachate at the penetration points. In addition, there is a second collection system between the primary and secondary geomembrane liners that is used to detect and collect any leachate that may have passed through the first leachate collection system.

3. What is the rate of percolation expected through the various clay lenses? Who is verifying the actual composition of the types of clay to be used and their permeability rates?

   Response: The compacted clay liner will be comprised of soil that is placed and compacted to achieve a hydraulic conductivity of less than or equal to 1×10^{-7} cm/s in accordance to the project applicable or relevant and appropriate requirements (ARARs). The geologic buffer zone layer that underlies the compacted clay liner will have a hydraulic conductivity of less than or equal to 1×10^{-5} cm/s. These two soil layers form a barrier to leachate movement downward into the groundwater system. All soil materials for these layers will be extensively characterized for engineering properties at the landfill site and/or nearby borrow site(s). This pre-qualifies the materials to meet the project performance requirements. The materials will be tested a second time during the actual construction of the layers to confirm their conformance to the construction specifications by an independent quality assurance contractor. The borrow area characterization and the soils testing during construction will be performed by U.S. Department of Energy contractors responsible for these phases of work.

4. What exactly are the types and volume of hazardous wastes that will be deposited here? Are any caustic or acidic materials expected to be dumped which may affect the integrity of the membrane liner?

   Response: RI/FSs for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for the Environmental Management Disposal Facility (EMDF). The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this Record of Decision (ROD). Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils) and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, Federal Facility Agreement parties-approved primary document, the WAC Compliance Plan.

5. How many geo-probes will be installed between the landfill and the river to verify the integrity of the barriers?

Response: Downgradient detection monitoring wells will be installed between the landfill and Bear Creek (please note there is no river present in the area), but closer to the landfill. The number of detection monitoring wells will be determined during completion of the final design and consultation with U.S. Environmental Protection Agency and Tennessee Department of Environment and Conservation.

Comment 194: Comment from Joel Fairstein

As a longtime Oak Ridge resident, I am concerned that the DOE is rushing into hazardous waste disposal here that could jeopardize the health of our community. Please adhere to our state's guidelines before proceeding any further.

Response: The U.S. Department of Energy thanks you for your participation in the public comment process. The Environmental Management Disposal Facility will meet all regulations that apply to landfills in the state of Tennessee (called applicable or relevant and appropriate requirements [ARARs]) except for a distance from groundwater requirement under a Federal law (Toxic Substances Control Act of 1976 [TSCA]).

Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

A TSCA waiver for two parts of TSCA 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

- **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the Oak Ridge Reservation. Compliance with the Resource Conservation and Recovery Act of 1976 Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the U.S. Environmental Protection Agency determination that the remedy is protective of human health and the environment.**

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.**

An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is part of this Record of Decision (ROD) to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent

level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

3.2 SUMMARY OF ADDITIONAL PUBLIC ENGAGEMENT COMMENTS AND RESPONSES

Following development of the D1 ROD, the FFA parties recommended additional public engagement to provide supplemental information related to WAC, discharge limits, and siting of the EMDF (specifically related to groundwater levels and the GWFD), developed since the Proposed Plan. The additional information was presented in a series of three fact sheets (Site Groundwater Characterization, WAC, and Water Quality Projected for Bear Creek). Several EMDF-project framework documents were also provided (D1 EMDF ROD, the Proposed plan, the RI/FS), along with other additional resources for information. DOE held an additional 30-day public review and comment period from May 9 to June 7, 2022, and hosted a public meeting on May 17, 2022, to obtain public input on the additional information.

DOE received comments from 68 individual commenters via email, comments turned in at the public meeting, speakers asking questions at the public meeting, and correspondence sent via U.S. Postal Service. Comments were requested on the three fact sheets; however, all additional comments received are included in this Responsiveness Summary, along with DOE's responses to the additional comments.

The breakdown of the comments received showed a majority of commenters were in favor of the EMDF project overall. The following topics were consistent through the supporting comments:

- Continuing efficient and cost-effective cleanup of contaminated and aging facilities
- Maintaining accelerated cleanup momentum in Oak Ridge
- Retention of the trained and skilled workforce
- Providing opportunities for supporting future DOE programs and missions,
- Keeping waste shipments off public roadways
- Isolating wastes in a manner that is protective of people and the environment.

Remaining commenters expressed concerns or opposition to the EMDF or requested additional information and/or additional public review of the requested additional information. The concerns expressed were similar to those provided in public comments to the Proposed Plan:

- Need for waivers for regulatory compliance
- Building EMDF in a "greenfield"
- Opportunity for additional WAC information and additional public review
- Groundwater levels at the EMDF location and rainfall.

Remaining commenters provided comments or requests for additional information on a range of topics:

- Climate change considerations
- Overall cleanup plan for the ORR and whether EMDF has capacity for all future remediation waste
- Plans for ongoing fish sampling and monitoring

- Request for additional information on offsite disposal cost evaluations
- EMWMF past performance and lessons learned
- Request for additional engagement with affected communities.

While many of the comments present information or opinion with which reasonable people may disagree, DOE believes that the information, analysis, objectives, and decisions made to this point support the need for additional CERCLA onsite disposal on the Oak Ridge NPL Site that can be safely and compliantly implemented. These responses provide information relative to opinions where additional information would help the reader understand the basis of the selected remedy.

DOE appreciates the public input provided during the evaluation of this remedial action alternative. The selected remedial action contained in this ROD will provide a permanent and safe alternative for the disposal of CERCLA waste generated at the Oak Ridge NPL Site.

INDIVIDUAL COMMENTS

Note: The comments have been presented below exactly as received, including all typographical and grammatical errors.

Additional Comment 1: Comment from Tennessee Lt. Governor Randy McNally

The current Oak Ridge disposal cell was the receptacle of waste generated by the DOE Environmental Clean-Up of the former K-25 site, now East Tennessee Technology Park. The proximity of the waste disposal cell resulted in large savings which allowed DOE to accomplish more clean-up in a shorter amount of time. The overall result is a thriving industrial park that is providing jobs and taxes to the county and city.

Now that the focus of the DOE Environmental Clean-Up is shifting to Y-12 and ORNL the new waste disposal cell will duplicate the tremendous success of the first cell by providing a cheaper way of performing clean-up, shortening the schedule and providing opportunities for economic development and further DOE programs.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Comment 2: Comment from Oak Ridge Chamber of Commerce

Part 1: RESOLUTION IN SUPPORT OF ENVIRONMENTAL MANAGEMENT DISPOSAL FACILIY (EMDF)

Whereas the U.S. Department of Energy (DOE), U.S. Environmental Protection Agency (EPA), and Tennessee Department of Environment and Conservation (TDEC) are hosting a public meeting on May 17, 2022 to provide information and answer questions about a proposed onsite disposal facility to aid

DOE's environmental cleanup on the Oak Ridge Reservation (ORR). The new facility is the Environmental Management Disposal Facility (EMDF); and

Three new fact sheets are available that provide additional details about the project that were not available during the previous public meetings. The fact sheets cover information about Waste Acceptance Criteria, Water Quality Protection for Bear Creek, and Site Groundwater Characterization. The DOE is accepting written comments about the topics and details shared in the three fact sheets; and

Each of the fact sheets describes the need for additional on-site disposal. With the current disposal facility reaching the end of its life, DOE has worked collaboratively with the EPA and TDEC to develop plans for a science-driven approach to identify a suitable location for the facility; and

The Oak Ridge Chamber of Commerce (ORCC) concurs with the process outlined in the fact sheets whereby DOE will (1) conduct a field demonstration test at the site to show how groundwater levels will be affected after landfill construction; (2) continue to work with EPA and TDEC to determine final waste acceptance criteria that are protective of human health and the environment; and (3) limit mercury and other contaminant discharges through finalization of a comprehensive strategy to prevent further degradation of Bear Creek; and

The Oak Ridge Chamber of Commerce Board of Directors recognizes that a new waste disposal facility is needed to continue the DOE's environmental management mission on the ORR. The current disposal facility has been essential to the cleanup and transition of the Heritage Center and its exciting job growth and economic development activity; and

Having an onsite CERCLA waste disposal facility for work at Heritage Center kept thousands of trucks carrying waste from ETTP, Y-12 National Security Complex Y-12 and the Oak Ridge National Laboratory (ORNL) off the public roadways; reduced carbon emissions; and accelerated cleanup activities for the taxpayer; and

There is significant cleanup remaining to remove aging facilities around ORNL and Y-12. This new facility will allow DOE to maintain its cleanup momentum in Oak Ridge while enhancing safety by removing aging and unneeded production buildings. These next phases of cleanup will lead to planned job creation and investment – supporting enduring missions in national security and science for the Oak Ridge region.

Therefore, the ORCC supports the creation of a new EMDF in Oak Ridge.

Adopted by the Oak Ridge Chamber Board of Directors – May 2022

Part 2 (from May 17, 2022 public meeting): Yes, Christine. C-H-R-I-S-T-I-N-E. M-I-C-H-A-E-L-S. I'm the president and CEO of the Oak Ridge Chamber of Commerce, and I'm here with a resolution in support. The Oak Ridge Chamber of Commerce Board of Directors recognizes that a new waste disposal facility is needed to continue the DOE's environmental management mission on the Oak Ridge Reservation. The current disposal facility has been essential to the cleanup and transition of the Heritage Center and its exciting job growth and economic development activity. The Chamber concurs with the process outlined in the fact sheets whereby DOE will, one, conduct a field demonstration test at the site to show how groundwater levels will be affected after landfill construction. Two, continue to work with the EPA and TDEC to determine final waste acceptance criteria [INAUDIBLE] protective of human health and the environment. And three, limit mercury and other contaminant discharges through finalization of a comprehensive strategy to prevent further degradation of Bear Creek. There is significant cleanup remaining to remove aging facilities around ORNL and Y-12. This new facility will allow DOE to maintain its cleanup momentum and overage while enhancing safety by removing aging and unneeded production

buildings. These next phases of cleanup will lead to planned job creation and investment, supporting enduring missions in national security and science for the [INAUDIBLE] region. Therefore, the Oak Ridge Chamber supports the creation of a new EMDF in Oak Ridge. And that is part of a full resolution that I've submitted in writing. Thank you.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Comment 3: Comment from National Nuclear Security Administration Production Office

On behalf of the National Nuclear Security Administration (NNSA) Production Office (NPO), I would like to like to express our support of the proposed onsite disposal cell, the Environmental Management Disposal Facility (EMDF). The EMDF will aid in the Department of Energy's (DOE) cleanup mission across the Oak Ridge Reservation, including at the Y-12 National Security Complex (Y-12).

As we look to the future, we acknowledge the challenges we face associated with our aging infrastructure. NNSA is committed to revitalizing our sites' infrastructure to ensure continued delivery of our missions. We have a vision of where we want to go, but, to get there, we must work with our partners to recapitalize the space needed for new facilities.

In June 2021, the DOE Oak Ridge Office of Environmental Management (OREM) completed demolition of the former Y-12 Biology Complex. NNSA plans to construct the new Lithium Processing Facility at this location. The coordination among NPO, OREM, and its contractors is essential to the much-needed replacement of Y-12's current lithium processing operations, which is currently housed in a World War II-era building.

We also seek to reduce the footprint of the Protected Area by 50 percent, which requires demolition of the old Perimeter Intrusion Detection Assessment System and legacy facilities that are no longer needed at Y-12. Demolishing infrastructure no longer needed for production will reduce maintenance and operational costs.

There is more work associated with our role in the nuclear deterrent in the years to come. The EMDF will enable continued support of these and other infrastructure modernization efforts underway at Y-12 that are imperative to support future operations critical to national security. NPO values its partnerships with and the cooperation among DOE and NNSA Headquarters, OREM, and its contractors in support of the Y-12 mission. We look forward to future environmental cleanup projects at Y-12 and are excited to see continued site transformation.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Comment 4: Comment from Mark Watson, Oak Ridge City Manager

Part 1: Representatives of the Department of Energy (DOE), Environmental Protection Agency (EPA) and Tennessee Department of Environment and Conservation (TDEC).
Since 2014, the City of Oak Ridge has actively pursued a resolution to the siting of a second landfill in the Bear Creek Valley. Each of your agencies has assisted and cooperated through a series of meetings, responses and sharing of information critical to the City of Oak Ridge. We must thank you for representing the local interests of 31,500 people that live adjacent to the Department of Energy reservation. The City would like to respond to the following:

Site Groundwater Characterization Fact Sheet

According to the fact sheet, existing data show groundwater elevations in the highest parts of the knoll in the area where Cells 1 and 2 would be constructed. Thus, the City concurs with the approach to conduct a field demonstration over at least two wet seasons at this location to gather real-time data. The fact sheets states that adjustments would be made if there are unusual amounts of rainfall but does not state what those adjustments would be.

The Waivers and Exemptions section of the fact sheet on Page 4 state that "the robust engineered liner system DOE designed that fulfills the intent of the requirements to prevent and rapid release of

contamination." The fact sheet should explain how and who will test and maintain this system, since it will be in place for hundreds of years.

Similarly, the fact sheet states that limits on waste contaminant acceptance will reduce the impact of potential future releases but does not describe how that process will work. Oversight and strict documentation are needed to promote public and community acceptance of the proposed landfill.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

The Groundwater Field Demonstration (GWFD) scope will be detailed and finalized in a post-ROD Remedial Design Work Plan, a primary document that requires approval by all three parties before implementation of the demonstration. This GWFD will provide additional characterization information, and while not itself a change to the remedy, has the potential to affect the final design of the facility. Results of the field study will be incorporated into the Remedial Design Report, which will present the final landfill design, and is also a primary document that requires approval by the Federal Facility Agreement (FFA) parties before landfill construction.

All disposal facilities depend on liners, caps, and water diversion features. The life expectancy, as demonstrated in several scientific journals, greatly exceeds hundreds of years. Continued maintenance is a key element of some aspects such as controlling erosional features on covers. DOE will maintain the disposal facility in perpetuity.

Waste acceptance criteria (WAC) are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation

indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils), and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

Waste Acceptance Criteria

Many of the public's comments have revolved around the need to have Waste Acceptance Criteria (WAC) in place prior to a final Record of Decision (ROD). What are the criteria that have not been agreed to among the agencies?

What is the definition of "unacceptable risk," and how is that determined? Upon what standards is risk determined, and how does the 5% of the total radiological activity that will be disposed on-site factor into WAC? It would be helpful to have more information about how these analyses are completed.

Response: See the above response related to the inclusion of the WAC in the D2 ROD. The FFA parties have worked together to sign this ROD. All three parties agree that the onsite remedy selected is protective and will either comply with the ARARs or shows justification for waiving a portion of a regulation. The FFA parties believe there is sufficient information available to support this decision. The final set of EMDF inventory limits will be informed by the supplemental analysis in the WAC Compliance Plan.

Unacceptable risk is defined as risk greater than the 10^{-4} to 10^{-6} CERCLA risk range based on an estimated risk to an exposed individual.

The 5 percent of the total radiological activity does not factor into the WAC. It is an estimated percent based on past and expected future waste disposal practices where higher activity waste is disposed offsite and not accepted for onsite disposal.

Water Quality Protection for Bear Creek

This fact sheet acknowledges the existing impaired condition of Bear Creek. The fact sheet states that DOE will treat all contaminated wastewater and leachate from EMDF prior to discharge into Bear Creek but does not address how stormwater will be managed. A robust stormwater management system is important to the City, as the creek system continues to flow through the City into East Fork Poplar Creek, Poplar Creek and enters the Clinch River.

The fact sheet states that fishing does not occur due to the "low number and small size of the fish." Fishing is prohibited due to contamination. The fact sheet should explain what measures are and will be taken in the future to reduce the contaminants so that the State's posting signs can eventually be removed.

Page 4 discusses Mercury Discharge Limits. The comprehensive mercury strategy under discussion among DOE, EPA and TDEC should include not only an "evaluation" of factors causing methylation, but a program of investment by DOE into technology that will expedite the restoration of the stream.

OREM and the State should partner with the Oak Ridge Innovation Institute and ORNL that has just received $80 million in state funding that could help support this vital research to improve public health and the environment in Tennessee. The warning signage posted along the waterways in Oak Ridge are a major source of negative public perception about Oak Ridge.

Response: Construction of support facilities, including a stormwater management system, is part of the selected remedy. As a best management practice, landfill wastewater generation will be minimized by keeping the number of cells open to the minimum required by operations and placing temporary precipitation/clean stormwater controls to divert clean stormwater out of the disposal cells. Ditches will be installed for the management of stormwater. Diversion ditches and interceptor trenches can work together to intercept surface water and shallow stormflow from the steeply sloped section of Pine Ridge above EMDF. Along the east side of EMDF, [drainage] D-10W will be diverted to [North Tributary] NT-10, as needed.

Please note that the mercury warning signs were not placed along Bear Creek because of ongoing waste disposal activities in the valley. Current mercury levels in Bear Creek are on the order of those in reference streams throughout the state. Even so, the fish in the creek exhibit elevated levels of mercury. DOE will control levels of mercury in landfill wastewater through treatment and per applicable or relevant and appropriate requirements and agreements reached by the FFA parties, prior to discharge to Bear Creek.

DOE will meet all regulatory requirements pertaining to mercury treatment and onsite disposal of waste, including Resource Conservation and Recovery Act of 1976 (RCRA) requirements that dictate WAC for mercury. The regulatory compliant design, operation, and closure of the onsite disposal facility, coupled with DOE's compliance with all regulatory requirements concerning mercury, will help to ensure that the new disposal facility is protective of human health and the environment over the long term. For West End Mercury Area remediation projects with EMDF-bound waste streams, DOE will take all practical measures to remove mercury before waste generation and send that mercury offsite to treatment/storage/disposal facilities. Mercury hazardous waste that is characteristically hazardous per RCRA (D009 waste) is prohibited from disposal in EMDF.

Finally, the City of Oak Ridge should be noted as supportive of continuing the environmental work of DOE. The economics of our community is unique with many "ups and downs" as businesses change and adapt to new missions of the federal government. The actions taken by the three agencies to consider a new landfill have taken our comments into consideration. We look forward to working with you as a strong "host" community.

Part 2 (from May 17, 2022 public meeting): Thank you. Good evening. I'm Mark Watson. I'm the City Manager for Oak Ridge, and I wanted to just make a couple of brief observations for you tonight. First off, dealing with this issue since 2014, so it's a long time in coming, and we have come a long way. Tonight, we want to thank the agencies, the Department of Energy, and also Environmental Protection Agency, and Tennessee Department of Environment Conservation. I know they've spent countless hours on that. Also want to say that this is important to us as a community, and we have expressed interest in the water and drainage of the landfill, and sufficient information has been provided to us on the geologic [INAUDIBLE] and concerns. So, I think as we continue to look at run-off and those sorts of things, the city has supported the effort in that regard. Also, the concern has been the waste acceptance criteria, and we know and believe that this waste acceptance criteria will be developed sufficiently to protect the interests of the community for the long term. It's also identified that the Department of Energy and TDEC would meet Clean Water Act regulations and TDEC standards, which is very important to us as a community operating a wastewater plant as part of the various watersheds in our community. And finally, I would just mention that we look

forward to working with you, the Department of Energy, as this record of decision is completed, and we encourage – and strongly encourage – that there be continuous updates as this project goes along. So, thank you for the opportunity tonight, and I know the others have things to say.

Response: DOE thanks you for your participation in the public comment process and appreciates your support of the preferred remedy.

Additional Comment 5: Comment from Christopher Wieland

That a new radioactive waste landfill is necessary to accommodate and isolate the wastes generated by demolition of contaminated buildings at Y-12 National Security Complex and the Oak Ridge National Laboratory is clear. A well designed, well operated, and well monitored landfill can, I believe, successfully isolate the wastes and protect both the people and environment of East Tennessee. However, I have several comments regarding some currently active issues discussed in the subject fact sheets and the draft Record of Decision (ROD).

Site Groundwater Fact Sheet

- DOE, which is self-regulating with regard to radioactive materials and wastes, does not have a defined landfill liner/cover requirement for radioactive wastes. As proposed, the EMDF landfill liner/cover system design meets the minimum criteria for a Resource Conservation and Recovery Act landfill. This design also meets the Toxic Substances Control Act requirements as well. However, because the landfill will contain radionuclides that are highly mobile in surface water and groundwater, as well as radioisotopes with long half-lives, DOE's design should exceed the bare minimum requirements. This is more especially true when DOE is requesting waivers from state and federal requirements that no surface water discharge in the landfill area, and that the groundwater table be 50 ft. below the base of the landfill. For example, the proposed EMDF landfill liner system design should be strengthened with an additional drainage/leachate collection layer to provide redundant leak detection and capture capability, and an underdrain to provide a hydraulic break between the liner and natural groundwater to reduce hydrostatic pressure on the liner. Once waste is in place, the liner system, unlike the cover, cannot be repaired. Enhancing the design now will help ensure that the liner maintains waste isolation for many years.

- The proposed impermeable liner test will cover a small knoll in the footprint of the landfill for two wet seasons, and is expected to show that the liner reduces groundwater elevations below the design elevation of the landfill liner. I fully expect to see such decline, since the cover is over a knoll. However, landfill construction will remove the knoll, after which groundwater levels will be influenced by the ridge on the north rim of the landfill. This demonstration may therefore not be representative of post-construction conditions. Further, unless East Tennessee experiences a much wetter than normal year during the test period, this test will not be representative of years with high and sustained rainfall, such as those predicted to occur as a result of climate change. As noted above, an underdrain is recommended to help reduce hydrostatic pressures on the landfill liner.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge

NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

The design of the facility does not use underdrains to lower the water table beneath the waste. The Groundwater Field Demonstration (GWFD) scope will be detailed and finalized in a post-ROD Remedial Design Work Plan, a primary document that requires approval by all three parties before implementation of the demonstration. This GWFD will provide additional characterization information, and while not itself a change to the remedy, has the potential to affect the final design of the facility. Results of the field study will be incorporated into the Remedial Design Report, which will present the final landfill design, and is also a primary document that requires approval by the Federal Facility Agreement (FFA) parties before landfill construction.

Waste Acceptance Criteria Fact Sheet

1. While Administration Waste Acceptance Criteria (WAC) have been agreed to, full agreement has not yet been reached on the Analytical WAC. I urge DOE, TDEC, and EPA to reach a clear and defined agreement on the analytical WAC before the ROD is signed. This will ensure a clear path forward and avoid potential disagreements from impacting landfill operations in the future. Further, this will improve transparency in operations.

2. Administrative WAC requirements, as applied through Waste Handling Plans or documents of similar intent, should require segregation of uncontaminated construction debris for disposal at conventional construction debris landfills on the Oak Ridge Reservation in order to ensure that EMDF landfill volume is not unnecessarily consumed by uncontaminated materials.

Response: Waste acceptance criteria (WAC) are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils), and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended

to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

Waste segregation and volume reduction is a very high priority for DOE in the planning and implementation of all remedial actions at the Oak Ridge NPL Site. DOE is committed to the reduction of waste volumes going to the EMDF through waste segregation and maximizing recycling. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the current Environmental Management Waste Management Facility, provided characterization allows this path. The application of the waste hierarchy will also apply to EMDF.

Water Quality Protection for Bear Creek Fact Sheet

- The current draft of the EMDF ROD is unclear as to when the final radiological discharge limits will be set. According to ROD §2.13.2.3, Radiological Discharge Limits (p. 2-55):

  Additionally, the Dispute Resolution stated "*For the proposed landfill, final effluent limits will not be set until the ROD is issued by the DOE and the EPA with the concurrence of the Tennessee Department of Environment and Conservation.*"

  RDLs will be established by the FFA parties and will be included in this ROD prior to its approval.

  Which is it? I urge that RDLs be set and published prior to ROD finalization to maintain full transparency. I further urge that all monitoring data generated during EMDF operation and post-closure be fully shared among all three regulating entities.

- Sampling of fish and selected benthic filter feeders in Bear Creek downstream of the Bear Creek Valley waste management areas should be performed annually and results made timely available to the public at the DOE Information Center and at the Oak Ridge and Roane County libraries. Results of all chemical and radiologic analyses should be included in the summary, together with baseline data from the studies mentioned in this fact sheet and any comparative studies from local streams not impacted by DOE operations.

  Response: The specific remediation goals for landfill wastewater are specified in the ROD (Sect. 2.12.2.4). The approach was agreed upon among the FFA parties. The discharge limits will be developed in the future, based on the remediation goals, when the specifics of the EMDF landfill wastewater treatment systems are known, including the discharge location, consistent with CERCLA. The remediation goals are, and future discharge limits will be, within the CERCLA risk range and protective of human health and the environment.

  Additional monitoring requirements will be developed as part of the Remedial Action Work Plan/Sampling and Analysis Plan for the EMDF. Five-year reviews will be performed to ensure protection of the environment; these reports are available in the DOE Information Center (https://doeic.science.energy.gov/).

Additional Comment 6: Comment from Eric Nolan, President of Atomic Trades and Labor Council

The Atomic Trades and Labor Council (ATLC) fully supports the Environmental Management Disposal Facility (EMDF). Keeping our members, their families, and the community safe is our main concern. Being able to have legacy waste and other contaminates properly disposed of on site, we can focus on our mission of keeping America safe.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Comment 7: Comment from Jim Skelton (from May 17, 2022 public meeting)

Thank you. Hi, I'm Jim Skelton. J-I-M. S-K-E-L-T-O-N. Director of Member Services and Programs for the Tennessee Chamber of Commerce and Industry. The Tennessee Chamber serves as the primary voice of business and manufacturing interests on major employment and economic issues facing public policy decision-makers in Tennessee, and we are also the state affiliate for the U.S. Chamber of Commerce, the National Association of Manufacturers, and the American Chemistry Council. Moving forward with the EMDF facility outlined here tonight by DOE, EPA, and TDECT is of critical importance for the Oak Ridge Reservation and the continued economic vitality of this area. The successful cleanup of the East Tennessee Technology Park has proven the value of a safe on-site disposal option for Oak Ridge's cleanup efforts. Without the existing on-site disposal facility, the East Tennessee Technology Park would almost certainly be undergoing major cleanup activities rather than being a cutting-edge business and recreational park attracting new investment to the region. Building upon that success, DOE is now focusing their cleanup efforts near the footprints of the Y-12 Security Complex and the Oak Ridge National Laboratory, which contained DOE's largest inventory of high-risk facilities, more than 200 buildings now slated to be demolished. These buildings, some dating all the way back from the Manhattan Project era in the 1940s, present an ongoing environmental risk and occupy land that can be cleaned up and utilized for scientific and national security missions. With the current disposal facility slated to be at capacity no later than 2028, it is crucial that the EMDF move forward now. If that fails to occur, DOE will lose its options for on-site disposal. This would either force a reliance on off-site disposal or essentially halt major demolition and cleanup activities in Oak Ridge. Both of these scenarios would be accompanied by a massive loss of jobs, force the Oak Ridge community to live longer with facilities that present environmental hazards, and significantly drive up cleanup costs to taxpayers. The Tennessee Chamber of Commerce and industry supports DOE, TDEC, and EPA in the diligence they have applied to their respective regulatory oversight roles, and we encourage DOE to approve the record of decision and move forward with the construction and operation of the environmental management disposal facility to continue Oak Ridge's continued leadership on science and national defense work. Thank you for your work on this crucial project.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Comment 8: Comment from Warren Gooch (from May 17, 2022 public meeting)

Thank you. Warren Gooch. G-O-O-C-H. I'm the Mayor of Oak Ridge. First of all, I want to thank all of the parties here tonight for this public engagement. I think it's absolutely critical that it continues, and we appreciate the presentation that Mr. Petrie has made tonight. You heard about the criticality of the [INAUDIBLE] waste disposal facility. I do want to point out that we have momentum in this community. The Department of Energy and its missions have momentum, and when you have it, you need to use it. And fortunately, we have political support. We have funding for the missions for DOE here in Oak Ridge. We obviously value our relationships with the Department of Energy, EPA, and TDEC, and we want to continue working with them. I would just urge everyone to continue working as hard as you can. I think it is absolutely essentially that we move forward with the ROD so that the groundwater demonstration project can start and be completed and that the monitoring continue. That will assist in many different aspects of this project in moving forward, and so, I would just urge all of the regulatory parties to respond as quickly as you can to the questions and comments tonight and issue the next version of the ROD, which hopefully can be executed sooner rather than later. Thank you very much.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The

selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Comment 9: Comment from Parker Wayland (from May 17, 2022 public meeting)

My name is spelled W-A-Y-L-A-N-D. I want to express admiration, you might say, appreciation to the point to which this issue has been developed by the Department of Energy. I was the project manager for a proposed mixed-waste treatment facility some 15 or 20 years ago. Mixed waste being radioactive plus hazardous. Uranium plus mercury. At that time, the cost of treatment was, shall we say, extremely high and unacceptable to DOE. So, this issue has laid dormant for a long, long time. One of the key issues was what is specifically the tolerance for the treated waste or, in this case, the disposed waste. And it seems from this presentation that that issue, those issues have been addressed and decided. If we have a waste-acceptance criteria with definitive concentrations of various waste in them, then that job is done, and the engineers can go forward and design accordingly. So, [INAUDIBLE].

Follow-up comment from Parker Wayland at May 17, 2022 public meeting: As I mentioned earlier, my name's Parker Wayland. W-A-Y-L-A-N-D. I noticed several comments here. In fact, I guess, [INAUDIBLE] concern, really. It has to do with the environmental impact of possible outflow from this project. I do want to just mention the experience I had previously with an approach that would treat the waste and compress it into small—much smaller volumes that could be sent [INAUDIBLE] or some such place. So, we have a choice [INAUDIBLE] between protective design in the landfill here or treating the waste. There may be an economic difference there. There may be an environmental difference there. But I would encourage DOE to look again at that possibility.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for

siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Waste generator projects would be required to treat wastes as needed to meet the EMDF waste acceptance criteria and ARARs before onsite disposal. However, that treatment is not part of this onsite remedy.

Additional Comment 10: Comment from Elizabeth Harm (from May 17, 2022 public meeting)

My name is Elizabeth Harm. H-A-R-M. I am the Executive Director of the Energy, Technology and Environmental Business Association, or ETEBA, which it is more commonly known as. Our organization started in Oak Ridge in 1989, and today we are a national non-profit trade association representing approximately 170 small, large, and midsize companies and affiliate members who provide environmental, technology, energy, construction and related services to government and commercial clients. ETEBA has been a strong supporter of the Department of Energy's cleanup successes to date at the Oak Ridge Reservation, which now serves as a model for similar cleanup and economic development and conservation partnerships across the country. We encourage and support DOE's plans to continue the next chapters of that cleanup at the National Lab and the Y-12 Security Complex, which will continue to reduce environmental risk, remove aging and abandoned facilities, and bring new facilities and potential new missions and facilities at both Y-12 and the National Lab. In closing, ETEBA would like to thank DOE, EPA, and TDEC for all of their hard work, for this opportunity for interested stakeholders to share comments, and what they outlined here tonight, which will benefit East Tennessee and continue this important cleanup and further Oak Ridge's proud legacy as the City of Firsts. Thank you.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Comment 11: Comment from David Wallace (from May 17, 2022 public meeting)

Yes. David Wallace. I'm a member of the community. I work for Barge Design Solutions. I'm a member of the [INAUDIBLE] board director of ETEBA. My family's actually [INAUDIBLE] from the early 1700s in this area. I actually have a few members that had to leave because of the reservation. But very positive that we got to go forward with this disposal cell. My question is really simple: will this disposal cell suffice for future needs? Will this be the last one? Or will we have to expand it? That's it.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

All scope currently identified as being remediated under CERCLA is anticipated to be covered by the EMDF capacity. At this time, there is no information to suggest a third disposal landfill would be needed.

Additional Comment 12: Comment from Rose Weaver (from May 17, 2022 public meeting)

I'm Rose Weaver. R-O-S-E. W-E-A-V-E-R. And I am a past resident of the Scarboro community. I do agree that there needs to be a disposal site. I'm just concerned that it may be nearby the Scarboro community. I like the comments that was made by this young lady in terms of hopefully DOE and others will make sure that all nearby communities get an opportunity to speak. My biggest question is, are there other contaminants other than those that were presented in the presentation that may have an impact of residents nearby and what those health impacts are going to be. I know we see, like, turtles and fish, but what about human beings over a period of time? The other thing is, what kind of socioeconomic activities will be in place for a person in those nearby areas? I know we talk about economic development, but what about nearby Scarboro residents? What kind of economic development is going to be in place for them?

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental

Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex (Y-12) and Oak Ridge National Laboratory (ORNL) that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Existing and new data from hundreds of wells in Bear Creek Valley support the conclusion that any contamination in the valley cannot reach residential areas. CERCLA also requires groundwater monitoring around any disposal facility so any unlikely releases would be identified quickly. The law also requires those releases to be remediated. There is no credible threat to any downstream water users. The protectiveness offered by the design/operation/closure/monitoring of an onsite facility, combined with other factors such as protectiveness of people on the transportation route (due to vehicular accidents/carbon emissions) were the waste to be sent offsite, all factor into the determination that onsite is the preferred solution for disposing of this waste.

The comment expresses concern of a socioeconomic nature. Jobs associated with construction and operation of the facility, and the acceleration of cleanup enabled by onsite disposal and subsequent opportunities that it would present to Y-12 and ORNL, are expected to benefit both the economy and perception issues associated with environmental conditions in Oak Ridge. DOE points to the recent socioeconomic study supporting the landfill that is referenced and summarized in this ROD (see Sect. 2.10.11).

Additional Comment 13: Comment from Martin McBride (from May 17, 2022 public meeting)

My name is Martin McBride. I am a retired DOE manager living in Oak Ridge, and for the last three years, it's been my privilege to be the co-chair of the celebration of the first public school desegregation in the southeastern United States, which occurred at DOE's order back in 1955. My purpose in rising is to express support for DOE's waste management activities. I'm a strong supporter of DOE and their waste management activities. But there is an issue of economic impact of these waste sites on the local communities. And I think I second Ms. Smith's comment that it's not just one or two waste sites, in fact. There is many, many tons of waste out at ORNL—excuse me, out at the DOE reservation. And I think with that in mind, I think one of the things that we can do is [INAUDIBLE] to DOE to perhaps support some of the celebration activities for the Black Americans who were not allowed to really choose where they lived back in the 1940s, but in fact, were instructed to live on the DOE fence line. Yes, the Scarboro community

is a wonderful community, and I think economically, there are things the Department of Energy can do to support, for example, the celebration of the Scarboro 85 students who were the very first ones to walk into all-white classrooms in the southeastern United States. There are a number of things the Department of Energy can do, which will both show support and respect for the historically Black community here and also provide a really nice economic boost to the City of Oak Ridge. Thank you.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex (Y-12) and Oak Ridge National Laboratory (ORNL) that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

CERCLA provides some funding authorities for municipal governments to provide technical assistance support for CERCLA activities in their jurisdictions; these funding mechanisms are administered by the U.S. Environmental Protection Agency through the Brownfields Grant funding program. DOE provides technically supported community participation in the CERCLA decision making process through the Site Specific Advisory Boards (SSABs), and the Oak Ridge SSAB has provided independent advice and recommendations on the preferred alternative. The Oak Ridge SSAB Recommendation 240 supported additional onsite disposal capacity on the Oak Ridge Reservation (ORR), with a number of recommendations that continue to strongly influence DOE's decision making to this day. The State of Tennessee provides funding to the Oak Ridge Reservation Communities Alliance, an organization of regional municipal governments who receive information and provide feedback on environmental cleanup activities on the ORR. Finally, DOE provides funding to the Energy Communities Alliance, a national organization of local governments adjacent to or impacted by DOE activities, who have shared information and policy positions regarding DOE's preferred alternative.

The comment expresses concern of a socioeconomic nature. Jobs associated with construction and operation of the facility, and the acceleration of cleanup enabled by onsite disposal and subsequent opportunities that it would present to Y-12 and ORNL, are expected to benefit both the economy and perception issues associated with environmental conditions in Oak Ridge. DOE points to the recent socioeconomic study supporting the landfill that is referenced and summarized in this ROD (see Sect. 2.10.11).

Additional Comment 14: Comment from Derrick M. Hammond (from May 17, 2022 public meeting)

My name is Derrick M. Hammond. That's D-E-R-R-I-C-K. M. H-A-M-M-O-N-D. Okay? Appreciate you making the time. I simply sketched this out. It says good evening. My name is Derrick Hammond. As pastor of Oak Valley Baptist Church in the historic Scarboro community, as a city councilman and a chemical engineer, I understand institutional mistrust that has historically existed in minority and disadvantaged communities for organizations even like the DOE. I also understand the concerns that have been expressed about things like the need for groundwater studies, discharge limits, waste acceptance criteria, community discussion. I get it. To be clear, I believe that the current cleanup progress of DOE is benefitting Oak Ridge in meaningful, tangible ways and that delays caused by adequate on-site waste disposal capacity will negatively impact us in significant and a number of detrimental ways. Even beyond that, to be quite honest, my greater concern in public discussions like these as an African American pastor are twofold. Couple things. One, I'm always concerned about organizations, even ones that do great work around the nation and in the area, who show up and seem to speak and fight for a community that they're not speaking to. I've looked over the claims of [INAUDIBLE] groups, and I can honestly say while I understand the language and the concerns, I've not seen any [INAUDIBLE] of the Scarboro community or at even a city council meeting at expressing these current [INAUDIBLE] elected representatives of those who they're supposed to fighting for. Please forgive me if I missed it or they did, and I overlooked it. I do not want to misspeak. But in my opinion, a comprehensive approach to environmental justice in a city should include and involve an intentional effort to include one of that city's most abused communities, especially a community that also happens to be one of the closest to the proposed site. That's the first thing that typically concerns me in conversations like these and this one. Secondly, I'm always concerned about those who show up in these conversations who have the privilege of focusing on environmental justice without regard for economic justice. IN the 1980s, local and national newspapers circulated an erroneous story stating that Scarboro was contaminated by a mercury spill. Numerous attempts by the community to have that story corrected failed, and so many residents ended up moving out of that community, which fostered, facilitated, and created a significant wealth gap and social stigma that the Scarboro community never recovered from. It's one that I and many others must continue to deal with to this day. So, for this reason, economic opportunities for Scarboro residents, in addition to environmental justice, remain one of my highest priorities and areas of focus. So, please forgive me for being leery about environmental justice efforts that are extremely vocal about preventing future injustice while remaining wholly silent about the need to economically correct past abuses. Based on the track record of DOE's existing disposal facility, I'm confident in their and your ability to safely build and operate this new facility in collaboration with the EPA and the State of Tennessee. Again, thank you for this opportunity, for your commitment to community involvement in this process. May God bless you and keep you all, is my prayer.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex (Y-12) and Oak Ridge National Laboratory (ORNL) that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected

remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

The comment expresses concern of a socioeconomic nature. Jobs associated with construction and operation of the facility, and the acceleration of cleanup enabled by onsite disposal and subsequent opportunities that it would present to Y-12 and ORNL, are expected to benefit both the economy and perception issues associated with environmental conditions in Oak Ridge. DOE points to the recent socioeconomic study supporting the landfill that is referenced and summarized in this ROD (see Sect. 2.10.11).

Additional Public Comments 15 – 45 Comment from East Tennessee Economic Council members

Part 1: [This letter was submitted by multiple commenters – see full list following the comment.]

On behalf of the East Tennessee Economic Council (ETEC), we would like to express our full support for the Environmental Management Disposal Facility (EMDF). ETEC is an independent, regional, non-profit membership organization dedicated to supporting the federal government's missions in Oak Ridge and creating opportunities for economic growth around those missions.

Recognizing that the current onsite disposal facility is nearing maximum capacity, and many excess contaminated facilities remain at Y-12 National Security Complex and the Oak Ridge National Laboratory, the new EMDF is critical to the successful and timely cleanup of the Oak Ridge Reservation. Timely cleanup is important not only to remove potential risks, but also to enable continued progress on vital research and national security missions.

ETEC supports EMDF because it will allow:

3. DOE to maintain cleanup progress to satisfy moral and legal obligations to the people of East Tennessee
4. Removal of aging, contaminated structures and contamination sooner, thereby reducing worker risk and advancing current and future science and security missions
5. Retention of trained and skilled cleanup workforce including underserved communities
6. OREM to reduce risk of transporting waste on public roads and avoids significant carbon impacts (~113,000 metric tons)
7. More efficient use of taxpayer dollars as onsite disposal is half the cost of offsite disposal for waste generated by Oak Ridge Reservation cleanup

In summary, the future of the Oak Ridge Reservation hinges on this new onsite disposal facility. Without EMDF, the cleanup will be cost prohibitive and will extend the time to completion by many years or even decades. Maintaining cleanup momentum will enable new federal missions that will create regional economic growth opportunities. This is the definition of ETEC's mission and therefore heartily supported by the ETEC members who have affixed their signatures to this letter (below and on the attached pages).

We thank you for all you have done thus far to enable future success on the Oak Ridge Reservation.

List of commenters:

- Nichole Allen
- Tracy S. Boatner*
- Gerald Boyd
- Chris Caldwell
- Paul Clay
- Kim K. Denton
- Levi Gross
- George H. Hein III
- Doyle R. Inklebarger**
- Alan Liby
- Norm Nelson
- Cortney Piper
- Alex Snyder
- Joe Storch
- Robert Van Hook
- Susanna Waters
- Mike Arms
- Harry Boston
- Sherry L. Browder
- Bonnie Carroll
- David Coffey
- Clint Gross
- Spencer Hall
- Travis Howerton
- Douglas Lattman
- Melodie McDonald
- Patty Pace
- Mike Schlitz
- Billy Stair
- Thomas E. Tuck
- David W. Wallace

* Also spoke at May 17, 2022 public meeting on behalf of ETEC; comment is included as Part 2 following the list of signatures.
** Additional comment: Respectfully submitted with my full endorsement for this important project.

Part 2: (from May 17, 2022 public meeting) Hello. I am Tracy Boatner. T-R-A-C-Y. B-O-A-T-N-E-R. And I am the president of the East Tennessee Economic Council or ETEC here in Oak Ridge. And on behalf of our board of directors, I would like to pledge our support of the EMDF because we believe that it is critical to the future missions on the Oak Ridge Reservation that we have this disposal facility, that being an on-site disposal facility so that it will speed up the cleanup and enable those future missions, which will enable our economy to continue to grow. And we will also be submitting a letter of support to Roger Petrie before the June 7th date.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is

invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Public Comment 46: Comment from Thomas Zacharia, President and CEO UT-Battelle, LLC

On behalf of UT-Battelle, LLC, the managing and operating contractor for Oak Ridge National Laboratory (ORNL), please accept this letter of strong support for the proposed new Oak Ridge Reservation Environmental Management Disposal Facility (EMDF).

There are close to 100 structures at ORNL that are surplus to the science mission and need to be demolished. In many cases, these excess structures are occupying land that could be used to construct new science facilities. In addition, many of these excess structures pose environmental and safety risks due to historical chemical and radiological contamination.

These structures need to be demolished in a safe and efficient way, and the waste from that demolition needs to be managed safely and efficiently. A significant potion of this ORNL demolition waste would be disposed of at the proposed new EMDF.

Based on the fact that the current onsite disposal facility is nearing capacity, it is critical that the proposed EMDF moves forward as quickly as possible. Failure to provide additional onsite waste disposal capacity would result in reduced clean-up activity at ORNL due to the increased cost of shipping contaminated demolition waste across the country. Project plans indicate offsite disposal could be twice as expensive as onsite disposal via the EMDF.

Any slowdown in clean-up activity would directly impact ORNL's science mission and our ability to construct new science facilities. The EMDF will play a central role in ensuring ORNL's greatest impact on the national missions entrusted to us by the Department of Energy.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and

state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Public Comment 47: Comment from David Adler

My name is David Adler, and I have lived in Oak Ridge for over 30 years. I support implementation of DOE's proposal for a new landfill to enable cost effective implementation of the cleanup mission. I have reviewed the materials developed to support the ongoing public comment period and am satisfied that the approaches being taken to manage water discharges, waste acceptance, and ground water protection will assure long-term and short-term protectiveness. I urge the Department to proceed with urgency to avoid interruption of cleanup schedules and resultant environmental impacts.

Given past experience in Oak Ridge, provision of additional onsite disposal capacity seems critical to successful cleanup, and the opportunities created by restoration of facilities and land areas on the Oak Ridge Reservation.

Thank you for the opportunity to comment.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. DOE appreciates your support of the preferred remedy. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Public Comment 48: Comment from Doug Colclasure

Part 1: There are numerous DOE legacy waste cleanup projects across the DOE complex where cleanup waste has been disposed of off-site. These cleanup projects have been successfully completed often ahead of schedule and under budget? Answers to the following questions for a more comprehensive comparison would be helpful in understanding the cost benefit and risk comparison of on-site vs off-site disposal option of future ORR cleanup. Unfortunately the emphasis in the documentation supporting EMDF appears to be mostly driven by experiences with EMWMF.

Questions, RE: OREM - Public Meeting -- EMDF May 17, 2022: [Note: these questions were not presented at the May 17, 2022 public meeting.]

- At the ORRCA meeting on Nov 1, 2021, DOE's Mr David Adler promised attendees he would arrange a public tour of the proposed EMDF site in mid Bear Creek Valley. What is the date and time of the on site tour?

- What are the coordinates of the proposed EMDF site and what is the total acreage with all support facilities?

  Response: The U.S. Department of Energy (DOE) appreciates your interest in touring the proposed Environmental Management Disposal Facility (EMDF) site. DOE committed that a tour would be given if one was requested. A tour has not yet been requested, but DOE stands ready to respond to any reasonable request for a tour.

  The exact location (i.e., coordinates) of the EMDF will be determined once the final design is completed. Construction of EMDF on the selected site in Central Bear Creek Valley would cover an approximately 80 acres of land.

- Turning a greenfield of a mostly undisturbed 80 year old oak forest into a hazardous waste site seems to be counter productive to the objective of ORR cleanup?

  Response: Based on strong state preferences related to site hydrology, the Federal Facility Agreement (FFA) parties have agreed to the Central Bear Creek Valley site for the waste disposal facility. DOE indicated in the Proposed Plan and this Record of Decision (ROD) that the land use around and including the Central Bear Creek Valley site would have to be changed to industrial use from that designated in the Bear Creek Valley ROD (consistent with the recommendation of the End Use Working Group). This ROD changes the land use designation for Central Bear Creek Valley as part of this remedy selection. The land use recommendations from the End Use Working Group and eventually documented in the Bear Creek Valley ROD were identified solely to set remediation levels across the valley. There was never any expectation that the land in Bear Creek Valley would be released by DOE for use by others. The land was always intended to be a buffer between DOE activities and the public and to provide future opportunities for DOE use. Although forested land will be used for disposal, upon closure much of that land can be returned to nature, with natural local grasses grown on the cover of the facility and land not used for disposal can be returned to forested land.

  From the alternatives within Bear Creek Valley considered for locating the EMDF, DOE considered brown field sites first, but ultimately the Central Bear Creek Valley site provided the most beneficial attributes in total over those other sites. Please note, the site has been logged as part of a timber harvest in the past.

- Has the proposed site been registered in the Roane County deeds office Plat Book? If so what is the Plat Book alphabetical letter and page number?

  Response: Registration will not occur until after the ROD is signed.

- Were the DOE Rocky Flats legacy facilities and site contamination cleanup wastes disposed off site? If so why was off-site disposal chosen as opposed to burying the cleanup waste on site? If off site

disposal, how was the waste transported? How many cubic yards? Were public roads involved? Were commercial railroads involved? Who (name) was the contractor involved in the transportation? Were there any documented public safety occurrences? https://www.energy.gov/sites/default/files/2020/06/f76/Rocky%20Flats%20History.pdf

- Was the DOE Energy Technology Engineering Center (ETEC) northwest of Los Angeles -- Santa Susana Field Laboratory cleanup waste disposed of off-site? If so why? Did transportation of the waste involve truck loads of wate traveling on public roads? If so why was off-site disposal chosen as opposed to burying the hazardous waste in an engineered pit on site. What was the cost of off site disposal versus on site burial? https://www.energy.gov/em/energy-technology-engineering-center-etec

- Was the hazardous material cleanup waste at the ***Accelerated Retrieval Project (ARP) IX facility at the Radioactive Waste Management Complex- DOE- Idaho National Laboratory (INL) Site*** -- disposed of off site? If off site disposal, how was the waste transported and did transportation involve public roads and or commercial railroads?

  Response: The alternatives and analyses for waste disposal at the above-mentioned sites are unique to those sites and are not related to or relevant to the EMDF analysis.

- How many 3 axel dump truck loads (cu-yds/load) of crushed limestone rip-rap rock (shot rock) are projected to be required for the proposed EMDF? Will public roads be used for transporting the rock?

  Response: Material quantities for EMDF construction will be determined as part of the final design. Materials purchased from offsite vendors will transport materials to the EMDF over public roads.

- Is contact water (rainfall) falling on the proposed EMDF to be pumped directly into Bear Creek ? It is not uncommon for Oak Ridge to receive 6" to 8" of rainfall in 24 hour period. If so how will mercury contamination be eliminated? For example when I worked in Alpha 4 “shiny stuff” was observed along the base of the walls. Demolition debris-concrete-tile-etc is likely contaminated with hazardous materials that would be contained in the contact water and be pumped into Bear Creek?

  Response: Rainwater that contacts the waste will be treated prior to discharge to ensure it is protective of recreational use (human health), specifically fish ingestion. When the facility is closed, a final cover will be installed that will prevent rainwater from entering the waste.

- How many 3 axle dump truck loads (cy-yds/load) of red clay will be required for the proposed EMDF? Will the dirt be transported over public roads?

  Response: Material quantities for EMDF construction will be determined as part of the final design. Materials purchased from offsite vendors will transport materials to the EMDF over public roads.

- What is the estimated Legacy Management (long term oversight & maintenance for generations) cost of the proposed EMDF?

  Response: As part of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) process, rough order of magnitude life-cycle costs were prepared to compare alternatives. The onsite disposal option included costs for long-term oversight, monitoring, and maintenance for comparison to the offsite alternatives.

- Has a RFP been issued to obtain an estimated cost of off site disposal of Y-12 and ORNL cleanup waste? Energy Solutions has hundreds of waste transportation rail hopper cars and rail car mounted wast disposal shipping containers, plus owns and operates the railroad that connects directly to the "haul road". Energy Solutions also owns/operates a licensed disposal facility in Clive Utah, a arid climate with no ground water or streams to pose a long term hazards to surrounding communities?

  Response: In response to public comments received on the Proposed Plan, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the recent evaluation of the offsite disposal costs.

- What measures are planned going forward to mitigate and control stream sedimentation caused by erosion runoff from the EMWMF haul-road during heavy rainfall? See attached picture of Bear Creek at Rt 95 bridge showing sedimentation following heavy rain events. It appears no sedimentation mitigation measures of haul road runoff, have been taken during the past 20 years?

  Response: The Haul Road was designed, constructed and is maintained to minimize impacts to Bear Creek. As necessary following heavy precipitation, the Bear Creek watershed is investigated to determine and remedy sources of sediment to the creek as occurred when this photo was taken in 2018.

  The proposed EMDF would be located along Bear Creek a tributary of Watts Bar lake a major recreation resource and drinking water supply for numerous communities. Do you believe the risk of further contamination of the lake and public safety outweighs the cost of off site waste disposal?

  Has consideration been given to extending the Energy Solutions railroad spur (using haul road for rail bed) joining the Energy Solutions facilities on west Bear Creek Rd to the west end of Y-12 for transporting cleanup waste off site?

  What is the Ecosystem Services value ($'s) of the proposed EMDF site? https://en.wikipedia.org/wiki/Ecosystem_service

  Has a separate comprehensive assessment t been done for a off-site disposal option? These documents indicate the off site option has not been independently evaluated.

Part 2: Please address a detailed cost analysis and NEPA compliance assessment before making a final decision on disposal of remaining DOE hazardous waste from legacy facility cleanup on the DOE Oak Ridge Reservation.

Response: DOE decided years ago that the Remedial Investigation/Feasibility Study (RI/FS) under CERCLA augmented with National Environmental Policy Act of 1969 values is the preferred documentation for making environmental cleanup decisions as the two types of documents are very similar and serve the same purpose (DOE 1994). The RI/FS documents the consideration of long-term impacts of onsite disposal, as does this ROD and includes cost estimates of alternatives (see Sect. 2.10.3).

Off site is clearly a hazardous waste disposal option for the remaining legacy cleanup of DOE facilities in Oak Ridge, TN. See three DOE-EM examples referenced below where off-site disposal was used 100% at other DOE cleanup projects of cold war legacy/Manhattan Project sites/facilities. And off-site, can also work for the remainder of Oak Ridge Reservation cleanup especially with well over 90% of the transportation infrastructure already existing and fully operational -- namely rail.

I ask Tennessee Congressman Fleischmann at a forum in January 2022 (*150 area business leaders in attendance - he was the guest speaker*), *"**Given the widespread opposition to the proposed EMDF by Oak Ridge City Government and many citizens of the community, why not adopt off site disposal as has been done at Rocky Flats and INL"*** And just reported -- at ETEC in California.

His answer -- if we don't get the Environmental Management Disposal Facility (EMDF) sited in Oak Ridge, cleanup dollars will go elsewhere. And then added he has been working with Governor Lee to get the Tennessee Department of Environment and Conservation (state agency) to find a solution.

If everyone collaborates I do not believe cleanup funding will be redirected elsewhere especially if/when Congressman Fleischmann is convinced to help support off site disposal. It is entirely conceivable that cleanup costs will actually be less. It will save 10's of thousands of truck loads of rip-rap rock, compacting clay, leach-ate water , contact water, rubber membrane covers, as well as ground water monitoring, not to mention monitoring/management of another hazardous burial site for generations to come.

The cleanup funding clearly did not go elsewhere at (INL, Rocky Flats, and ETEC - examples below), other EM cleanup projects where off site disposal was the solution. The rail capacity and infrastructure already exists in Oak Ridge to handle this waste. Energy Solutions has a big presence here , i.e. owns the railroad in Oak Ridge that serves existing off site disposal. They have a large rail-car capability -- see attached pictures, and they have a licensed disposal facility in Clive Utah. An arid climate describe by a colleague as having "negative" rainfall.

I believe off site disposal would be successful by starting now rail shipping off site the maximum percentage as railroad resources can handle. And thus minimize the demand on the remaining space in the existing on site land fill -- EMWMF - and use that remaining space to meet rail overcapacity and also be available for any short term contingencies should there be any temporary interruptions in off-site. This would keep the cleanup going uninterrupted. And preclude the need for EMDF. Saving money, a 80 acre greenfield of oak forest with ground water table issues, and DOE Legacy Management (LM) monitoring for generations to come. EMWMF has capacity to handle 4 more yeas of cleanup at the current fill rate and with rationed use, many more years.

Besides creating another hazardous waste land fill, EMDF is proposed for an especially problematic location partially below the groundwater table in wet weather along Bear Creek, a tributary of Watts Bar lake on the Tennessee river. And excessive wet weather and above average rainfall has been occurring in

Oak Ridge over the past 10 years. Here we are 5 months into 2022 with rainfall above normal. We received 10" of rain in February 2022. Hydrostatic groundwater pressures are difficult to predict and mitigate -- for example - https://en.wikipedia.org/wiki/Kingston_Fossil_Plant_coal_fly_ash_slurry_spill and https://en.wikipedia.org/wiki/Teton_Dam .

Placing a hazardous nuclear waste burial site with low level mercury contamination below the ground water table in a rainy climate at the headwaters of a major water body, is simply not a good idea.

Again I would appreciate you requesting the local DOE office and stake holders (Public, UCOR, DOE-OREM, & Energy Solutions) focus an in-depth review on off site disposal logistics.

One of your EPA staff in Atlanta -- Ms Connie Jones, among others has followed this closely over the years and I believe can brief you with a more in-depth understanding. I have copied her on this.

Response: DOE thanks you for your participation in the public comment process. EMDF will be a permanent CERCLA waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of Y-12 and the Oak Ridge National Laboratory that will meet the limits as documented in this ROD. The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

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Remaining Demolition Waste Departs ETEC -- EM News Flash February 1, 2022

Josh Mengers, EM's acting field manager at the Energy Technology Engineering Center (ETEC), right, shakes hands with California Department of Toxic Substances Control Engineering Geologist Bruce Garbaccio as the last of the waste from the final teardown of DOE buildings at ETEC is added to a truck on Jan. 26, bringing EM a step farther in its cleanup at the Santa Susana Field Laboratory.

SIMI VALLEY, Calif. – Trucks carrying the last of demolition waste safely left the Energy Technology Engineering Center (ETEC) northwest of Los Angeles on Jan. 26, marking another milestone in EM's cleanup following the teardown of the final DOE-owned buildings there in October.

The waste from demolition at the former nuclear energy and liquid metals research site was shipped to a licensed facility for disposal out of the state of California.

"EM takes public health and environmental protection very seriously, and we have a commitment to the community, the local tribe and the state to clean the site safely and effectively," EM Senior Advisor William "Ike" White said. "Removing risks by taking down and removing debris from the remaining buildings demonstrates our commitment to completing our job at the ETEC."

Clearing the last remnants of demolition safely is a significant accomplishment for EM's cleanup in Area IV of the Santa Susana Field Laboratory, said Josh Mengers, EM's acting field manager at ETEC.

"Moving piles of debris truckload by truckload isn't glamorous, but it doesn't take away from the importance of finishing the job and finishing it safely," Mengers said.

The Sodium Pump Test Facility at the Energy Technology Engineering Center prior to its demolition on Oct. 1, 2021.

Water is applied for dust suppression following the demolition of the Sodium Pump Test Facility at the Energy Technology Engineering Center.

EM continues to focus on groundwater and soil remediation at ETEC.

"The ongoing cooperation with the California Department of Toxic Substances Control that enabled us to make this tangible progress towards site cleanup is a positive sign of future collaborations to keep this momentum going," Mengers added.

The last DOE buildings demolished at ETEC were Buildings 4462 and 4463, which comprised the Sodium Pump Test Facility (SPTF). The nine-story facility built in 1972 was used to test components of large reactor pumps before they were installed in a radiological environment. SPTF had a red-and-white crane on its roof that could be seen from parts of Simi Valley, California.

-Contributor: Stephanie Shewmon

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EM News Flash | Dec. 29, 2021

DOE-Idaho Buried Waste Project Marks Major Accomplishment Ahead of Schedule

An extended-arm excavator retrieves the final waste from the Accelerated Retrieval Project IX facility on Dec. 6, 2021. The final waste retrieval is pictured on a computer monitor inside a control room at the Idaho National Laboratory Site as access to the retrieval area is controlled for safety.

IDAHO FALLS, Idaho – Department of Energy crews at the Idaho National Laboratory (INL) Site recently made significant progress toward completing a high-priority cleanup project that helps protect the Snake River Plain Aquifer and maintains a commitment with the state of Idaho.

In an achievement more than 18 months ahead of schedule, an operator in an extended-arm excavator retrieved the final amount of targeted buried waste at the Accelerated Retrieval Project (ARP) IX facility at the Radioactive Waste Management Complex earlier this month.

Crews will continue to repackage waste from ARP IX for the next several weeks. The repackaged waste will then be shipped out of state to a permanent repository.

"The buried waste was the primary concern of our stakeholders since the beginning of the cleanup program," said Connie Flohr, manager of the Idaho Cleanup Project for the DOE Office of Environmental Management (EM). "Completing exhumation early will allow us to get an earlier start on construction of the final cover."

The buried waste retrievals took place within the Subsurface Disposal Area (SDA), a 97-acre landfill. Eventually, crews will take down the remaining soft-sided buildings at the SDA and construct an earthen cover over the entire area.

The excavation marked the completion of targeted waste exhumation in the final 0.69-acre portion of the SDA. **The remediation is a requirement under a 2008 agreement with the state of Idaho and subsequent Record of Decision (ROD) between DOE, the state of Idaho, and U.S. Environmental Protection Agency.**

DOE and its contractor are required to remove, repackage and ship out of state plutonium filters, graphite molds, sludges and roasted uranium fines from the SDA, which received radioactive and hazardous wastes for shallow burial from 1952 to 1970.

DOE is working with the Idaho Department of Environmental Quality to provide information that could result in a regulatory declaration that all buried waste exhumation activities required by the 2008 agreement are complete.

"I want to thank everyone associated with waste retrieval portion of this project," said Fred Hughes, program manager with EM INL Site cleanup contractor Fluor Idaho. "I'm so proud of the crews that took this on as personal goals to get this very important task completed this year."

Flohr also expressed her appreciation for the workers who finished the exhumation project early.

"I can't thank them enough," she said. "The crews were so dedicated to the mission and they exceeded everyone's expectations. It doesn't get better than this."

The ARP project officially began in early 2005. Crews were tasked with removing waste from portions of the SDA. Eight subsequent exhumations completed the 5.69-acre requirement outlined in the 2008 agreement and ROD. **Crews removed more than 10,300 cubic meters of waste — or about 49,542 drums — from the SDA**, surpassing the minimum 7,485 cubic meters of waste required to be exhumed.

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https://en.wikipedia.org/wiki/Rocky_Flats_Plant

From Rocky Flats Wikepedia Page --

Throughout the remainder of the 1990s and into the 2000s, cleanup of contaminated sites and dismantling of approximately 800 contaminated buildings continued with the waste materials being shipped to the Nevada Test Site, ***the*** Waste Isolation Pilot Plant ***in*** New Mexico, ***and the Envirocare***

EM completed the accelerated cleanup and closure of ***Rocky Flats*** *in 2005. The Cold War site was then* ***transferred to LM, which is responsible for*** *operating and maintaining groundwater collection and treatment systems, groundwater and surface water monitoring, routine inspection and maintenance, records-related activities, and stakeholder support.*

EPA Awards Partnership for Creating Wildlife Refuge From Former Nuclear Plant
November, 2021

Elk roam the Rocky Flats National Wildlife Refuge, the site of the former Rocky Flats nuclear weapon production plant. EM was part of a federal-state team honored by the U.S. Environmental Protection Agency for revitalizing the site in Colorado into a wildlife refuge.

EM was integral to a federal-state cleanup team honored by the U.S. Environmental Protection Agency (EPA) last week (9-21-2021) for revitalizing a former nuclear weapon production plant into a wildlife refuge that provides recreational opportunities and protects critical habitat.

The EPA bestowed its 2021 National Federal Facility Excellence in Site Reuse Award on EM, DOE's Office of Legacy Management (LM) headquarters and Westminster, Colorado offices, the U.S. Fish and Wildlife Service, Colorado Department of Public Health and Environment, and EPA, Region 8 for their work at Rocky Flats just outside of Denver.

"We're particularly proud of the work at our Rocky Flats site, one of our largest and most successful cleanups, and now it's a nature preserve visited by more than 50,000 people per year," DOE Deputy Secretary David M. Turk said. "It's a fitting testament to all who have worked at Rocky Flats over the many, many years of its history."

Turk said EM and LM are at the heart of DOE's efforts to make sure the Department's programs help improve the environment.

"Secretary Granholm and I share the belief that these programs are morally the right thing to do in response to a legacy of radioactive and chemical contamination," Turk said. "But this work is so much more important than just restoring our land. It's about keeping our promises to the American people.

We're helping more families breathe clean air, drink clean water, and raise children in safe homes and safe communities."

Before: A view of the Rocky Flats site before EM completed cleanup and closure of the site. Rocky Flats was transferred to the DOE Office of Legacy Management in 2005.

After: A view of Rocky Flats after EM completed cleanup and closure of the site in 2005.

EM completed the accelerated cleanup and closure of Rocky Flats in 2005. The Cold War site was then transferred to LM, which is responsible for operating and maintaining groundwater collection and treatment systems, groundwater and surface water monitoring, routine inspection and maintenance, records-related activities, and stakeholder support.

The cleanup resulted in a DOE long-term stewardship site and the 5,200-acre federally protected Rocky Flats National Wildlife Refuge, restoring and preserving native ecosystems while providing habitat for migratory and resident wildlife and recreational opportunities for surrounding communities.

Mark Gilbertson, EM's associate principal deputy assistant secretary for regulatory and policy affairs, recalled how he helped assess environmental programs at Rocky Flats in 1989, and continued to support cleanup of the site throughout his management career.

"This is really special for me," Gilbertson said. "It's a nice sense of closure for me to see the site recognized by EPA for all the hard work that's been done over the decades."

Gilbertson emphasized that the successful cleanup and closure project would not have been possible without EM's partners, including the community near Rocky Flats, EPA, state regulators, LM, and the U.S. Fish and Wildlife Service.

"The Rocky Flats story gives us inspiration as we do our current and future work," he said. "It started out with more than 800 structures, including about 150 permanent buildings and facilities. After tearing down those buildings and processing 100 tons of high-content plutonium residue waste, we shipped out enough radioactive waste to fill a string of rail cars 100 miles long."

LM Deputy Director Peter O'Konski also noted the importance of partnerships in the Rocky Flats cleanup and closure.

"Because of the partnerships, because of the folks working together, Rocky Flats has been successful and continues to be successful," he said. "I am particularly pleased to see that it is getting recognized because it was a hard lift. It was a hard lift for the Office of Environmental Management, and it continues to be a hard lift in the community to keep it relevant, to keep it focused, keep it moving forward."

Speaking on behalf of LM Director Carmelo Melendez, O'Konski added: "Thank you all for recognizing this great achievement, and we look forward to Rocky Flats being part of the Denver community for years to come and for it to move on to its next chapter of its mission to the nation."

-Contributor: David Sheeley

Additional Comment 49: Comment from Rhonda Bogard

I am opposed to the EMDF as proposed by the DOE. We already have a huge landfill that wasn't properly managed and is being filled up prematurely. The answer should not be to fill another landfill in Oak Ridge with building waste. It is in fact unfair to our community which has already sacrificed much in the area of reputation for environmental pollution. This is especially unnecessary when there are alternatives. Shipping the waste out to the western United States would make much more sense, considering Oak Ridge's landscape and average rainfall.

We already have problems with EMWMF during heavy rain events, and as a result, thousands of gallons of untreated wastewater containing radionuclides and other hazardous pollutants have been discharged from EMWMF into Bear Creek. This proposed location is right next to the headwaters of Bear Creek and would easily have similar discharges, causing problems for those downstream. The proposed area is a clean site- a forested area that has been undisturbed to date. Why would you build a burial facility on a clean site when there is so much contaminated land throughout the DOE Reservation?

Is it appropriate that the proposed landfill is classified as a remedial action under CERCLA (Superfund), when it can be built and operated without the regulatory oversight that applies to ordinary landfills.

The continuous burial of these contaminated wastes in Oak Ridge will continue a history of poor regulation and environmental insults. We can choose a different path, and make a positive impact on Oak Ridge's future.

The DOE has not convinced the community that burying this waste near in a clean forested area near a waterway is a good idea. The location is an area of the ORR that DOE agreed would be kept uncontaminated and has hydrology unsuitable for waste disposal. The DOE has not convinced the community why there are environmental regulations that DOE wants to have waived. We have not seen a cost analysis for sending offsite vs onsite.

We should be looking at what is best for Oak Ridge, not just what is in the best interests of DOE. It should be a win-win for both, and this is not.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

DOE does not agree that the capacity of the Environmental Management Waste Management Facility (EMWMF) has been wasted or that operations at EMWMF have been mismanaged. Since EMWMF began operations in 2002, about 200,000 waste shipments have been made safely to the facility and approximately 80 percent of the landfill capacity has been used to date. DOE has sanctioned independent reviews or audits of the EMWMF operations from experts in the construction and operation of disposal facilities, DOE-Headquarters, and the environmental regulatory agencies. Results of the independent reviews have identified no immediate concerns with the performance of the facility and have confirmed that operations are being conducted following all ARARs. DOE works to continuously improve its efforts involving the cleanup mission at the Oak Ridge Reservation through lessons learned. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the EMWMF, provided characterization allows this path. The waste disposal hierarchy will also be applied for EMDF waste disposal.

Rainwater that contacts the EMDF waste will be treated prior to discharge to ensure it is protective of recreational use (human health), specifically fish ingestion. When the facility is closed, a final cover will be installed that will prevent rainwater from entering the waste.

The identification of permanent solutions for the onsite and offsite disposition of CERCLA waste has always been a fundamental part of the CERCLA process. CERCLA actions are not complete without all waste that has been generated having a disposal decision. The CERCLA process has been used to support decisions for many disposal facilities across the United States, some on previously disturbed sites and others on "greenfield" sites, including many disposal sites at CERCLA facilities (e.g., Oak Ridge, Hanford, and the Fernald and Portsmouth sites in Ohio). In many of these cases, a program-level evaluation of disposal needs has been conducted under CERCLA and a final decision on disposal to apply to CERCLA actions made. Agreements

reached under the CERCLA framework are enforced by the state and U.S. Environmental Protection Agency.

In response to public comments received on the Proposed Plan, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the recent evaluation of the offsite disposal costs.

Based on strong state preferences related to site hydrology, the Federal Facility Agreement parties have agreed to the Central Bear Creek Valley site for the waste disposal facility. DOE indicated in the Proposed Plan and this ROD that the land use around and including the Central Bear Creek Valley site would have to be changed to industrial use from that designated in the Bear Creek Valley ROD (consistent with the recommendation of the End Use Working Group). This ROD changes the land use designation for Central Bear Creek Valley as part of this remedy selection. The land use recommendations from the End Use Working Group and eventually documented in the Bear Creek Valley ROD were identified solely to set remediation levels across the valley. There was never any expectation that the land in Bear Creek Valley would be released by DOE for use by others. The land was always intended to be a buffer between DOE activities and the public and to provide future opportunities for DOE use. From the alternatives within Bear Creek Valley considered for locating the EMDF, DOE considered brown field sites first, but ultimately the Central Bear Creek Valley site provided the most beneficial attributes in total over those other sites.

Additional Comment 50: Comment from Roger Johnson

The DOE reservation in Oak Ridge is a unique resource due to history that encompasses an ecology worth preserving and not turning into an industrial development site. A waste facility of any kind will push the value of this land downward for recreation and biological diversity.

The long term value of this property is more important than the convenience of throwing DOE legacy waste over Pine Ridge and degenerating the area into an industrial development site.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected

remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Based on strong state preferences related to site hydrology, the Federal Facility Agreement (FFA) parties have agreed to the Central Bear Creek Valley site for the waste disposal facility. DOE indicated in the Proposed Plan and this ROD that the land use around and including the Central Bear Creek Valley site would have to be changed to industrial use from that designated in the Bear Creek Valley ROD (consistent with the recommendation of the End Use Working Group). This ROD changes the land use designation for Central Bear Creek Valley as part of this remedy selection. The land use recommendations from the End Use Working Group and eventually documented in the Bear Creek Valley ROD were identified solely to set remediation levels across the valley. There was never any expectation that the land in Bear Creek Valley would be released by DOE for use by others. The land was always intended to be a buffer between DOE activities and the public and to provide future opportunities for DOE use. Although forested land will be used for disposal, upon closure much of that land can be returned to nature, with natural local grasses grown on the cover of the facility and land not used for disposal can be returned to forested land.

From the alternatives within Bear Creek Valley considered for locating the EMDF, DOE considered brown field sites first, but ultimately the Central Bear Creek Valley site provided the most beneficial attributes in total over those other sites.

Additional Comment 51: Comment from Kathleen Vinson

In reading The Oak Ridger article, dated June 1, 2022 on the EMDF meeting recently held to discuss the proposed landfill in Oak Ridge to hold radioactive construction debris from Y-12, I noticed, according to the article, the following -

1) The supportive comments came from Mayor Warren Gooch, City Manager Mark Watson, Chamber of Commerce President Christine Michaels, Member Services Director for Chamber of Commerce Jim Skelton, US Representative Chuck Fleischmann, East Tennessee Economic Council President, Tracy Boatner and City Council Member Derrick Hammond.

2) The negative comments came from City Council Member Ellen Smith, City Council Member Chuck Hope, TDEC employee Syd Jones and OR resident Virginia Dale.

I attended a similar meeting in 2018, where the opposition to this landfill was overwhelming, coming mainly from residents in the community. Some were able to speak to the technical aspects and others were concerned for their quality of life as impacted by this landfill.

There were few "leaders" there to enthusiastically support this project.

The opposition was so clear and unanimous, the project had to be placed on hold. We were told at the time, that DOE would review options and consider alternatives.

I see the only thing that has happened in the interim is that those who claim this dump is critically important to Oak Ridge, who also happen to be stakeholders, elected/appointed title holders in Oak Ridge and those who are told to make the DOE happy, were drafted to come out and keep the public placated while you go

ahead and do what you were going to do all along, which is build this ill-conceived, poorly-designed and incorrectly located radiation dump anyway, despite any objections anyone may express.

It clearly makes one wonder, is there a cash incentive involved? Is there some completion bonus on the offer? Fleishmann stated there was no money for a more appropriate, more expensive solution. But, there is most likely, money given to those who fulfill their appointed function, which is to ramrod this mess down the throats of the public and distract them with empty promises, while the project goes ahead and we end up with another source of toxic radiation in an area where we are already poisoned to the point of intolerance.

So, it is clear the game plan is to go through the motions of postponing the dump, wait a few years, wear them down with a plandemic, then start talking about it again; but, this time, bring out the Names, the ones whos' butts are on the line to "just make them shut up and get this thing done".

Oh, don't you wish you were BWXT, that only deals in the private sector, where there are no pesky public safety measures, no public review and no EPA to get in the way? Our desire to poison the world with nuclear waste at the behest of owners we will never see, is so much easier if you don't actually have to get the recipients of said waste to agree to their own poisoning.

So, no on this landfill in this wet, humid climate, on this untouched land, for this nuclear industry that does not give one whit for the health and well-being of the human beings that have built this monstrosity for the smallest paycheck they could get away with giving them.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Members of the public provide Public Comments voluntarily. DOE does not provide financial or other incentives to induce the submittal or influence the content of these Comments.

Additional Comment 52: Comment from Ellen Smith

Part 1 (from the May 17, 2022 public meeting): Hi. I'm Ellen Smith. E-L-L-E-N. S-M-I-T-H. [INAUDIBLE] I am retired from Oak Ridge National Laboratory. I spent a number of decades working on a diverse variety of things related to the issue of how radioactive and hazardous wastes are managed, and I currently serve on the Oak Ridge City Council. So, I look at this from a diverse [INAUDIBLE] of perspectives and probably more detail than some of my colleagues in the community. One concern that I have about this proposal is related to the general sense that while conducting the cleanup, we're basically creating yet another new waste site on the Oak Ridge Reservation. We know – and I know – that there's an awful lot of material on the reservation that Mr. Petrie didn't mention in his presentation tonight that is too hazardous to clean up. It will remain in the ground forever. We have legacy here of waste that we'll live with forever, and I hate to think that we're adding an area that previously was clean and wasn't adjacent to any of the production sites and making that into an additional waste site. And in that regard, one concern I have about waste acceptance criteria relates to the fact that this site is in Bear Creek Valley, adjacent to the Y-12 plant and it will be receiving waste from across the ridge in the Oak Ridge National Laboratory arena where the nature of the waste is very, very different from what was previously managed at Y-12 and at the K-25 site. We're going to be having—it was mentioned that there'd be no transuranic waste in this site, but there are transuranic radionuclides at the Oak Ridge National Laboratory. There are a number of other radioactive constituents that are chemically and radiologically unlike what's been managed in the Y-12 area previously, and I'm concerned that we're going to need—we're going to expect that the community will, at some point, encounter those materials in the stream because I know that no waste site works nearly as well as it's supposed to. And they all fail over time. And I know that city government isn't equipped to handle weird stuff like uranium, much less weird stuff like curium or neptunium. So, I would feel much better if we were not moving materials across the bridge to this valley. I see nothing in DOE's analysis that addresses the philosophical aspect of that, and [INAUDIBLE] further, I'd like to see the waste acceptance criteria. We see a lot of things that can go in a landfill, but we can't see the quantitative goals that we've met by analysis. So, those are two things of concern. [Comment cut short due to time constraint; continued as follows.]

Continuation of comment from Ellen Smith: Ellen Smith again. No worries about the timing on this. I recognize that we need to keep everybody to a reasonable time. I was talking a little bit about waste acceptance when I stopped off, and I do have a strong concern about waste acceptance criteria. The DOE's materials saying things like, basically, modeling analysis will be done to determine whether the waste fits within specific criteria that are supposed to be protected. But we don't know what those specific criteria are, and it's important for people to understand what analysis is going to be done and what the goals are. And this is something, as others have said, the community's been asking for for years, and it has not been forthcoming, which is very frustrating. We'd like to know what the criteria are. And further, if we're applying waste acceptance criteria, I would hope that we're characterizing the waste to evaluate it against criteria, and that's relevant for the question of whether it's safe to put a particular material in this landfill. But even more so, to determine whether there's waste that doesn't need this degree of isolation. I've been disappointed with DOE's performance on the first landfill because I feel like it has received an awful lot of material that could have been handled in a normal garden variety demolition waste landfill. And I say that in part because the DOE managers said, oh, yeah. We put the entire building in the landfill. We're not evaluating whether things like the outside surface of the building was actually clean and safe. So, that facility should have been treated as a precious, precious resource, and it seems to me that it's been squandered by using it for material that didn't need to go there, also by using clean soil to fill voids in various items that needed to have holes filled, when we know there's plenty of contaminated soil around it. It could have gone in there instead. So, I'd very much like to see the Department of Energy do a better job of characterizing waste and then also applying good waste acceptance criteria that truly are protective. The water treatment is another topic we're being asked to comment on, and I have questions about the plans for treating water that would come out of this facility before it goes into Bear Creek. The description in the fact

sheet indicates a fairly simple system that probably would be effective in keeping a lot of significant contamination out of the creek. So, that's good. But there's a suggestion of additional treatment if that's not good enough. And I'd like to know what DOE's contingency plans are for implementing additional treatment, if it's found to be necessary, rather than saying we'll cross that bridge when we come to it and discover that there's a whole [INAUDIBLE] that needs to be treated fast, and there's no system in place. Those are two additional comments I had, and I think my three minutes are up again now.

Follow-up comment from Ellen Smith at May 17, 2022 public meeting: Yes. Ellen Smith. I'd like to augment what Mr. Jones was saying. I believe he's pointing out that uranium is actually more toxic as a chemical than it is as a radioactive material, and, as a result, that chemical toxicity of uranium should be considered in the analysis alongside the chemical toxicity of something like mercury.

Part 2 – Comments on EMDF and Fact Sheets issued May 2022

1. **Inappropriate to create new waste sites in the name of cleanup.** Oak Ridge's proud history of serving the nation by performing work critical to national needs has left a sizeable legacy of buried contamination on DOE lands here. I am aware, and I accept, that much of this material must remain in place forever because it's too dangerous to move it. I do not believe, however, that we should have to accept that DOE will continue to add new waste sites to this environmental legacy in the name of "cleanup."

I have a basic philosophical (and possibly legal) concern about the proposed EMDF. I don't think it is right that the creation of a new landfill on a clean site outside the area of contamination, not even adjacent to the area of contamination, should be treated as a remedial action under CERCLA, and thus eligible for the special treatment that remedial actions receive under the law (such as exemption from procedural requirements of other environmental laws and eligibility for waivers from substantive requirements).

I am also concerned that a clean site is deemed to be necessary so that prior contamination does not interfere with monitoring of the performance of the EMDF. I think that a combination of (1) good baseline monitoring to determine the contamination background and (2) sensors designed and positioned to monitor the performance of engineered systems in the EMDF ought to be sufficient to determine whether the appropriate response to a future incident requires attention to the engineered landfill or attention to sources outside the landfill.

The interpretation that a landfill outside the area of contamination can be a "remedial action" and the notion that a clean site must be used have, in combination, led to a situation that I think is an insult to the natural environment and the local community. It is an insult to the natural environment and the local community that a sizeable tract of DOE land in Oak Ridge that had a chance of someday becoming accessible for other uses will be made off-limits forever. Not only does this spread environmental damage in the name of environmental cleanup, but I see other long-term detriment for the community. Local government and citizens may need to deal with new restrictions on a stream that flows through our community, and Oak Ridge will not be relieved from the economic detriment of being known as a place that built a new radioactive waste landfill.

> **Response: The identification of permanent solutions for the onsite and offsite disposition of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste has always been a fundamental part of the CERCLA process. CERCLA actions are not complete without all waste that has been generated having a disposal decision. The CERCLA process has been used to support decisions for many disposal facilities across the United States, some on previously disturbed sites and others on "greenfield" sites, including many disposal sites at CERCLA facilities (e.g., Oak Ridge, Hanford, and the Fernald and Portsmouth sites in Ohio). In many of these cases, a program-level evaluation of disposal needs has been conducted under**

CERCLA and a final decision on disposal to apply to CERCLA actions made. Agreements reached under the CERCLA framework are enforced by the state and U.S. Environmental Protection Agency.

2. **The public deserves more clarification and specificity in waste acceptance criteria for radioactive materials**. The waste acceptance criteria outlined in DOE's fact sheet leave some important questions unanswered regarding criteria for disposal of radioactive wastes.

Statements about excluding transuranic waste, high-level waste, and greater-than-class-C waste seem to reassure people who are not familiar with the meanings of these terms. However, because I know that these are legally-defined types of materials that are not legally allowed in shallow land burial anywhere in the United States, they leave me wondering if DOE is truly going to restrict the EMDF to low-activity waste, as their public relations statements have blandly implied. The fact sheet says that DOE will perform calculations to limit radioactive materials to "specific thresholds that keep risks minimal," those thresholds should be revealed before the issuance of record of decision to build this landfill.

I understand that the acceptability of radioactive materials for disposal is to be determined by calculations that estimate the potential future release and transport of the radioactive constituents from a given volume of waste. What batch sizes will such calculations be done for? (An entire waste cell, an entire building, a truckload, a set of like items from one building or one room, or a specific item?) I submit that the acceptability of materials for disposal must be determined from the radionuclide inventory and physical characteristics of a specific item or a set of like items, not from an assemblage of unlike materials that might be found in a building, truckload, or waste cell.

I have not dug deep enough into the report on the details of those calculations to know what phenomena are included in the modeling. I do hope that the analysis considers the effect of our local water chemistry on the mobilization and transport of waste constituents (notably, that uranium is very soluble in our carbonate-rich groundwater and surface water). Also, I hope that the analysis does not rely on literature-based generic Kd values (1) when there are local estimates of Kd derived from observations at contamination/disposal sites here in Oak Ridge, nor (2) to simulate the behavior of constituents such as uranium that are not much affected by the sorption phenomena that the Kd parameter approximates.

To provide a meaningful understanding of the nature of radioactive materials that would and wouldn't be allowed in the EMDF, I think there should be information about the approximate upper limits that calculations indicate would be placed on the allowable activity concentrations or inventories of representative radionuclides (for example, Sr-90, Tc-99, U-238, or alpha-emitting radionuclides) in a waste item or waste batch.

Response: Waste acceptance criteria (WAC) are contained in this Record of Decision (ROD). Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as applicable or relevant and appropriate requirements (ARARs) (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation (ORR) indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils), and in accordance with the WAC limits specified in Sect. 2.12.2.3 of the D2 ROD, the final inventory of radionuclide contaminants will be protective of human health and

the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, Federal Facility Agreement (FFA) parties-approved primary document, the WAC Compliance Plan.

3. **Waste acceptance criteria should preserve disposal capacity by including provisions to minimize disposal of clean material.** Among the several reasons why the existing EMWMF landfill has filled up faster than expected is that it has received substantial quantities of clean material, including clean soil used to fill voids in odd-shaped items that had not been broken up or compacted prior to disposal, and also including building debris that are unlikely to have been contaminated (for example, brick walls of gaseous diffusion buildings at K-25), but were not characterized. Waste acceptance criteria that restrict use of clean soil to situations where there is no practicable alternative (no chance of breaking up the item and no stockpiled contaminated soil to fill the voids) and that specifically exclude disposal of materials that could be sent to a conventional demolition waste landfill ought to reduce the disposal of clean material that squanders capacity that is needed for more hazardous materials.

Response: The U.S. Department of Energy (DOE) does not agree that the capacity of the Environmental Management Waste Management Facility (EMWMF) has been wasted or that operations at EMWMF have been mismanaged. Since EMWMF began operations in 2002, about 200,000 waste shipments have been made safely to the facility and approximately 80 percent of the landfill capacity has been used to date. DOE has sanctioned independent reviews or audits of the EMWMF operations from experts in the construction and operation of disposal facilities, DOE-Headquarters, and the environmental regulatory agencies. Results of the independent reviews have identified no immediate concerns with the performance of the facility and have confirmed that operations are being conducted following all ARARs. DOE works to continuously improve its efforts involving the cleanup mission at the ORR through lessons learned. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the EMWMF, provided characterization allows this path. The waste disposal hierarchy will also be applied for EMDF waste disposal.

4. **Effect of groundwater elevation on waste capacity.** I continue to believe that the Oak Ridge site is not technically suited to safe isolation of highly hazardous material in shallow burial, particularly over the long term. Not only will heavy East Tennessee rainfall fall on the landfill cover and need to be kept out of the waste, but the landfill will be directly in the path of shallow groundwater that moves downhill on the flanks of Pine Ridge and pushes upward as it flows toward Bear Creek, and will need continual control. It is a certainty that the engineered barriers that DOE plans for the EMDF will fail sooner or later (in this region we know about the damage that wild animals, plant roots, heavy rains, winter weather, and alternative wet and dry spells can do to land and structures) and failures are likely to release contaminants straight into Bear Creek. I see that the agencies recognize the reality of groundwater flow from Pine Ridge and will attempt to determine the post-development water table elevation. I expect that the findings of the planned investigation will lead to a redesign decision that will reduce the waste volume that can be accommodated in the EMDF. Conservative (i.e., upper-end) estimates of the potential water elevations, with the resulting potential reductions in waste capacity, should be developed and shared with all decision-making parties and the public before a Record of Decision is finalized, and should be factored into planning for future disposal of remediation waste, to ensure that the EMDF capacity is not exceeded.

Response: DOE believes that multiple sites in Bear Creek Valley can support construction of a protective landfill for wastes planned for onsite disposal. Protectiveness will be assured through a combination of facility engineering, restrictions on waste acceptance, and long-term monitoring and maintenance. The site selected in the Central Bear Creek Valley for the EMDF provides a

controlled location within the Oak Ridge National Priorities List (NPL) Site and is located in an area that is not being considered for reindustrialization or reuse. The Central Bear Creek Valley Site is in the same valley as the existing EMWMF, along with several other CERCLA areas in the Bear Creek Valley. The site allows waste to be placed between two tributaries and offers hydrologic separation from Pine Ridge. The slope of the Central Bear Creek Valley Site is not as steep as other sites considered, thereby minimizing the need for surface water diversion. Based upon strong State preferences related to site hydrology, the FFA parties have agreed to use of the Central Bear Creek Valley site. From the alternatives within Bear Creek Valley considered for locating the EMDF, DOE considered brown field sites first, but ultimately the Central Bear Creek Valley site provided the most beneficial attributes in total over those other sites.

The facility is designed and will be built with natural materials and to take advantage of existing geological features to ensure longevity. Natural, existing features are relied on to maintain surface water flows away from the waste; the facility is constructed in large part above grade. Drainage features are designed with graded filtration to ensure longevity. The cap and liner systems have natural components (such as clay and rock) that maintain their properties for thousands of years. Life expectancy of synthetic liners are in the many hundreds of years, but even with failure of those components, demonstrations indicate the facility remains protective of human health and the environment.

5. **Need more information on treatment plans for contaminated stormwater (and leachate?).** The water treatment measures outlined on the "Water Quality Protection for Bear Creek" fact sheet are not technically sophisticated (they are very similar to the way lake water is treated in the City of Oak Ridge 1940s-era drinking water plant that is about to be replaced with newer technology), but I expect that they will work to keep some problematic materials out of the creek. The fact sheet indicates that additional treatment might be considered if problems are detected, and I wondered if there were contingency plans for this, or if this was an empty promise. In a recent ORSSAB meeting I heard more about DOE's conceptual plans for this additional treatment, and I think that this is information that ought to be made more publicly available.

Response: Landfill wastewater, including rainwater that contacts the waste, will be treated prior to discharge to ensure it is protective of recreational use (human health), specifically fish ingestion. When the facility is closed, a final cover will be installed that will prevent rainwater from entering the waste. All management of wastewater will be carried out in compliance with agreed-upon regulatory discharge requirements. Discharge limits are set in compliance with applicable or relevant and appropriate requirements and will be met throughout the operation of the EMDF. DOE will treat landfill wastewater to remove contaminants that exceed regulatory discharge limits. Additional information will be provided when developed in the Remedial Design Report and Remedial Action Work Plan. Both will be reviewed and approved by the FFA parties and included in the Administrative Record.

DOE thanks you for your participation in the public comment process. The EMDF will be a permanent CERCLA waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge NPL Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this ROD. The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for

selecting a remedial action—overall protection of human health and the environment and compliance with ARARs. The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Comment 53: Comment from Virginia Dale

Part 1 (from the May 17, 2022 public meeting): Thank you. I'm Virginia Dale. D-A-L-E. My family has lived in Tennessee since 1798. I've lived in Oak Ridge for more than three decades and worked at ORNL as an environmental scientist. My comments today come from my perspective as a citizen, a scientist, and a grandmother who wants our children to live in a safe environment. I'm also a member of Advocates for the Oak Ridge Reservation, Tennessee for Wilderness Planning, and on the board of Sierra Club for Tennessee and the Nature Conservancy for Tennessee. First, it's absolutely necessary that the contaminated buildings on the Oak Ridge Reservation be cleaned up. My concern is that they do it in a proper and timely fashion. And I'm presenting my comments as my role on a project led by the National Science Foundation on best practices for stakeholder engagement.

So, I have weighted DOE and how well they're doing in this regard with the six best practices our team has identified. First practice, the full diversity of interested stakeholders be identified and engaged. DOE gets a C. I know of no effort to specifically engage people who live in West Oak Ridge or in Lenoir City who are closest to Bear Creek and its streams into which it flows that are mostly likely to access and [INAUDIBLE] turtles, fish or whatever. And many of these people are Hispanic and mainly speak Spanish, yet none of the signs that I have seen are in Spanish. They get a high grade of C because some of the fact sheets were in Spanish. Thank you. And they've also – the EPA, at least on this topic – has made a specific outreach effort to the Scarboro Community, which in the past has been wrongly associated with environmental issues.

The second-best practice is that the values of ecosystems should be identified for all stakeholders, but I am not aware of any effort to document who has used the contaminated waters of Bear Creek or Poplar Creek to fish, collect turtles and so forth. Also, the use of an established forest for this site does not consider its value for many organisms on the Oak Ridge Reservation, even though that land has a high diversity on a per area basis, as high as the Smokies. The new proposed landfill is in an area of the Oak Ridge Reservation that a prior in-use working group designated to keep uncontaminated when other sites were stipulated to be contaminated. This site has shallow and upwelling groundwater, meaning it's highly unsuitable hydrologically and it's been unaffected by past waste.

Okay, the third best practice is listening, and that takes time and attention. However, questions that our groups have asked four years ago have still not been answered. They've been acknowledged but not answered. Those questions are what are the waste acceptance criteria? What are the models that are being used? What are the assumptions of these models?

The fourth best practice: trust should be established, which requires upfront transparency as to timeframe, process, and results. DOE gets an F on that one. I forgot to tell you, DOE got an F on listening as well. This video you just saw, 20 years of success is misleading because the past site was not a success. It filled up much too fast, and that's because uncontaminated material was added to it. And it sounds like the same

thing's going to happen with the EMDF. Also—[Comment cut short due to time constraint; continued as follows.]

Continuation of Comment from Virginia Dale: Okay. Well, thank you. And I do appreciate you giving everybody the three minutes because it's important to hear from everybody, and maybe some other people want to comment later. So, I was on the topic of trust. This 20 years of success, which you saw, you know, of course, that spills occur during those 20 years, and that meant they treated the material or tried to – I don't know how they did that – after it was spilled, and that overflow water averaged more than double the concentration of uranium in drinking water. So, I don't think that's a success. Another point: although DOE has been asked, they have not provided the cost of the off-site transport vs. on-site storage over the long term. We're going to be doing this forever. They keep saying it's more expensive, but we haven't seen any of the information, nor have we seen the number of employees and types of jobs in the alternatives. As you saw, if you keep it onsite, there are lots of truck drivers, there's lots of bulldozer movement, but I think if you had to test it more carefully and send more things off-site, you'd have analysts, you'd have chemists working. And so, you know, what kind of jobs do we want here in Oak Ridge? Another point is while this field demonstration has been proposed, it's been four years that we've been waiting for information. It seems like some of that work could have been done instead of producing videos and fact sheets [INAUDIBLE]. So, that's kind of disappointing. And finally, this DOE site groundwater characterization fact sheet had a graph on page two that you've seen twice up here in slides that shows the 75 feet of waste compared to the 26 feet of other material in very misleading scales. They did have one figure that showed it scaled correctly, but it's just a little upsetting that it implies some misleading information.

Okay. Best practice number five is being flexible. And that requires that when new information becomes available, it's used. DOE gets an F. Even though we've had record rainfalls in the intervening four years since that last review was published, no new analysis had been provided to the public since the last review, so we haven't seen how climate change might be dealt with when we have even increasingly more rainfall and how this landfill's going to hold up to that. And best practice number six is accountability. DOE gets an F. The data models in their assumptions need to be made available. Questions should be answered. The questions that we've raised over four years have still not been answered. They've been acknowledged, but we haven't really seen information.

So, overall, DOE gets a D- in effective engagement of the community. While engagement is time-consuming and an ongoing process, the total time it had involved is reduced with early engagement and clear communication. Furthermore, this project I'm working on shows that better decisions are made if good practices are followed for engagement in environmental decision-making. So, I ask DOE once again, please provide the details the community needs on the basis for choosing the site, not just the names of the categories, hydrology, geology. We want to see the information. This is a very well-educated community. We'd like to see the waste acceptance criteria, not just what is not included. We'd like to see the models in their assumptions. We want to see the model projections of landfill conditions under increased rainfall. We like to see the cost of off-site vs. on-site long-term storage of the toxic waste. And finally, and probably most importantly, I ask, as did Mr. Wallace over here, that a plan for complete cleanup of the Oak Ridge Reservation be provided as required by law instead of providing the information piece by piece, only taking a holistic view at the hazardous waste disposal can the public have confidence that DOE will fulfill its obligation to clean up forever the Oak Ridge Reservation. Thank you.

Part 2: These comments are based on my dedicated effort to follow activities on the EMDF over the past years. They represent my role as a citizen, scientist, and grandmother. I ask that DOE provide information to the public on

The basis for choosing the site

Details of the Waste Acceptance Criteria

All models, their assumptions, and their projections

Model projections of landfill conditions under increased rain. Note that (as documented below) hydrologic extreme events are expected on the Oak Ridge Reservation based on 6 downscaled climate models.

Costs of off-site versus on-site long-term storage of hazardous waste

I have been in communication with Shih-Chieh Kao at Oak Ridge National Laboratory about modeling work to downscale projected changes in precipitation. He says:

"Hydrologic extreme events are intensifying in the Oak Ridge Reservation Area (as well as in the southwest US). This finding is generally consistent with many other climate studies on climate extremes. This initial analysis is based 6 downscaled CMIP6 models, and other CMIP6 models (before downscaling) are showing similar trends in this region. The intensifying precipitation will very likely increase the risks of flood events in the area." Personal communication to Virginia Dale from Shih-Chieh Kao on June 3, 2022, based on anaylsis out to 2059 reported in Rastogi, D., S.-C. Kao, M. Ashfaq (2022). How May the Choice of Downscaling Techniques and Meteorological Reference Observations Affect Future Hydroclimate Projections? *Earth's Future, In Revision.*

The Coupled Model Intercomparison Projects (CMIP) were used in the 2021 Intergovernmental Panel on Climate Change (IPCC) sixth assessment report (AR6) that featured new state-of-the-art CMIP6 models.

[Attached comments] My name is Virginia Dale. My family roots in TN go back to 1798. I've lived in Oak Ridge more than 3 decades. I have a PhD in environmental science and my comments come from my perspective as a citizen, scientist, and most importantly a grandmother who wants all of our children to live in a safe environment.

It is absolutely necessary that the contaminated legacy buildings on the ORR be cleaned up. My concern is that the clean up occurs in a <u>proper and timely fashion</u>.

I am a co-principal investigator on a project supported by the National Science Foundation to identify best practices for stakeholder engagement in environmental decision making. Since our team has learned that appropriate engagement results in better decision making, I evaluated how well those 6 best practices apply to DOE's decisions regarding the EMDF.

1. <u>The full diversity of interested stakeholders be identified and engaged</u>. DOE-C

   a. I know of no effort to specifically engage either the people who live in west OR nor those in Lenoir City, who are closest to Bear Creek and the streams into which it flows and who are most likely to access and even fish in the contaminated waters. Many of those people are Hispanic and primarily speak Spanish; yet none of the posted signs are in Spanish.

   b. I was so glad to see the Fact Sheets in Spanish

   c. However, EPA has make a specific effort to reach out to the community in Scarboro, which has been discriminated against in the past, but that community is not at high risk with the proposed landfill.

2. <u>The values of the ecosystem should be identified for all stakeholders</u>. DOE- F

a. I am not aware of any effort to document who uses the contaminated waters of Bear Creek or Poplar Creek into which it flows, or how they use it.

b. The use of an established forest for the site does not consider its value as a habitat for many organisms even though the ORR has diversity on a per area basis that is similar to the Smokies.

   i. The proposed new landfill site is in an area of the ORR that the OREM End Use Working Group designated to be kept uncontaminated, while other areas were stipulated to be permanently sacrificed to contamination.

   ii. This site has shallow and upwelling groundwater (hydrology unsuitable for waste disposal), is in a watershed that has been relatively unaffected by past federal nuclear activities, and supports mature forest and wetlands.

3. Listening deeply takes time and attention. DOE -F

Careful listen requires answering all questions making sure the nuances are understood, and using communication tools appropriate for the audience.

Questions asked 4 years ago have still not been answered.

4. Trust should be established, which requires upfront transparency as to timeframe, process, and results as well as the costs and benefits of potential outcomes. DOE-F.

The video "20 years of success" is misleading because

The site filled up too fast

Spills occurred

The landfill has had a series of overflow events that basically dumped untreated effluent into Bear Creek"

That overflow water averaged more than double allowed concentration of uranium in drinking water.

Although DOE has been asked, they have not provided

Costs of off-site transport vs onsite storage – nor the number of employees and type of jobs engaged in each alternative. I expect that offsite transport would require more analysts to document the material while the on-site option would require more truck drivers.

Waste acceptance criteria have never been provided (the Fact Sheet on WAC says what will not be included – not what will be or what the criteria are for acceptance). The Waste Acceptance Compliance Plan is still in development.

While a field demonstration has been proposed, it seems that some aspect of this demo could have been started in the time since 2018 when questions were formally asked.

DOE's "Site Groundwater Characterization" fact sheet figure on page 2 is highly misleading, for it does not show the waste (of 75') to scale with the rest of the layers (which total 26').

5. Being flexible requires that as new information becomes available that changes are made in the analysis and process. DOE -F

> Even with record rainfall in the intervening 4 years since the last review, no new analyses have been provided that assess how the landfill will operate under increased rain.

6. Accountability by all parties is necessary. This means that all question or concerns be addressed in a timely fashion. DOE- F

> Data, models and their assumptions should be made available.
>
> Questions should be answered – yet queries raised 4 years ago have never been addressed.

Overall DOE get a D- in effective engagement of the community. While effective stakeholder engagement is a time-consuming and ongoing process, the total time and effort involved is reduced with early communication and clear engagement. Furthermore, better decisions are made if good practices for engagement in decision making are followed.

So I ask DOE once again, please provide information on

> The basis for choosing the site
>
> The Waste acceptance criteria details
>
> All models and their assumptions
>
> Model projections of landfill conditions under increased rain
>
> Costs of off-site vs on-site long-term storage of toxic wastes

Finally (and most importantly, I ask that a plan for a complete clean up of the ORR be provided (as required by law) instead of providing information piece by piece. Only by taking a holistic look at hazardous waste disposal can the public have confidence that DOE will fulfill its obligation to clean up the Oak Ridge Reservation.

> **Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic**

Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

DOE has made extensive effort to ensure meaningful community involvement throughout this nearly decade-long process of selecting a remedy for final disposition of CERCLA waste at the Oak Ridge NPL Site consistent with the U.S. Environmental Protection Agency and TDEC-approved EMDF Community Outreach Plan. Large-scale outreach began in 2015 and has continued to the present. City and county officials received tours and briefings. The Oak Ridge Office of Environmental Management (OREM) hosted numerous community meetings, and there was substantial media outreach on the topic. OREM also proactively reached out to numerous community groups to provide presentations about EMDF. DOE released the Proposed Plan to the City of Oak Ridge before the start of the formal public comment period. In addition to providing notices to the paper, every household in Oak Ridge received a flyer requesting input to the public comment process. The original comment period was 45 days but was extended to 120 days at the request of the public. DOE has made every effort to ensure there has been meaningful public input and will look for opportunities for future public involvement as the project proceeds.

The 2021 Census Bureau information identified less than 7 percent of the Oak Ridge residents were identified as Hispanic or Latino origin. In addition, no discrete Hispanic or Latino neighborhoods have been identified in proximity to the EMDF.

Based on strong state preferences related to site hydrology, the Federal Facility Agreement (FFA) parties have agreed to the Central Bear Creek Valley site for the waste disposal facility. DOE indicated in the Proposed Plan and this ROD that the land use around and including the Central Bear Creek Valley site would have to be changed to industrial use from that designated in the Bear Creek Valley ROD (consistent with the recommendation of the End Use Working Group). This ROD changes the land use designation for Central Bear Creek Valley as part of this remedy selection. The land use recommendations from the End Use Working Group and eventually documented in the Bear Creek Valley ROD were identified solely to set remediation levels across the valley. There was never any expectation that the land in Bear Creek Valley would be released by DOE for use by others. The land was always intended to be a buffer between DOE activities and the public and to provide future opportunities for DOE use. Although forested land will be used for disposal, upon closure much of that land can be returned to nature, with natural local grasses grown on the cover of the facility and land not used for disposal can be returned to forested land.

From the alternatives within Bear Creek Valley considered for locating the EMDF, DOE considered brown field sites first, but ultimately the Central Bear Creek Valley site provided the most beneficial attributes in total over those other sites.

WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal.

Experience with cleanup projects on the Oak Ridge Reservation indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils), and in accordance with the WAC limits specified in Sect. 2.12.2.3 of the D2 ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

The Performance Assessment (PA) and the Composite Analysis (CA) were provided as supporting information during the public comment period. Detailed information on the modeling done to support landfill planning and design is provided in the PA and CA.

The landfill siting and design reduce concerns from climate change and provide resiliency to potential increase in rainfall and flood events through the following measures:

- **Located outside the 100-year floodplain and on Pine Ridge, away from and at a greater elevation than Bear Creek. Waste elevation is approximately 60 ft higher than Bear Creek elevation in this area.**
- **Landfill does not cross one of the northern tributaries. Tributary immediately west of the landfill will be armored and widened to improve run-off. Tributary immediately east of the landfill will be diverted into an adjacent tributary. Culverts beneath the existing Haul Road will be oversized to improve drainage from the area and eliminate ponding.**
- **Upgradient diversion ditch is considerably oversized—greater than 100-year storm event.**

Additional considerations will be part of the post-ROD final design.

In response to public comments received on the Proposed Plan, DOE has conducted a more recent analysis on the costs associated with the Offsite Disposal Alternative. This evaluation concluded that offsite disposal is still significantly more expensive than onsite disposal and that the cost ranges of both alternatives are within the CERCLA cost range of +50/-30 percent accuracy. Section 2.14 of the ROD contains more information about the recent evaluation of the offsite disposal costs.

Additional Comment 54: Comment from Andy Binford

Part 1 – Comments primarily related to the Waste Acceptance Criteria fact sheet

On November 4, 2021, several former TDEC employees sent a letter concerning the Environmental Management Disposal Facility (EMDF) to EPA Administrator Michael S. Regan. The December 29, 2021, response from Acting Assistant Administrator Barry N. Breen stated the EPA, DOE, and TDEC will solicit and consider public comments on new information before EPA and DOE finalize the ROD. This response letter encouraged us to review new information added to the Administrative Record file as well as provided to the public on a dedicated website. The website includes the following new information:

EMDF Site Groundwater Characterization fact sheet
EMDF Waste Acceptance Criteria fact sheet
EMDF Water Quality Protection for Bear Creek fact sheet

Draft Record of Decision – July 2021
Draft ROD Responsiveness Summary
Technical Memo #1: Phase 1 Field Sampling Results (July 2, 2018)
Technical Memo #2: Phase 1 Monitoring (May 23, 2019)
Development of Fish Tissue and Surface Water Preliminary Remediation Goals (April 28, 2022)
Performance Assessment for the Environmental Management Disposal Facility at the Y-12 National Security Complex, Oak Ridge, Tennessee (April 23, 2020)
Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee (April 16, 2022)
Link to the Oak Ridge Environmental Information System (OREIS)

1. Developing analytical Waste Acceptance Criteria (WAC) keeps being postponed. The Remedial Investigation and Feasibility Study Figure 6-31 has WAC and WAC Compliance Plan development after completion of the EMDF Performance Assessment and appropriately documented to be consistent with CERCLA prior to the Record of Decision. The Waste Acceptance Criteria fact sheet now has analytical WAC completed after the Record of Decision and included in the WAC Compliance Plan. It is clear from the analytical WAC in the D1 Record of Decision (which is what the public has to comment on) that WAC is inconsistent with CERCLA threshold criteria and onsite disposal at the proposed EMDF should not be the selected remedial alternative. For onsite disposal to be selected, WAC consistent with CERCLA threshold criteria should be developed and documented. Further, said CERCLA consistent WAC should be presented to the public with another public comment period.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. Following the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Oak Ridge Reservation (ORR) Federal Facilities Agreement (FFA) process, the waste acceptance criteria (WAC) is described in the Record of Decision (ROD) and will be detailed in a post-ROD document. As stated in the Environmental Management Disposal Facility (EMDF) *Waste Acceptance Criteria fact sheet*, limits have been set for the Resource Conservation and Recovery Act of 1976 (RCRA) hazardous chemicals, and analytical WAC have been set for the radionuclides with the potential to exceed the CERCLA risk range after closure, therefore ensuring the remedy remains within the risk range and is therefore consistent with CERCLA threshold criteria.

2. At the May 17, 2022, public meeting, a commenter identified the 6 best practices for appropriate public engagement and graded DOE on each best practice. One of the best practices is TRUST should be established. To this category the commentor gave DOE the grade of F. With that level of trust, I think DOE should hold another public comment period for waste acceptance criteria that includes analytical WAC, when it is complete, even if the NCP doesn't specifically require it.

Response: See response to Additional Comment 54 (this comment), Part 1 Comment #1. Sufficient data to inform the public of the protectiveness of the preferred remedy were provided in the following publicly available documents during the additional public review: the EMDF Remedial Investigation/Feasibility Study (WAC development and Bear Creek Valley/site characterization data), the Proposed Plan, and the fact sheets developed for the WAC, Site Groundwater Characterization, and Water Quality Protection for Bear Creek that describe the updated information available since the Public Comment Period for the Proposed Plan. In addition to these documents, detailed characterization data (e.g., Technical Memoranda 1 and 2 with the EMDF site monitoring results) and detailed information on development of the preliminary remediation goals (PRGs) for fish tissue and instream water concentrations were provided during the recent public involvement period.

3. The Waste Acceptance Criteria fact sheet states, "landfill inventory limits are based on a hypothetical scenario where the maximally exposed individual is drinking contaminated groundwater and eating fish impacted by a release from EMDF." The fact sheet then points to the EMDF Performance Assessment for justification to assign inventory limits only for Carbon-14, Tritium, Technetium-99, and Iodine-129 meaning an unlimited inventory of other radionuclides may be placed in EMDF. At EMWMF, radionuclides without WAC are not tracked, radionuclides without WAC limits are not included in determining whether EMWMF is overall protective, and inventories for those radionuclides are not included in the EMDF/EMWMF Composite Analysis. Inventories of all radionuclides disposed in EMDF should be tracked. When corrective action is needed in the future, people will need to know what was disposed where.

Response: At the Environmental Management Waste Management Facility (EMWMF), radionuclides without WAC are not tracked because modeling determined there is not a risk to Human Health or the Environment from these radionuclides.

The final set of EMDF inventory limits for radionuclides will be informed by the supplemental analysis in the WAC Compliance Plan. The supplemental analysis will be performed to demonstrate protectiveness using CERCLA methodology. Procedures for tracking radionuclide inventories will be documented in the EMDF WAC Compliance Plan, an FFA primary document to be submitted to the U.S. Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC) for review and approval.

4. The Waste Acceptance Criteria fact sheet misrepresents waste to be disposed in EMDF. It says EMDF will accept much of the same types of wastes as the current onsite facility, implying that demolition waste and soils from Y-12 National Security Complex (Y-12) and Oak Ridge National Laboratory (ORNL) have similar levels of radionuclide and chemical contamination as demolition waste and soils from K-25 (ETTP). During DOE's presentation on the fact sheets at the May 17, 2022, public meeting, DOE's presenter said that they will be putting basically the same stuff in the proposed new landfill (i.e., EMDF) as the current facility (i.e., EMWMF). As was pointed out by at least one commentor, who retired from Oak Ridge National Laboratory (ORNL), the proposed site will receive waste from ORNL which is significantly different than most of the previous disposed waste.

To clarify further, the Environmental Management Waste Management Facility (EMWMF) is not indicative of a future Environmental Management Disposal Facility (EMDF). K-25 (East Tennessee Technology Park or ETTP), Y-12, and X-10 (Oak Ridge National Lab or ORNL) have different radionuclide and Clean Water Act (CWA) pollutant waste profiles. K-25 (ETTP) has been the major focus for many years and is the source of most of the recent waste disposed in the EMWMF. Wastes from Y-12 and ORNL proposed to be disposed in a future EMDF are orders of magnitude more contaminated with CWA pollutants (e.g., Y-12 - mercury) and radionuclides than wastes from ETTP disposed in the EMWMF. Radionuclide activity concentrations in EMDF landfill wastewater are also projected to be orders of magnitude greater than radionuclide activity concentrations measured in EMWMF landfill wastewater. The EMDF Performance Assessment[i] and EMWMF/EMDF Composite Analysis[ii] show that waste disposed in EMWMF is not indicative of future waste proposed to be disposed at EMDF. DOE proposes to dispose a significantly greater inventory of radionuclides at EMDF than EMWMF.

Radionuclide Inventory Identified for Disposal in EMDF is Significantly Greater than Radiological Inventory Disposed at EMWMF			
	EMDF/EMWMF Composite Analysis Table B.1		EMDF Performance Assessment Table B.6[iii]
Isotope Name	Reported EMWMF Activity at FY 19 (Curies)	Composite Analysis Estimated Waste Inventory Activity at EMWMF Closure (Curies)	EMDF Estimated Waste Inventory Activity at closure for a subset of Radionuclides (Curies decayed to 2047)
Am-241	20.2	25.5	**152**
C-14^	2.77	3.5	**7.43**
Cm-244	-----	-----	**326**
Cs-137	-----	-----	**3040**
Eu-152	-----	-----	**74**
Eu-154	-----	-----	**16.7**
H-3^	12.1	15.3	**28.8**
I-129^	0.00115	0.00145	**1.05**
K-40	-----	-----	**8.46**
Ni-63	-----	-----	**1740**
Np-237	1.4	1.77	0.837
Pb-210	-----	-----	**9.5**
Pu-238	-----	-----	**242**
Pu-239/240	14	18	**310**
Pu-241	-----	-----	**525**
Pu-242	-----	-----	**0.445**
Ra-226	-----	-----	**2.07**
Sr-90	-----	-----	**496**
Tc-99^	170	215	7.23
Th-229	-----	-----	**14.7**
Th-230	-----	-----	**4.94**
Th-232	-----	-----	**9.07**
Th-234*	-----	-----	-----
U-232	-----	-----	**26.3**
U-233/234	433	547	**1727**
U-235/236	42	53	**125.2**
U-238	258	326	**983**

^Radionuclides that EMDF PA Table G.9 adjusts for activity loss due to leaching during the 25-year operational period.
*Th-234 should be in secular equilibrium with U-238.

Further, average leachate activity concentrations projected in the EMDF Performance Assessment at landfill closure are significantly greater than maximum leachate and contact water activity concentrations measured at EMWMF from October 2015 through June 2021.

Comparison of Maximum Measured Activity Concentration in EMWMF Leachate and Contact Water for the period of October 2015 to June 2021 with the Average Leachate Activity Concentration Projected in EMDF at Closure.			
	Maximum Activity Concentration Measured from October 2015 through June 2021 and Reported in OREIS Data		EMDF Projected Leachate Activity Concentrations at EMDF Landfill Closure
Isotope Name	EMWMF Leachate (pCi/L) Activity concentration >1 rounded to a whole number	EMWMF Contact Water (pCi/L) Activity concentration >1 rounded to a whole number	EMDF Performance Assessment Table C.5. at T=0 (pCi/L)
Am-241	0.708	0.245	29
C-14	20	22	2,450
Cm-244	Undetected at 0.473	Undetected at 0.201	6,230
4 Cs-137	5	Undetected at 5.89	787
Eu-152	14	16	1,420
Eu-154	9	6	321
H-3	10300	4,790	21,000
I-129	3	2	158
K-40	65	67	215
Ni-63	65	53	673
Np-237	Undetected at 0.207	0.685	16
Pb-210	2	0.987	73
Pu-238	Undetected at 0.457	Undetected at 0.458	4,640
Pu-239/240	Undetected at 0.235	Undetected at 0.364	5,950
Pu-241	Undetected at 47.5	Undetected at 18.6	10,100
Pu-242	Undetected at 0.476	Undetected at 0.286	9
Ra-226	1	1	0.5
Sr-90 / radioactive strontium	44 (Sr-90)	8 (radioactive strontium - total)	12,600 (Sr-90)
Tc-99	2120	28,500	2,690
Th-229	Undetected at 0.503	Undetected at 0.241	4
Th-230	2	0.586	1
Th-232	0.201	0.361	2
Th-234*	28	41	
U-232	0.455	Undetected at 0.263	404
U-233/234	2200	676	26,650
U-235/236	226	48	1,926
U-238	100	41	15,100

*Th-234 should be in secular equilibrium with U-238.

Response: This comment is a duplicate of Additional Comment 54 (this comment), Part 3 Comment #3. Response is the same for both comments.

All waste intended for the EMDF will be derived from CERCLA cleanup at the ORR, primarily resulting from weapons research and development, nuclear energy research and development, and other Oak Ridge National Laboratory (ORNL) and Y-12 National Security Complex (Y-12) research activities. This includes waste from ORNL and Y-12.

While the majority of the EMWMF waste came from the East Tennessee Technology Park (ETTP), the EMWMF received and will continue to receive waste from all ORR sites listed.

Hazardous waste concentrations (including mercury) are limited by the EMDF WAC to less than RCRA hazardous levels. Mercury is additionally limited to concentrations in waste that do not require treatment.

Potential differences between EMWMF waste and EMDF waste are consistent with the assumptions in the technical analyses provided on the DOE EMDF information website, including the Performance Assessment (PA) and the Composite Analysis (CA). Appendix B of

the PA provides detailed justification for the use of data representing expected Y-12 and ORNL waste streams to estimate the EMDF radionuclide inventory.

5. TDEC contracted with Neptune and Company, Inc. to review the EMDF Performance Assessment. Neptune and Company, Inc produced a report titled *A Review of the Performance Assessment and Composite Analysis for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee Dated 12 October 2020.* This report documents and includes issues with the Performance Assessment that lead to questioning the validity of the Performance Assessment for determining Waste Acceptance Criteria. Many of these issues are unresolved. Categories of issues fit into the broad categories discussed in the report executive summary:

The EMDF PA "base case" radionuclide transport and dose assessment modeling is bounded by assumptions rather than structured to evaluate mechanistic modeling of all applicable events and processes. *This leads to inaccurate and incomplete modeling based on these constraining assumptions. Natural processes that will compromise the ability of the EMDF to isolate contaminants from the environment are either not incorporated into the base case modeling (e.g. gully erosion, "bathtubbing") or they are artificially constrained without supporting rationale (e.g. a twofold linear increase in infiltration up to year 1000, and no further cover degradation after that time). For example, a plausible mechanism leading to release of contaminants is a localized breach of containment at the top of the liner due to accumulation of water in the facility. A release resulting from this mode of failure, often referred to as bathtubbing, seems probable sometime during the compliance period specified by DOE, and such a scenario is considered in some detail in the PA's supporting documentation. Although modeling of this 'bathtub scenario' predicts unacceptable levels of radionuclides in groundwater at a point of assessment 100 meters from the edge of the landfill, this analysis is kept outside of the PA and the results are not used to evaluate facility performance.*

Contaminant fate and transport modeling does not adequately represent the natural system. *The PA does not address plausible fate and transport pathways including groundwater fracture flow, sheet and gully erosion of the cover, uptake of subsurface radionuclides by deep-rooted plants, and deposition of radon progeny in the cover from the upward diffusion of radon. One example is underprediction of times of travel for contaminants in groundwater. Studies conducted over decades in Oak Ridge have shown that many radionuclides migrate readily through the fractured rocks in Bear Creek Valley. The errors made in solute transport modeling result in the PA's conclusion that a member of the public consuming water or fish in the vicinity of the facility throughout the next millennium would receive a radiation dose from just one isotope, Carbon-14. The transport models should be calibrated using available results from the many field scale tracer tests that have been conducted in Oak Ridge and supplemented with models that incorporate the physics of solute transport in fractured media. Model predictions should be checked against Oak Ridge environmental monitoring data that yield independent estimates of travel times for many radionuclides.*

The hydrogeologic contaminant transport processes that are modeled are not coupled with other contaminant transport processes. *This problem stems from using software that is not capable of coupling such systems. For example, the upward migration of radon and its progeny (and indeed its parents) is not coupled with the downward transport to groundwater. In nature, these processes occur simultaneously, so decoupling them can cause obscure potentially important interactions.*

The lack of a fully probabilistic analysis misrepresents what may be important drivers in the analysis. *The "base case" for this assessment is a single deterministic calculation, affording no insight about the context of uncertainty. While a handful of select parameters are used in one-at-a-time sensitivity analysis calculations, these are selected based on their expected significance. Only a fully probabilistic analysis, where all model inputs reflect the uncertainty in their values, would reveal those parameters that have unexpected significance.*

Response: The EMDF PA incorporated both sensitivity and uncertainty analyses to address these types of issues. DOE has completed the PA/CA process to demonstrate protectiveness with methodologies described within DOE Orders; a supplemental analysis will be performed to demonstrate protectiveness using CERCLA methodology. The supplemental analysis in the WAC Compliance Plan will address concerns/uncertainties associated with setting WAC derived from the PA.

6. The Waste Acceptance Criteria fact sheet points to the inadvertent intrusion pathway of exposure in the D1 ROD. The D1 ROD included inadvertent intrusion based on a 100 mrem/year EDE (effective dose equivalent) where the upper end of the CERCLA risk range equates to about 10 mrem/year EDE and relevant and appropriate requirement 10 CFR § 61.41 requires releases must not result in an annual dose exceeding an equivalent of 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public. WAC proposed in the D1 ROD was not demonstrated to be protective of human health and the environment and are not consistent with relevant and appropriate requirements and therefore fail threshold criteria for onsite disposal to be selected as a remedial action under CERCLA. Further, Neptune and Company states in Performance Assessment Critical Issue 6 that *"there is no logical basis for excluding evaluation of groundwater pathways in a Chronic Post-Drilling residential scenario that includes exposure to cuttings from a groundwater supply well. Both of these exposure pathways should be included in this exposure scenario"*. In other words, exposure to people from drill cuttings from a borehole spread over a garden is evaluated but the cancer risk and non-cancer uranium toxicity from drinking and otherwise using water from that residential water supply well after the well is completed is ignored. This should be incorporated into the inadvertent intrusion pathway of exposure and Waste Acceptance Criteria.

Response: The D2 ROD text was revised from the D1 ROD to clarify that the inventory limits in Table 2.7 are based on the U.S. Nuclear Regulatory Commission-TDEC 25/75/25 mrem/year critical organ dose applicable or relevant and appropriate requirement (ARAR), and therefore meet the CERCLA risk range.

Waste Lot Concentration Limits represent an annual Inadvertent Human Intruder dose limit of 100 mrem, which corresponds to an excess lifetime cancer risk less than 1.0E-04 for an exposure duration of 1 year. The basis for CERCLA protectiveness of the Waste Lot Concentration Limits is explained in Sect. 2.12.2.3 of the D2 ROD text.

7. The EMDF is proposed to be constructed on a knoll and it is likely the EMDF landfill will have steep slopes. TN H2O[iv] includes *"Tennessee's climate is changing …. Average annual rainfall is increasing, and a rising percentage of that rain is falling on the four wettest days of the year …. The data clearly indicate an increasing trend in precipitation across Tennessee. This trend is expressed by more frequent heavy rainfall, and greater annual precipitation amounts, contrasted with dry spells that are more likely to be more severe because very hot days will be more frequent - even though annual precipitation is increasing … Consequently, the instance of flash flooding is more likely, in both urban and rural areas alike…. Finally, with abundant rainfall, which has increased over time, dry spells are more severe due to warmer night time low temperatures not reaching the dew point temperatures."* With climate change likely resulting in increased heavy rainfall and flash flooding with long dry spells likely damaging the vegetative cover, there should be an increasing likelihood of erosion or slope failure exposing waste over time. Human exposure to this waste should be evaluated and the WAC restricted to not cause a cancer risk in excess of the CERCLA 10-4 to 10-6 risk range.

Response: The EMDF will be constructed by removing much of the knoll area to form a gently sloping landfill. The slope is maintained to promote water drainage. Figure 2.5 of the D1 ROD demonstrates that the landfill will not have steep slopes.

A thick, multi-layer cover will be placed at closure as described in Sect 2.9.2 of the D1 ROD. The landfill will remain under DOE control, including land use controls. As per CERCLA, the landfill will be maintained in perpetuity. Therefore, the landfill will be maintained with any cover or other damage repaired when or if it occurs. This approach is similar to RCRA landfills in the state.

8. Neptune and Company's comments include the following. Among other things, this discusses mobile forms of uranium. Waste Acceptance Criteria including inventory limits are needed for uranium, and its various isotopes and progeny, and uranium metal. It is unclear what other radionuclides were screened out in the Performance Assessment due to relatively large assumed kd values and assumed negligible cover degradation. This should be reevaluated, and other radionuclides added to the analyticalWaste Acceptance Criteria to protect groundwater and fish consumption.

2.2.4 Radionuclide Mobility

The PA and CA evaluate risks from only a small handful of constituents proposed for disposal: H-3, C-14, Tc-99, and I-129. Many other potential contributors to radiological dose and risk have been practically omitted from the analysis due to a combination of relatively large assumed Kd values and an assumption of negligible degradation of the performance of the engineered cover over both 1000- and 10,000-year periods of assessment. The most significant omission from the analysis is evaluation of relatively mobile forms of uranium, and its various isotopes and progeny.

In dismissing other radionuclides from the analysis, their progeny are dismissed as well. Some of these progeny might have a low retardation factor and high dose effects, and should be considered. For example, the decay chain of U-238, even when limited to progeny with half-lives over 5 years, includes U-234, Th-230, Ra-226, Rn-222, and Pb-210. Radon-222 is a noble gas (with zero retardation) and although omitted from dose analyses in air, it can contribute strongly to doses by other exposure pathways and deposits another strong dose contributor, Pb-210 (and its progeny), in locations near the ground surface. Once U-238 progeny achieve secular equilibrium, doses from what was once purified U-238 can increase by orders of magnitude. The issue of the exclusion of doses from progeny (and specifically external doses from radon progeny) is not addressed in the R2 PA.

The PA models a variety of materials using the same Kd values, which is not in keeping with common practice. Even the older Baes et al. (1984) and Sheppard and Thibault (1990) references provide different values for different materials. Approximately 50% of the waste is expected to consist of debris with *characteristics very different from those of local soil. Critically, this statement (R2 PA Executive Summary, p. ES-10) may not be correct: "Under a long-term performance scenario, contaminant retardation in the vadose zone beneath EMDF and within the saturated matrix of the fractured rock at the CBCV (Central Bear Creek Valley) site serve disposal system safety functions by delaying and attenuating impacts of radionuclide release at potential groundwater and surface water exposure points." Retardation is reduced in the fracture-dominated flow of the saturated zone. By applying the same Kd values in the fractured rock zone as at other locations in the model domain, longterm performance is overestimated. Accordingly, this approach understates long-term contaminant transport and dose consequences.*

Neptune's supplemental RESRAD modeling indicates that near-term (<1000 years) and long-term performance is substantially poorer than that shown in the PA when substituting recommended Kd values (geometric mean) for clay soil type (most analogous to shale) from the RESRAD DCH, Table 2.13.3 (Yu et al. 2015) for the base case values used in the PA. Base case Kd values are lower (more "conservative" inasmuch as contaminants move more quickly via water pathways) than the RESRAD DCH Kd values for elements with relatively large Kd values. However, the opposite is true for uranium and the more-soluble elements hydrogen, carbon, and technetium, and it is these more-soluble elements that are responsible for water-pathways doses. The influence on modeled future doses from using these

lower Kd values is particularly evident if infiltration rates exceed the 1 in/yr "degraded condition" value assumed in the PA.

Response: See response to Additional Comment 54 (this comment), Part 1 Comment #5. In addition, uranium as a metal is being considered as part of the supplemental analysis as described in the D2 ROD.

9. The above comment on kd values and the comment on kd values in comments on the Water Quality Protection for Bear Creek fact sheet shows the effect of assumed kds in the EMDF Performance Assessment. WAC to protect groundwater use and ingestion of fish pathways should be calculated using kd values from ORNL Risk Assessment Information System, ANL RESRAD, and other authoritative sources.

Response: Similar comment is provided in Additional Comment 54 (this comment), Part 3 Comment #25. The basis for selection of Kd values is described in detail in the EMDF PA. Sensitivity and uncertainty analyses that evaluate the sensitivity of model results to uncertainty in Kd values are also included in the PA.

10. TDEC contracted with Neptune and Company, Inc. to evaluate the EMDF Performance Assessment (PA). Neptune's review[v] states *uncertainty in the inventory of disposed radionuclides is likely to be one of the more significant sources of uncertainty in the PA results.* This means there is significant uncertainty in how much of what radionuclides will be disposed in the proposed EMDF.

Response: Duplicate of Additional Comment 54 (this comment), Part 3 Comment #4. Both responses are the same.

Section 2.12.2.3 of the D2 ROD addresses the process for waste acceptance, including how EMDF radionuclide inventories will be tracked relative to the final inventory limits to ensure CERCLA protectiveness. Final WAC and WAC compliance procedures will be documented post-ROD in the EMDF WAC Compliance Plan, an FFA primary document to be submitted to EPA and TDEC for review and approval.

11. The EMDF Performance Assessment calculates a mean residence time exposure of fish to C-14 based apparently on an assumption that the mean flow in Bear Creek replaces radionuclide contaminated water in Bear Creek with upstream creek water about every 53 minutes. TN H2O[vi] includes *"Tennessee's climate is changing …. However, rising temperatures increase evaporation, which dries the soil and decreases the amount of rain that runs off into rivers. Although rainfall during spring is likely to increase during the next 40 to 50 years, the total amount of water running off into rivers or recharging groundwater each year is likely to decline 2.5 to five percent, as increased evaporation off sets the increased rainfall. Droughts are likely to be more severe because very hot days will be more frequent, so the impact of days without rain will be more pronounced."* Activities in Bear Creek surface water that fish are swimming in should be calculated based on low flow conditions, not mean flow.

Response: The EMDF PA evaluated the sensitivity in model results to uncertainty in the mean surface water body residence time, including larger values that would reflect lower flow conditions.

12. The EMDF Performance Assessment assumes significant leaching of C-14, H-3, I-129, and Tc-99 to Bear Creek surface water during the operational life of EMDF. This is addressed in PA Critical issue 5: Waste Leaching.

Isotope	As-Generated Waste Activity	As-Disposed Waste Activity	Post Operational Waste Activity	PA Assumed Leaching to Bear Creek during landfill operations
C-14	5.43	2.88	0.54	81%
H-3	21	11.2	4.64	59%
I-129	0.766	0.407	0.35	14%
Tc-99	5.28	2.8	1.56	44%

Response: The comment presents a summary of PA information. However, the leachate and contact water generated during EMDF operations will be collected and treated and will not be discharged directly to Bear Creek surface water.

13. **What are the results of DOE's modeling of differential settling of the landfill and how does this impact infiltration and the analytical WAC?** During DOE's presentation at the May 17th public meeting, DOE's presenter said for analytical waste acceptance criteria (WAC) development, DOE was modeling when and how the landfill may fail to inform what they can put in the proposed landfill. It was my previous understanding that DOE did not model differential settling because that would mean landfill failure and that DOE didn't model landfill failure. Modeling how the landfill may fail to inform Waste Acceptance Criteria and what may be placed in the landfill should include evaluating the impact of differential settling which should mostly occur within the first 100 years or so after closure.

Response: The PA assumed that differential settlement is one type of cover system degradation that contributes to increasing cover leakage over time. The PA results and the inventory limits in the ROD incorporate an appropriate assumption of cover degradation (degree of cover failure) to ensure long-term public protection.

Differential settling is not observed at the EMWMF and is not anticipated at the EMDF. Most of the waste received at the EMWMF and expected to be received at the EMDF is bulk demolition or soil remediation waste. Demolition waste is mixed with contaminated or clean fill material to eliminate void spaces, reducing or eliminating the potential for differential settling. This operational approach is included in EMWMF plans and procedures and will be incorporated into EMDF plans and procedures.

14. The Administrative WAC on page 2 of the Waste Acceptance Criteria (WAC) fact sheet includes administrative WAC for PCBs. Disposal of PCB should be removed from the administrative WAC. The TSCA waiver for 40 CFR 761.75(b)(3), that *"There shall be no hydraulic connection between the site and standing or flowing surface water*" in the Site Groundwater Characterization fact sheet is not protective of human health and should not be granted. The existing EMWMF is authorized to accept TSCA PCB waste and control of discharge of PCBs to surface water has not been a priority for almost 20 years. The Focus Feasibility for Water Management[vii] even screened PCBs out from being a contaminant of concern for the proposed EMDF based on the number of detections of PCBs when detection and reporting limits were 100 to 1000 times higher than promulgated recreational use water quality criteria. Isolation of the EMDF site from surface water is needed during landfill operations, closure, and post closure to protect human health and the environment from PCB pollution.

Response: DOE disagrees that control of polychlorinated biphenyls (PCBs) is not a priority. PCB waste disposed in the EMWMF is primarily painted surfaces where PCB was present in the paint. This form of PCBs is not soluble. No PCB liquids are allowed in the EMWMF. As described in the response to Additional Comment 54 (this comment), Part 3 Comment #15, ambient water quality criteria (AWQC) for chemicals with higher risk were sometimes set at concentrations that

are not possible to detect using current laboratory methods. Over time, analytical methods are expected to improve to allow detection at these very low levels (see Additional Comment 54 [this comment], Part 4 Comment #4). In addition, the EMDF site is planned and designed to be isolated from surface water during operations, closure, and post-closure periods.

15. Comparing the figure on page 2 of the Site Groundwater Characterization fact sheet with the following picture from the EMDF Performance Assessment, it is clear the current design has NT-D-10W stream bed under the berm along the northeastern edge of the waste disposal area for most of the length of EMDF. The drawing also shows upstream NT D-10W rerouted to NT-10 and NT 10 dammed and turned into a sediment pond. It is not specified whether current NT-D-10W will be turned into a temporary or permanent underdrain and, if so, how a porous channel to collect leachate and groundwater and route it to Bear Creek may impact WAC.

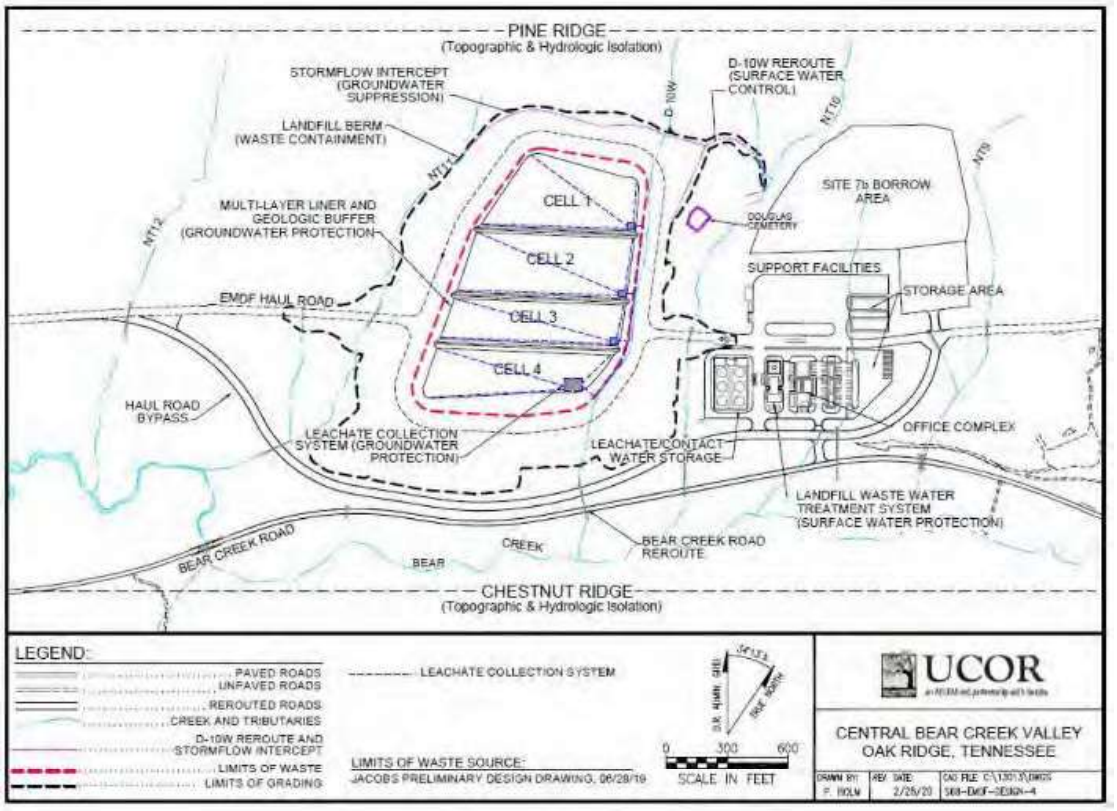


Fig. ES.4. EMDF site and design features and safety functions

[i] Performance Assessment for the Environmental Management Disposal Facility at the Y-12 National Security Complex, Oak Ridge, Tennessee (UCOR-5094/R2)

[ii] Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee (UCOR-5095/R2)

[iii]

Table B.6. Total EMDF radionuclide inventory (Ci decayed to 2047) (cont.)

Waste mass (g)	ORNL D&D 1.94E+11	ORNL RA 1.81E+11	Y-12 D&D Alpha-4 and Alpha-5 1.37E+11	Y-12 D&D Biology 2.81E+10	Y-12 D&D Remaining Facilities 3.03E+11	Y-12 RA 5.26E+11	EMDF Waste Total Inventory (Ci) 1.37E+12	EMDF waste average activity concentration (pCi/g)
Radio-isotope	**EMDF activity by waste stream (Ci)**							
Na-22	2.09E-06	2.63E-08					2.12E-06	1.55E-06
Nb-93m	Refer to Attachment B.3 for basis of inventory estimate						6.01E-01	4.39E-01
Nb-94	4.20E-02						4.20E-02	3.07E-02
Ni-59	7.84E+00						7.84E+00	5.73E+00
Ni-63	1.17E+02	1.62E+03		4.84E-02			1.74E+03	1.27E+03
Np-237	8.92E-02	5.08E-01	6.72E-03	6.04E-03		2.27E-01	8.37E-01	6.12E-01
Pa-231	6.15E-01						6.15E-01	4.49E-01
Pb-210	9.09E+00	4.08E-01					9.50E+00	6.93E+00
Pm-146	2.28E-04						2.28E-04	1.66E-04
Pm-147	5.49E-04	1.69E-05					5.66E-04	4.13E-04
Pu-238	1.43E+02	9.86E+01	2.52E-02		1.20E-01	4.62E-03	2.42E+02	1.77E+02
Pu-239	4.61E+01	1.04E+02			2.31E-02	3.12E-01	1.50E+02	1.10E+02
Pu-240	6.81E+01	9.18E+01	9.29E-03	5.07E-03			1.60E+02	1.17E+02
Pu-241	1.33E+01	5.12E+02					5.25E+02	3.83E+02
Pu-242	3.55E-02	4.10E-01					4.45E-01	3.25E-01
Pu-244	9.49E-03						9.49E-03	6.93E-03
Ra-226	5.68E-01	7.08E-01		2.80E-02		7.63E-01	2.07E+00	1.51E+00
Ra-228	1.27E-03	2.52E-03			5.17E-02	1.41E-03	5.69E-02	4.15E-02
Re-187	4.40E-06						4.40E-06	3.21E-06
Sb-125	7.82E-08						7.82E-08	5.71E-08
Sr-90	4.21E+02	7.50E+01		4.93E-02	5.02E-02		4.96E+02	3.62E+02
Tc-99	2.57E+00	7.11E-01	1.48E-01	1.14E+00	2.36E-01	2.43E+00	7.23E+00	5.28E+00
Th-228	2.25E-07	3.40E-10	8.14E-08	3.58E-07	4.78E-06		5.45E-06	3.98E-06
Th-229	3.36E-01	1.44E+01			1.43E-02		1.47E+01	1.08E+01
Th-230	3.30E-01	3.81E+00	5.92E-02		2.38E-02	7.20E-01	4.94E+00	3.61E+00
Th-232	2.32E-01	1.69E+00	5.14E-02	2.24E-02	1.98E-01	6.87E+00	9.07E+00	6.62E+00
U-232	1.62E-01	2.61E+01					2.63E+01	1.92E+01
U-233	5.15E+01	5.27E+01		2.71E+00	3.33E-01		1.07E+02	7.83E+01
U-234	2.15E+00	2.72E+01	1.25E+00	2.34E+00	1.58E+03	8.24E+00	1.62E+03	1.19E+03
U-235	8.15E-02	4.23E-01	1.02E-01	2.02E-01	9.57E+01	5.84E+00	1.02E+02	7.47E+01
U-236	5.14E-02	1.95E-01	5.22E-02	1.19E-01	2.26E+01	1.19E-01	2.32E+01	1.69E+01
U-238	1.32E+00	5.27E+00	4.71E+00	9.56E+00	8.83E+02	7.92E+01	9.83E+02	7.18E+02

D&D = deactivation and decommissioning
EMDF = Environmental Management Disposal Facility
ORNL = Oak Ridge National Laboratory
RA = remedial action
Y-12 = Y-12 National Security Complex

Table B.6. Total EMDF waste radionuclide inventory (Ci decayed to 2047)

Waste mass (g)	ORNL D&D 1.94E+11	ORNL RA 1.81E+11	Y-12 D&D Alpha-4 and Alpha-5 1.37E+11	Y-12 D&D Biology 2.81E+10	Y-12 D&D Remaining Facilities 3.03E+11	Y-12 RA 5.26E+11	EMDF Waste Total Inventory (Ci) 1.37E+12	EMDF waste average activity concentration (pCi/g)
Radio-isotope	EMDF activity by waste stream (Ci)							
Ac-227	7.54E-03						7.54E-03	5.50E-03
Am-241	4.09E+01	1.11E+02	2.20E-03	5.11E-03	1.80E-02	3.61E-01	1.52E+02	1.11E+02
Am-243	5.30E-01	7.12E+00					7.65E+00	5.59E+00
Ba-133	Refer to Attachment B.3 for basis of inventory estimate						4.14E+00	3.02E+00
Be-10	Refer to Attachment B.3 for basis of inventory estimate						6.52E-05	4.76E-05
C-14	1.66E+00	4.60E+00		1.17E+00			7.43E+00	5.43E+00
Ca-41	Refer to Attachment B.3 for basis of inventory estimate						1.09E-01	7.92E-02
Cf-249	2.80E-06						2.80E-06	2.05E-06
Cf-250	1.91E-05						1.91E-05	1.39E-05
Cf-251	5.42E-07						5.42E-07	3.96E-07
Cf-252	3.37E-07						3.37E-07	2.46E-07
Cm-243	1.01E+00	1.02E-01					1.11E+00	8.10E-01
Cm-244	3.23E+02	2.53E+00	5.39E-04				3.26E+02	2.38E+02
Cm-245	9.87E-02						9.87E-02	7.21E-02
Cm-246	4.10E-01						4.10E-01	2.99E-01
Cm-247	2.68E-02						2.68E-02	1.96E-02
Cm-248	1.44E-03						1.44E-03	1.05E-03
Co-60	4.23E-02	7.90E-03	8.87E-04			4.20E-04	5.15E-02	3.76E-02
Cs-134	5.41E-09	2.19E-08					2.73E-08	1.99E-08
Cs-137	4.11E+02	2.63E+03	2.73E-02	3.71E-03	1.42E-02	2.84E+00	3.04E+03	2.22E+03
Eu-152	7.25E+01	1.46E+00					7.40E+01	5.40E+01
Eu-154	1.65E+01	2.52E-01					1.67E+01	1.22E+01
Eu-155	1.72E-02	1.44E-04					1.74E-02	1.27E-02
Fe-55		2.31E-06					2.31E-06	1.68E-06
H-3	2.52E+01	3.56E+00		6.25E-02			2.88E+01	2.10E+01
I-129	9.56E-01	9.35E-02					1.05E+00	7.66E-01
K-40	1.07E+00	3.43E+00		6.27E-01		3.33E+00	8.46E+00	6.18E+00
Mo-100	1.08E-05						1.08E-05	7.92E-06
Mo-93	Refer to Attachment B.3 for basis of inventory estimate						1.00E+00	7.30E-01

[iv] https://www.tn.gov/content/dam/tn/environment/water/tn-h2o/documents/plan-%26-appendices/wr-tnh2o_plan-report.pdf
[v] A Review of the Performance Assessment and Composite Analysis for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee, October 12, 2020 (NAC-0131_R1)
[vi] https://www.tn.gov/content/dam/tn/environment/water/tn-h2o/documents/plan-%26-appendices/wr-tnh2o_plan-report.pdf
[vii] *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)

Response: The EMDF is not designed to include temporary or permanent underdrains like the EMWMF underdrain. As described in Sect. 2.12.2.1 of the D2 ROD, the berm may be placed over Drainage-10W (D-10W). If so, then water intercepts under the berm will direct shallow groundwater and surface water away from the footprint and into the natural drainages. These shallow intercepts are not located under the waste, do not collect deeper groundwater, and will not impact the WAC. The preliminary design re-routes D-10W to Northern Tributary 10 (referred to as NT-10), redirecting most of the current flow in D-10W away from the disposal cell.

Part 2 – Comments primarily related to the Site Groundwater Characterization fact sheet

On November 4, 2021, several former TDEC employees sent a letter concerning the Environmental Management Disposal Facility (EMDF) to EPA Administrator Michael S. Regan. The December 29, 2021, response from Acting Assistant Administrator Barry N. Breen stated the EPA, DOE, and TDEC will solicit and consider public comments on new information before EPA and DOE finalize the ROD. This response letter encouraged us to review new information added to the Administrative Record file as well as provided to the public on a dedicated website. The website includes the following new information:

EMDF Site Groundwater Characterization fact sheet
EMDF Waste Acceptance Criteria fact sheet
EMDF Water Quality Protection for Bear Creek fact sheet
Draft Record of Decision – July 2021
Draft ROD Responsiveness Summary
Technical Memo #1: Phase 1 Field Sampling Results (July 2, 2018)
Technical Memo #2: Phase 1 Monitoring (May 23, 2019)
Development of Fish Tissue and Surface Water Preliminary Remediation Goals (April 28, 2022)
Performance Assessment for the Environmental Management Disposal Facility at the Y-12 National Security Complex, Oak Ridge, Tennessee (April 23, 2020)
Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee (April 16, 2022)
Link to the Oak Ridge Environmental Information System (OREIS)

1) The Site Groundwater Characterization fact sheet includes several important points to groundwater characterization including:

a) There are fluctuations in groundwater elevations with seasons and rainfall.
b) The highest groundwater elevations occur following large rain events and in the wet season.
c) A short-term increase and decrease in groundwater elevation occur directly related to rainfall.
d) Areas to be excavated for Cells 1 and 2 have existing groundwater elevations higher than elevations of the proposed multi-layer EMDF landfill base.
e) A properly installed landfill liner system should prevent rain from percolating into the subsurface. (Except this may not be true adjacent to the outside limits of the landfill liner.)
f) DOE plans to perform a field demonstration project in the knoll area where current groundwater elevations can be higher than the proposed multilayer base elevation.

Response:

a) No response required.

b) No response required.

c) No response required.

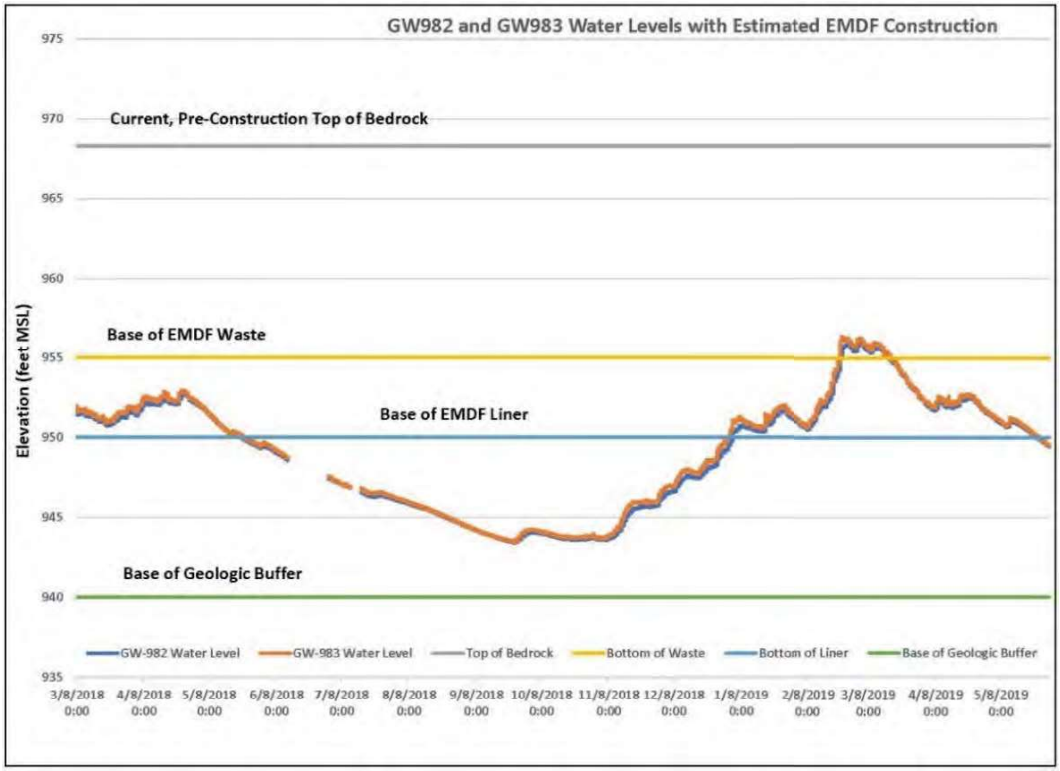
d) Modeling indicates groundwater elevations are expected to drop significantly following placement of the impermeable liner system and construction of an upgradient trench to divert surface water and shallow groundwater.

e) The landfill is surrounded by a compacted berm with only limited infiltration possible.

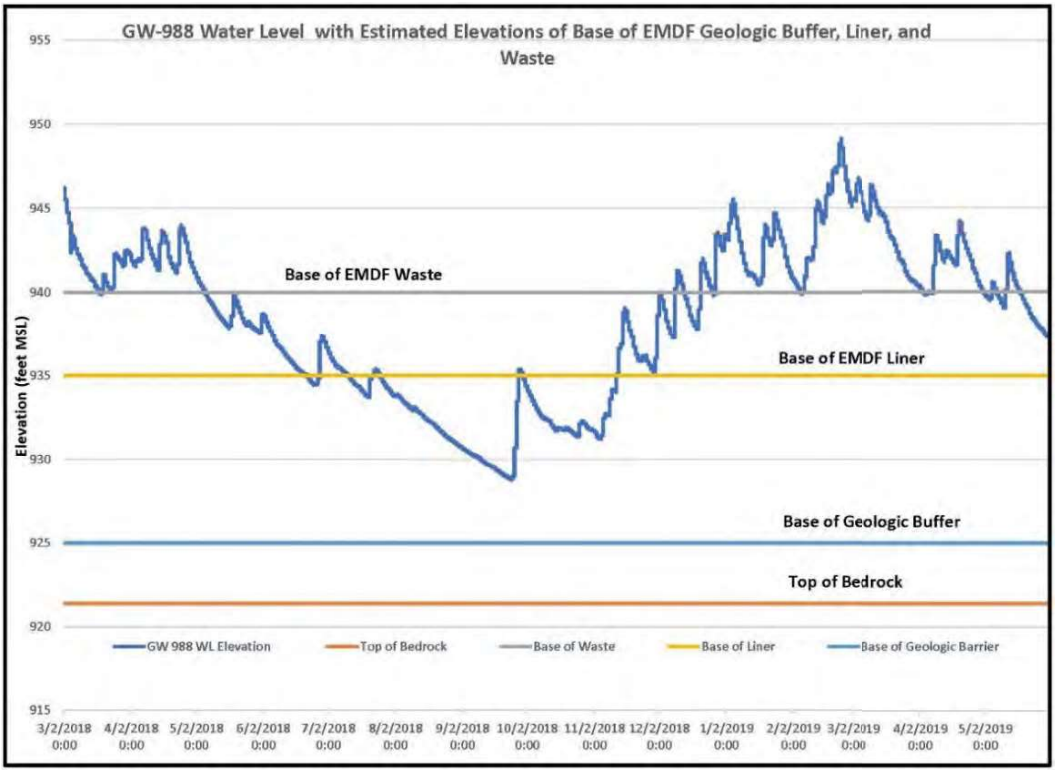
f) No response required.

2) Water level data collected for Technical Memorandum #2 (TM#2) available from the Oak Ridge Environmental Information System (OREIS) was compared with proposed EMDF Central Bear Creek Valley (CBCV) construction elevations estimated from *Figure 6-29 EMDF Cross-sections for CBCV Site* on page 6-74 of the last version of the *Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal Oak Ridge, Tennessee (DOE/OR/01-2535&D5)* (EMDF RI/FS).

The two well pairs in areas of proposed excavation on the knoll for proposed Cells 1 and 2, under current conditions groundwater conditions show groundwater levels are sufficient to impact the geologic buffer year round and to impact the geomembrane liner and rise into the waste zone at certain times of the year. Please see the following figures. Top of bedrock in the following figures was estimated from borehole log auger refusal in borehole logs included in TM#2.



Deep Piezometer GW-982 screened from 102.1 - 112.1 ft-bgs (elevation 913.5 - 903.5 ft)
Shallow Piezometer GW-983 screened from 79.1 - 89.2 ft-bgs (elevation 936.4 – 926.4 ft)



Deep Piezometer GW-988 screen interval 61.9 - 71.9 ft-bgs (elevation 895.1- 885.1 ft)
OREIS does not include monitoring data for this period for shallow paired GW-989

Response: As described in the *Site Groundwater Characterization fact sheet*, this area will be covered by the impermeable liner system. By eliminating infiltration from rainfall from this area (see 1c and 1 e above), the groundwater elevations will drop. The Groundwater Field Demonstration (GWFD) will be performed to verify this assumption (Additional Comment 54 [this comment], Part 2 Comment #1f).

3) The Site Groundwater Characterization fact sheet omits mention of upward groundwater movement. Upward movement of groundwater is shown in TM#2 and through evaluation of data collected for TM#2 included in the Oak Ridge Environmental Information System (OREIS). TM#2 also referenced the source for rainfall data and said rainfall data was also included in data evaluation.

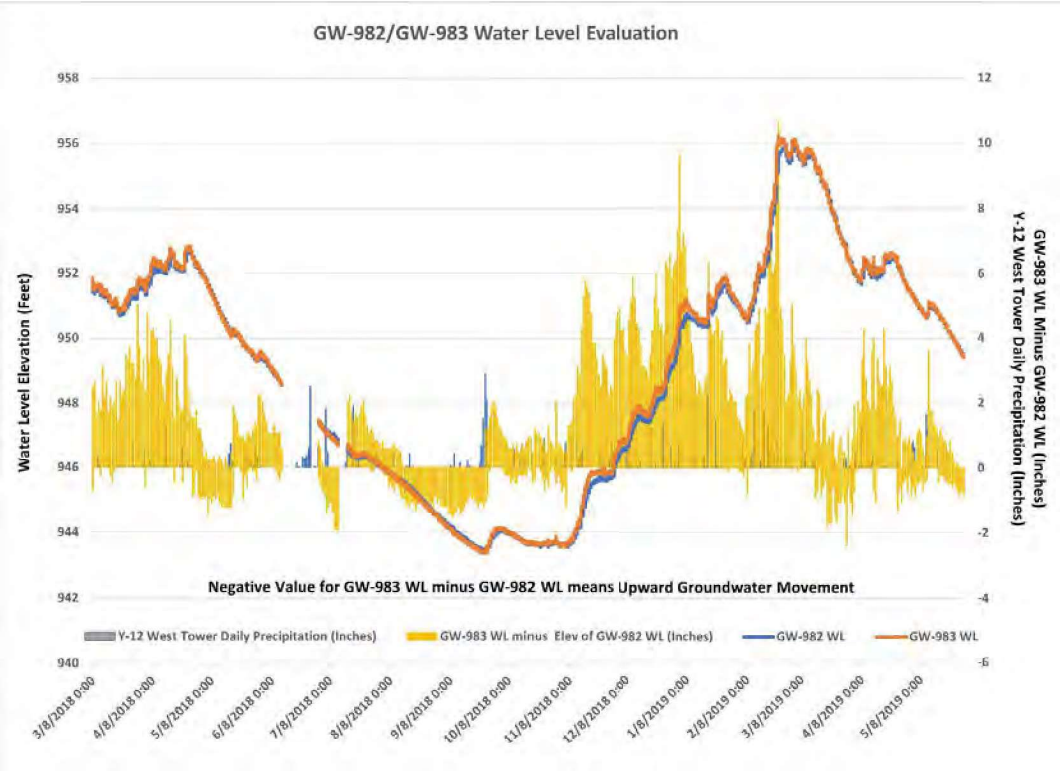
Select water level data for paired piezometers was used in TM-2 to develop Table 7.3 below. Up in the table means rising deeper groundwater.

Table 7.3. Vertical gradients at the CBCV site, September 2018 and February 2019

Piezometer	Mid-point of screen (ft bgs)	Total depth (ft bgs)	Vertical gradient during dry conditions, September 2018 (ft/ft)	Vertical gradient direction during dry conditions, September 2018	Vertical gradient during wet conditions, February 2019 (ft/ft)	Vertical gradient direction during wet conditions, February 2019
GW-978	64.5	80.0	0.12	Down	<0.01	Down
GW-979	31.3	37.8				
GW-980R	64.95	74.4	0.19	Down	0.28	Down
GW-981	27.1	34.0				
GW-982	107.1	126.5	<-0.01	Up	0.03	Down
GW-983	84.2	92.2				
GW-986	43.5	59.6	-0.01	Up	-0.02	Up
GW-987	21.1	27.9				
GW-988	66.9	78.5	0.02	Down	0.08	Down
GW-989	38.6	45.0				
GW-992R	41.85	55.5	-0.02	Up	-0.07	Up
GW-993	28.0	35.5				
GW-994	47.0	55.0	-0.07	Up	<-0.01	Up
GW-995	27.1	34.0				
GW-998	31.6	45.0	-0.01	Up	-0.03	Up
GW-999	15.3	22.0				

CBCV = Central Bear Creek Valley.
ft bgs = feet below ground surface.
GW = groundwater well.
R = replacement borehole.

The following figure derived by comparing water level data collected for TM-2 and available in OREIS for deeper and shallower piezometers GW-982/GW-983, shows that in addition to rising groundwater in the GW-982/GW-983 area during September 2018 dry conditions noted in TM-2 Table 7.3, under current conditions rising groundwater based on water levels was also recorded in TM-2 data up to an elevation of about 955 feet.



Response: An upward gradient is apparent in some piezometer pairs at some times of the year. As shown in the figure provided with this comment, this upward gradient is not significant. Also as shown on the figure, the lower and upper piezometer water level measurements are very similar at each point in time, indicating a close correlation. No issues are expected. However, as noted above, the GWFD will be performed to verify the basis of the design assumptions (Additional Comment 54 [this comment], Part 2 Comment #1f).

4) In addition to water level data, electrical conductivity, pH, and temperature data were also collected for TM#2. The following figures include:

GW-983 electrical conductivity overlain on GW-983 water level;

GW-983 electrical conductivity (specific conductance) overlain on the difference of water levels derived by subtracting the elevation of the water level in GW-982 from the elevation of the water level in GW-983;

GW-983 electrical conductivity overlain over groundwater temperatures measured in GW-983, GW-982, and GW-988;

Comparison of GW-983 groundwater temperature with air temperature measured at ORNL;

GW-983 groundwater electrical conductivity overlain on GW-983 pH;

Comparison of GW-982, GW-983, and GW-988 pH; and

Comparison of GW-982, GW-982, and GW-988 electrical conductivity (i.e., specific conductance).

Evaluation of these figures shows:

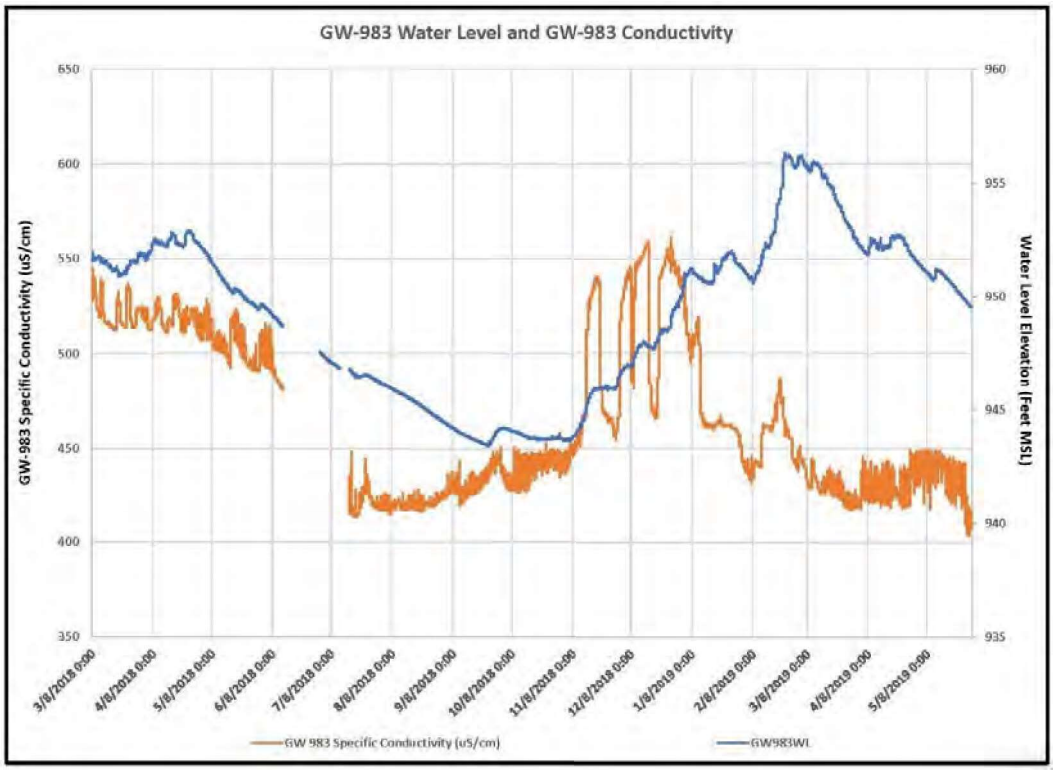
Increased electrical conductivity (i.e., specific conductance) in GW-983 observed from about November through March is real and is generally associated with an increase in groundwater temperature and a decrease in groundwater pH.

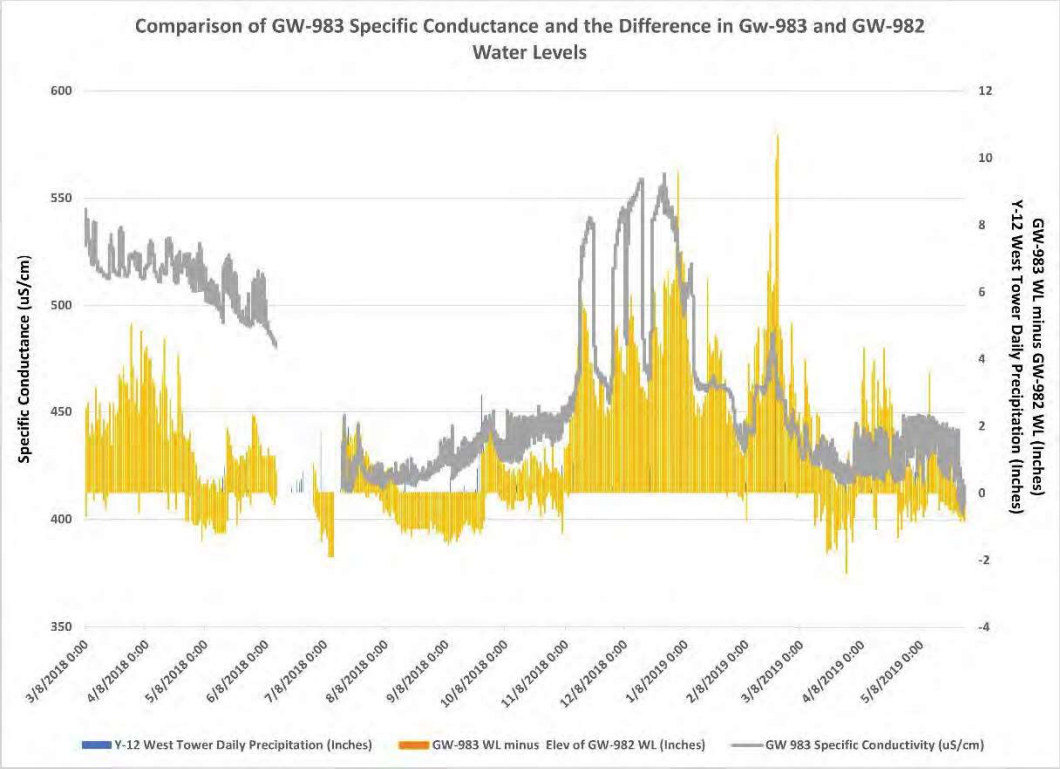
November through March are colder months and both air temperature at ORNL and groundwater temperature for deeper piezometer GW-982 have temperatures lower than the high conductivity groundwater entering GW-983. Increased temperature of groundwater associated with the higher electrical conductance groundwater during late fall and winter shows the source of the influx of higher electrical conductance groundwater is neither GW-982 nor infiltrating rainwater.

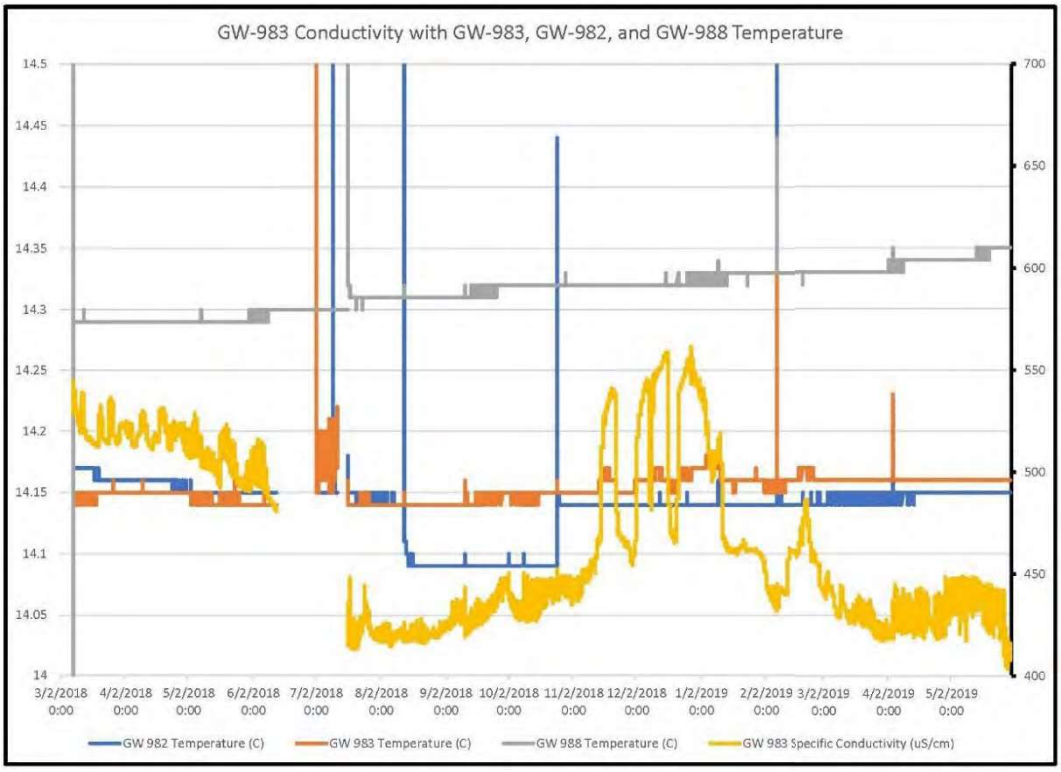
Deeper piezometer GW-982 also has a higher pH than GW-983, so again it's not the source of lower pH groundwater entering GW-983.

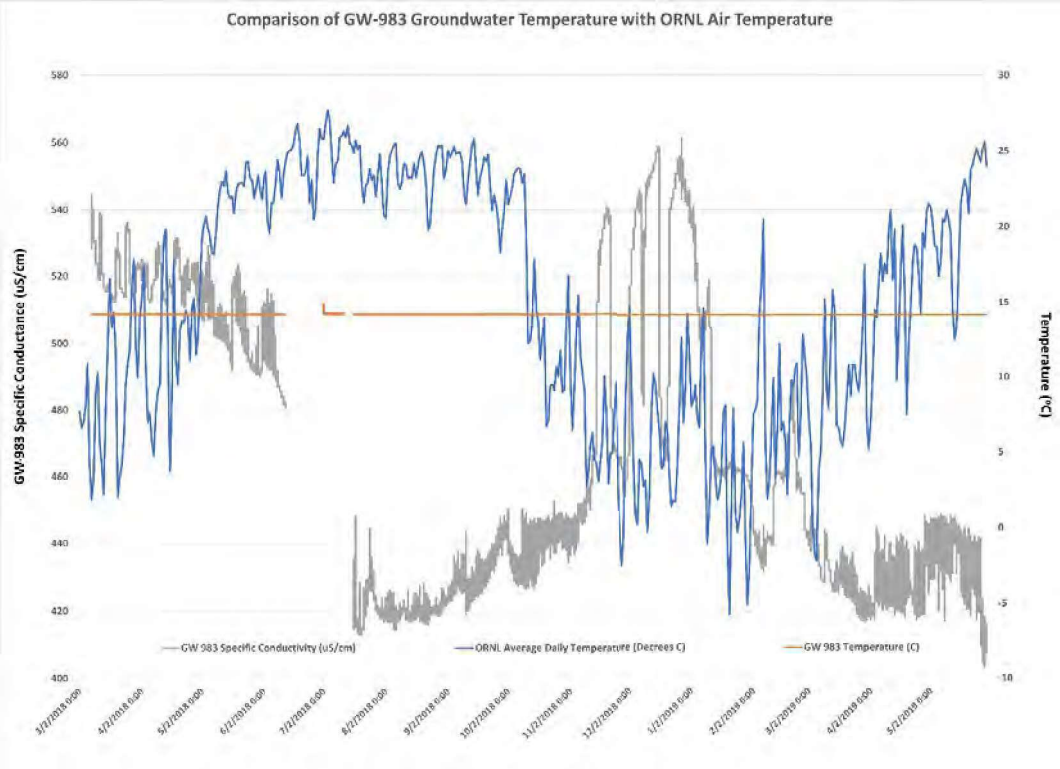
The higher electrical conductivity groundwater entering GW-983 appears more like groundwater measured in GW-988 than either rainwater or GW-982.

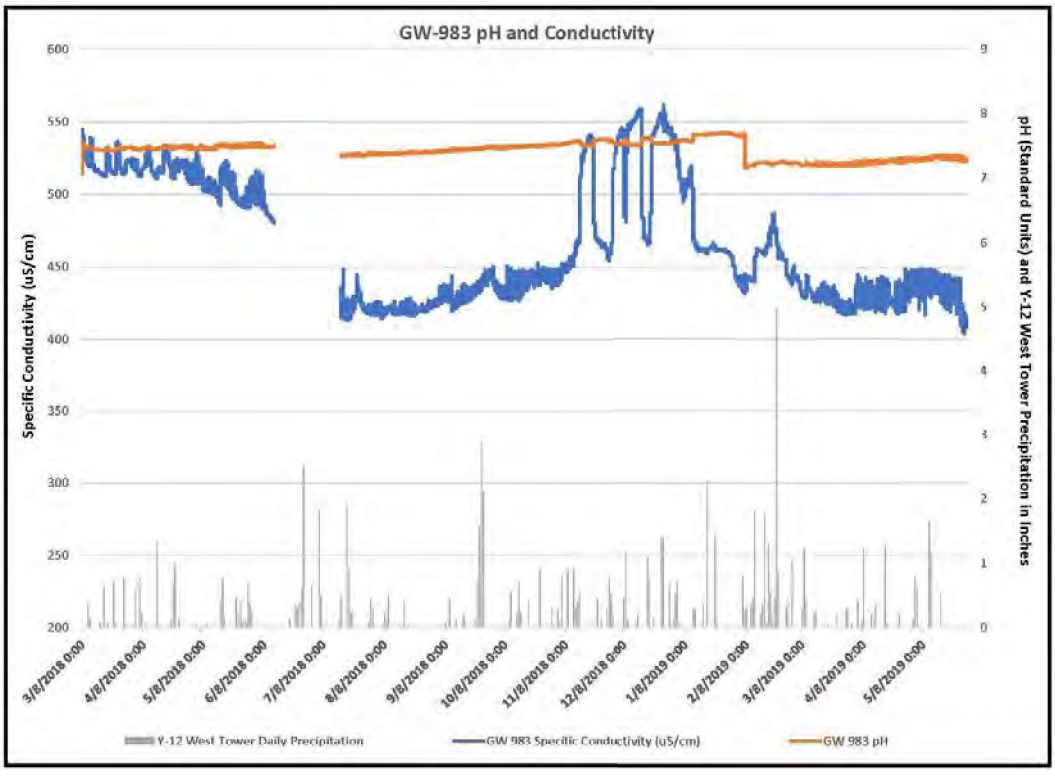
This analysis concludes the higher electrical conductivity, lower pH, higher temperature groundwater that entered GW-983 during late fall and winter 2018/2019 is real, not bad data, and was neither infiltrating rainwater nor GW-982 groundwater. Where electrical conductivity begins to drop off in January and February may be due to dilution from infiltrating rainwater.

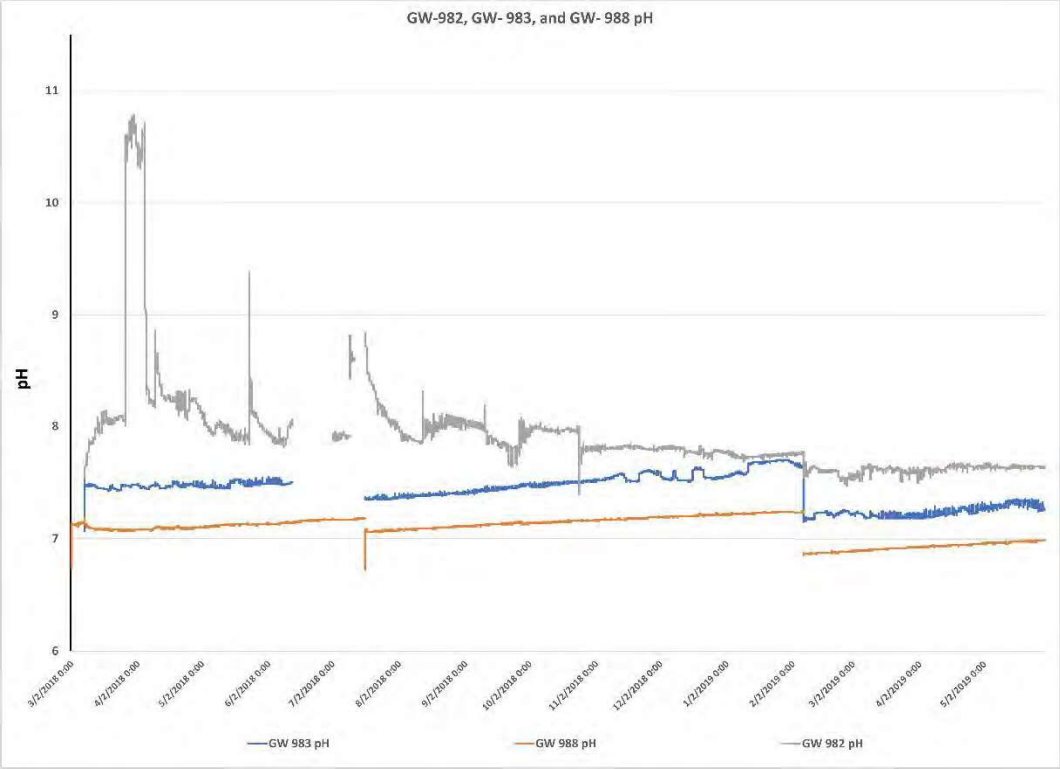


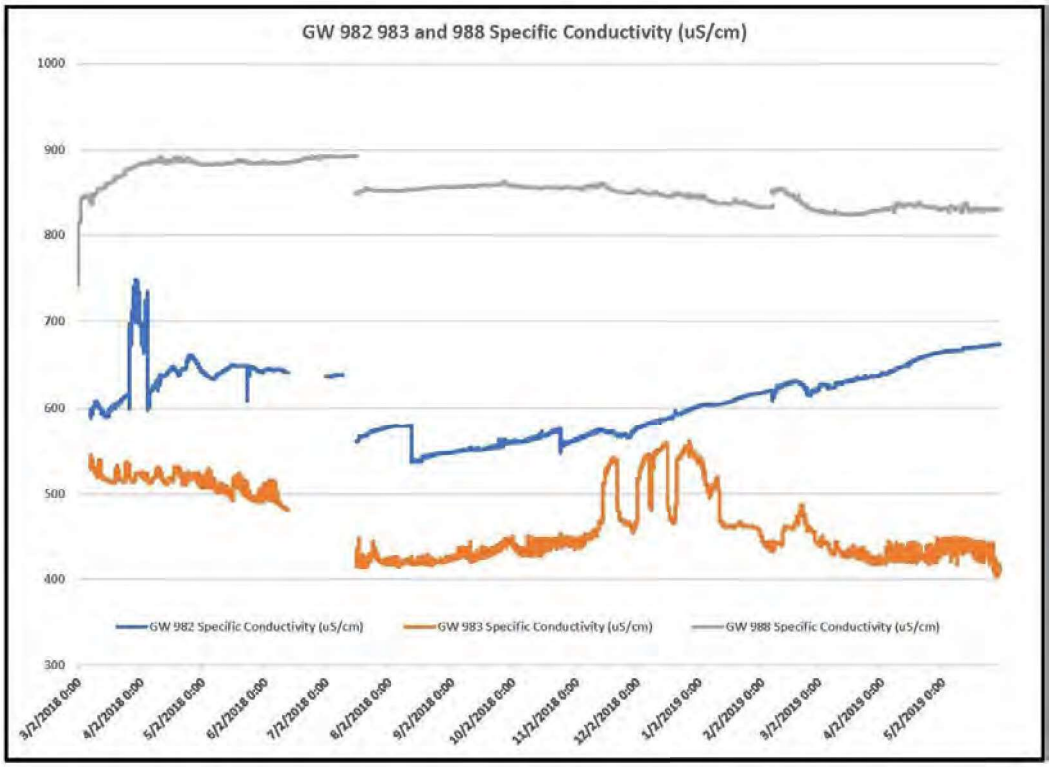

Comparison of GW-983 Specific Conductance and the Difference in Gw-983 and GW-982 Water Levels
Specific Conductance (uS/cm)
GW-983 WL minus GW-982 WL (Inches)
Y-12 West Tower Daily Precipitation (Inches)
600
550
500
450
400
350
12
10
8
6
4
2
0
-2
-4
3/8/2018 0:00
4/8/2018 0:00
5/8/2018 0:00
6/8/2018 0:00
7/8/2018 0:00
8/8/2018 0:00
9/8/2018 0:00
10/8/2018 0:00
11/8/2018 0:00
12/8/2018 0:00
1/8/2019 0:00
2/8/2019 0:00
3/8/2019 0:00
4/8/2019 0:00
5/8/2019 0:00
Y-12 West Tower Daily Precipitation (Inches)
GW-983 WL minus Elev of GW-982 WL (Inches)
GW 983 Specific Conductivity (uS/cm)


GW-983 Conductivity with GW-983, GW-982, and GW-988 Temperature
14.5
14.45
14.4
14.35
14.3
14.25
14.2
14.15
14.1
14.05
14
700
650
600
550
500
450
400
3/2/2018 0:00
4/2/2018 0:00
5/2/2018 0:00
6/2/2018 0:00
7/2/2018 0:00
8/2/2018 0:00
9/2/2018 0:00
10/2/2018 0:00
11/2/2018 0:00
12/2/2018 0:00
1/2/2019 0:00
2/2/2019 0:00
3/2/2019 0:00
4/2/2019 0:00
5/2/2019 0:00
GW 982 Temperature (C)
GW 983 Temperature (C)
GW 988 Temperature (C)
GW 983 Specific Conductivity (uS/cm)


Comparison of GW-983 Groundwater Temperature with ORNL Air Temperature
GW-983 Specific Conductance (uS/cm)
Temperature (°C)
GW 983 Specific Conductivity (uS/cm)
ORNL Average Daily Temperature (Decrees C)
GW 983 Temperature (C)

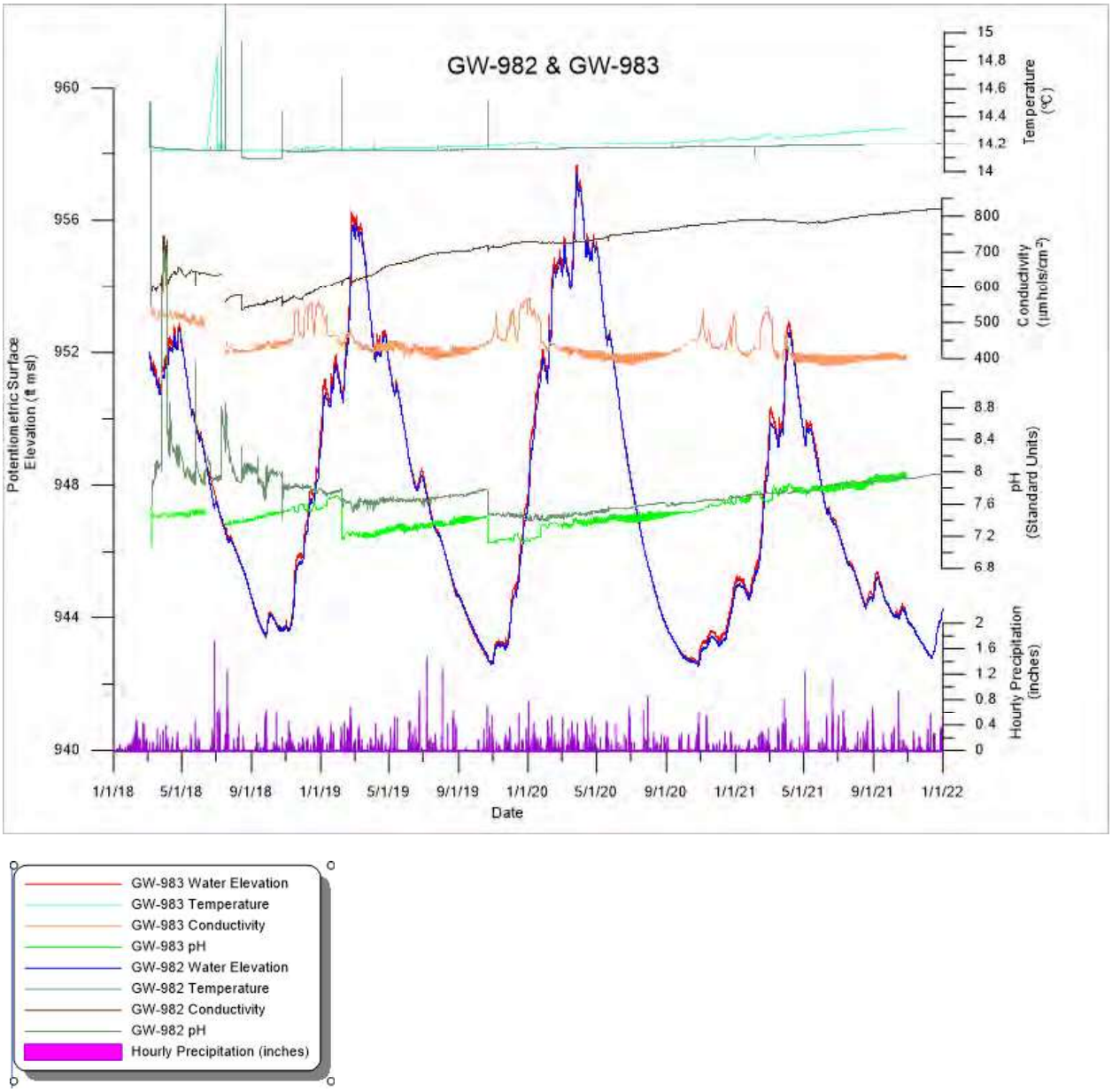

GW-983 pH and Conductivity
Specific Conductivity (uS/cm)
pH (Standard Units) and Y-12 West Tower Precipitation in Inches
Y-12 West Tower Daily Precipitation
GW 983 Specific Conductivity (uS/cm)
GW 983 pH





Response: The evaluation in the comment was based on data collected for a little over a year after the wells were installed. The piezometers have been continuously monitored since that time and there are more than 4 years of data. The additional data have increased the understanding

beyond the initial observations. The following graph displays data for GW-982 and GW-983 including temperature, conductivity, pH, water elevation, and hourly precipitation.



The conductivity measurements observed at GW-983 reflect more than an increase in groundwater temperature and pH. The variation in conductivity demonstrates a different source of water (a higher conductive, a slightly different pH, and a slightly different temperature) during certain time periods. However, the observations during these periods better fit a perched water bearing zone that is mixing with fresh groundwater during periods of heavy rain after an extended dry period. After the perched zone is flushed by infiltrating precipitation (~954 ft in elevation), then the impacts of that perched water no longer effect the conductivity measurements at GW-983. During the dry season, the perched zone becomes isolated, increasing groundwater conductivity and temperature with a lower pH, until the next seasonal rise in groundwater elevations.

Conductivity is a function of chemical kinetics and can be influenced by temperature, water contact time, mineralogy, initial composition of source water, and or increase surface area of the soil particle (smaller particle size). Warm water can dissolve more salts, however, the temperature difference is not substantial enough to justify the slight increase observed, and is only tied to a few time periods during the initial seasonal increase in groundwater levels. In addition, similar changes would be observed at multiple locations in Bear Creek Valley at a variety of times. If it was simply air temperature related, this type of change would be observed at many other nearby investigations and locations.

A very slight change in conductivity is observed at GW-982 early during the seasonal increase in groundwater elevation, which would suggest fresher water during the highest infiltration period. Conductivity measurements at GW-982 are still increasing towards ambient level, which further suggest limited groundwater flow in the deeper zone.

The plotted pH measurements initially show the initial effect of piezometer construction, where grout used during the piezometer construction may have affected pH values for GW-982. Over time, pH measurements demonstrate ambient conditions. The pH values are about the same for the groundwater near the GW-983 and GW-982 piezometer pair.

Conductivity does not reveal groundwater geochemistry and what species of metals are available. To make a comparison based on conductivity measurements alone can be misleading. Infiltrating precipitation does not result in the change in electrical conductivity in January and February by diluting the groundwater. Instead, as noted above, the change in conductivity is related to the rising groundwater elevations, that usually begins around November. The conductivity changes occur only during the initial rise after a long period of lower water levels and stops after reaching certain elevation. Therefore, flushing of a perched water zone is the most likely cause of the observed conductivity, slight temperature, and slight pH variations in GW-983.

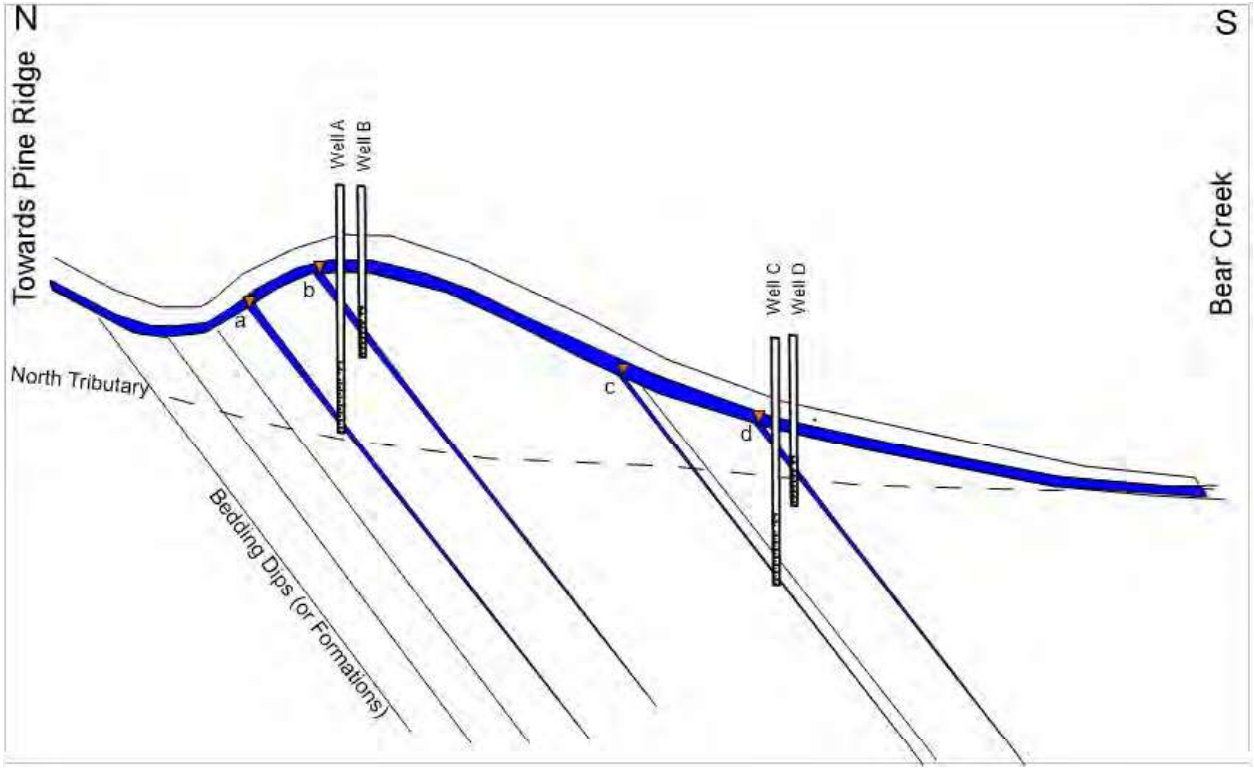
5) GW-983 has a sand pack from a depth of 74.1 to 91.5 ft -bgs (feet below ground surface) and the screen in GW-983 is from 79.1 to 89.2 ft-bgs. The GW-982 borehole logi shows that bedding dips 45 to 50 degrees and the description of the core changes at a depth of about 73.3 feet. Above this the core description includes numerous entries of fractured to intensely fractured intervals with iron oxide coatings indicating weathering, water movement, and that the fractures were not mechanically induced by drilling. Angular piece with slickensides from 65.9 to 66.5 may indicate faulting. The top of the GW-983 sand pack is immediately below the change in core description. Given the electrical conductivity with associated temperature and pH discussion in another comment with the core description it is plausible that deeper groundwater moves upward through dipping beds or fault described in the borehole immediately above the GW-983 sand pack and screen and impacts shallow piezometer GW983. This would give a false impression of a downward groundwater gradient.

Response: As a result of the geologic history, fractures, local dip angle changes and slickensides are common in the Conasauga Group formations, particularly in the Maryville and Nolichucky Formations which underlie the Central Bear Creek Valley site (*Geology of the West Bear Creek Site* [ORNL1989]). Generally, bed parallel slickensides are common, do not indicate faulting is present and are thought to be in part a result of bedding plane slip (*Status Report on the Geology of the Oak Ridge Reservation* [ORNL 1992]).

Based on the geologic investigations throughout Bear Creek Valley, monitoring of shallow and deep well pairs, geochemical data, conductivity measurements and continuous water quality data, it is not likely that deep groundwater moves upward through dipping beds. Throughout Bear Creek Valley, where there is a saddle or topographic low area north of well pairs, downward

gradients are observed. In areas where there are higher topographic elevations north of well pairs, upward gradients are observed.

As shown in the following schematic cross section, Well A will have groundwater elevations associated with inverted orange triangle location "a". Similar for Well B and inverted orange triangle location "b". Well C to "c" and Well D to "d". Paired wells A and B would have an observed downward gradient and paired wells C and D would have an upward gradient (consistent with Table 7.3 in Additional Comment 54 [this comment], Part 2 Comment #3).



In addition to the head values, the deeper wells monitor zones that are slower to recharge, have higher conductivity, and a geochemistry profile that suggests very slow groundwater flow conditions. There is not extensive interconnectivity at depth for the thin bedding plane water-bearing zones. Nearer to the groundwater table (closer to the surface), the weathered bedrock/residuum/saprolite has more interconnectivity and less restrictive groundwater flow. As the groundwater table zone mimics the ground surface under the knoll, so does the pressure head associated with the water-bearing bedding plane zone. Groundwater flow still seeks the least restrictive flow paths of the groundwater table zone and upper bedding plane zones. These conditions carry forward as the hill decreases in elevation towards the north tributaries and Bear Creek.

For Well pairs C and D, if the area "c" is lowered or capped, the upward vertical gradient is expected to change to a downward vertical gradient based on the elevation of groundwater recharge zone.

6) Piezometer pair GW-988 and GW-989 possibly drilled through a fault(s). Borehole descriptions[ii] of bedding turning from a 45-degree dip to near vertical with additional discussion of slickensides perpendicular to bedding, some limestone beds being highly deformed to almost brecciated, and possibly

slightly overturned beds appear to indicate faulting. In this case both deep piezometer GW-988 and shallow piezometer GW-989 are screened in or near potentially faulted intervals. Shallow piezometer GW-989 sand pack also appears to across the saprolite bedrock contact allowing shallow groundwater at the saprolite bedrock contact to enter the piezometer. TM-2 also includes the following figure with a statement suggesting deeper groundwater rises with rainfall.

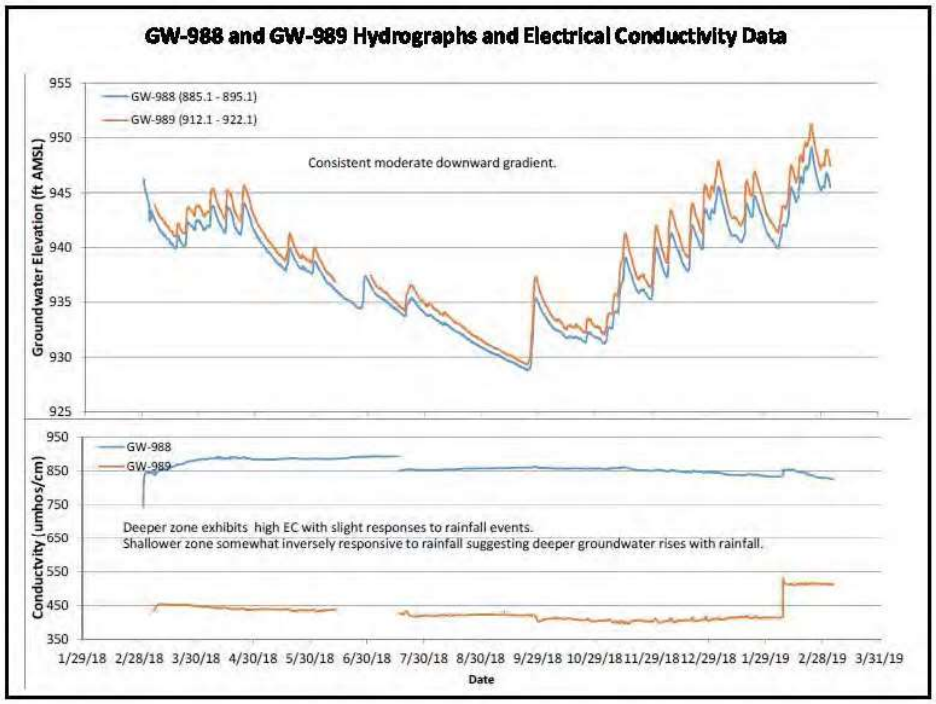
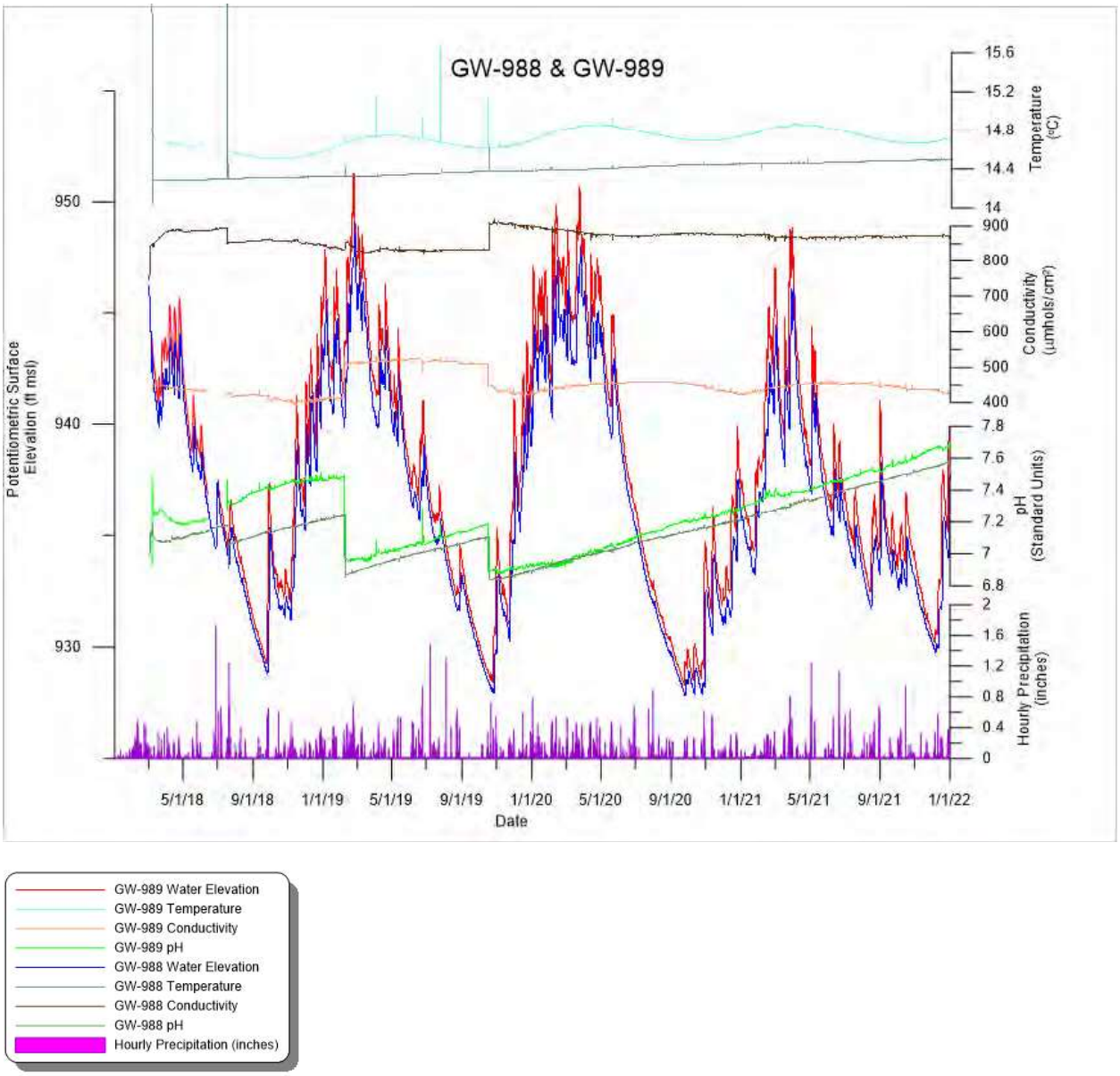


Fig. 7.26. GW-988/989 comparisons.

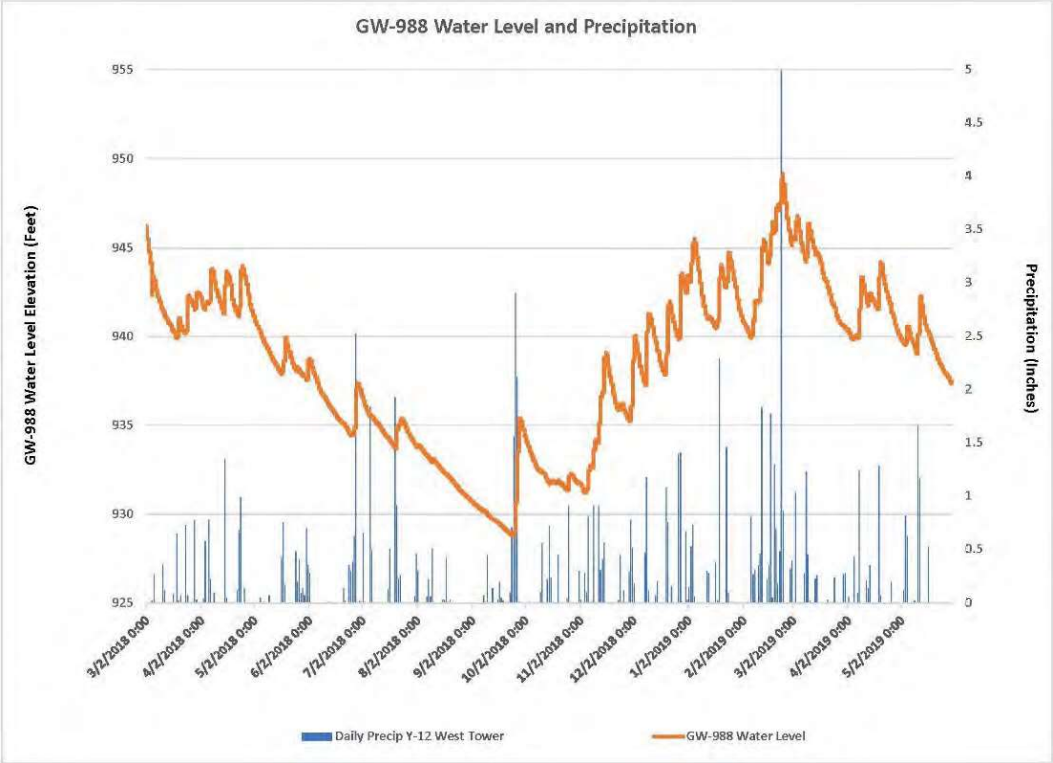
Response: The comment was based on the initial observations. While these provide an excellent overall look, the detailed evaluation provided by the commenter would benefit from using all the available data, which provides a more complete picture. Following is a graph with the available data for GW-988 and GW-989. Included in the graph is temperature, conductivity, pH, water elevation, and hourly precipitation.

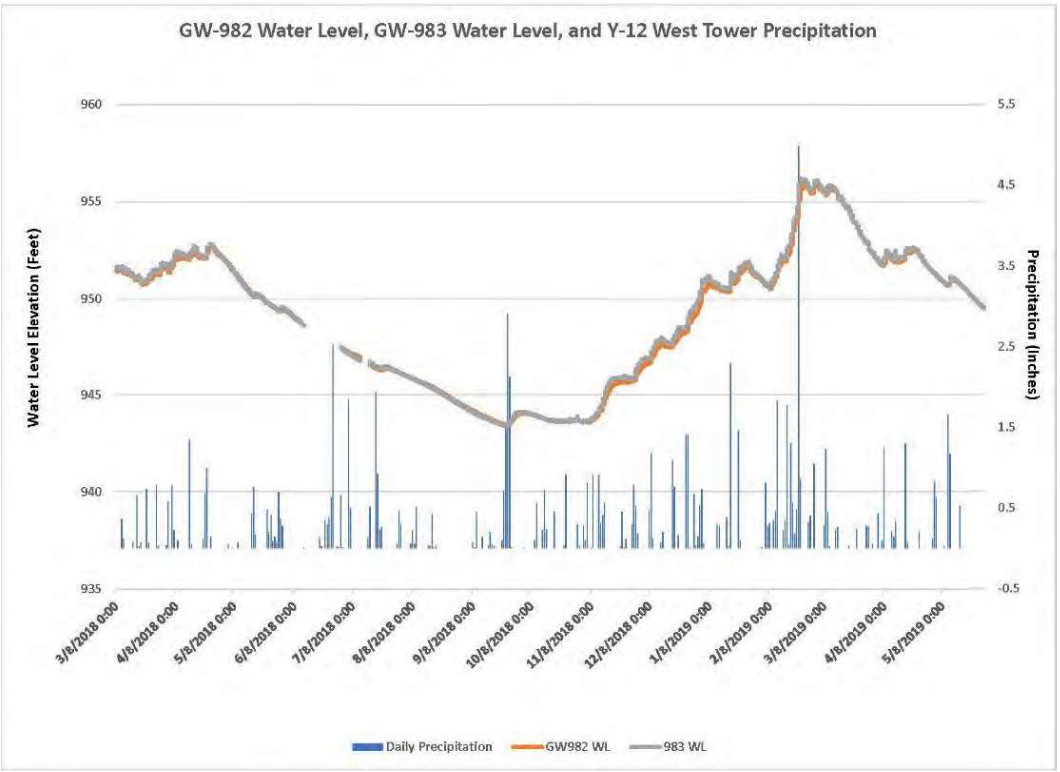


There is a downward vertical gradient, similar to the discussion in the response to Additional Comment 54 (this comment), Part 2 Comment #5. The conductivity values in the deep piezometer (GW-988) have reached ambient conditions; there is no observed influx of lower conductivity water in the deep zone at this location. The shallow zone piezometer (GW-989) shows that conductivity decreases as water level is increasing (beginning of the downward dips of the conductivity graph) and slightly increases as the groundwater elevation is still rising (beginning of the upward direction of the conductivity graph).

The conductivity increase suggests that the water is older (most likely due to water movement from the knoll or bedding plane water bearing zones entering into the shallow zones (increased time for the salts to get into solution) as it migrates towards surface water. Again, lower conductivity is influenced during the initial infiltration (rise in water elevation) by fresher rain water infiltration. The temperature of the shallow zone is based determined by height of water above the sensor and soil temperatures.

7) The Site Groundwater Characterization fact sheet correctly noted the water level response to rainfall. However, rainfall response in GW-988 was quick and response in GW-982/GW-983 was delayed.

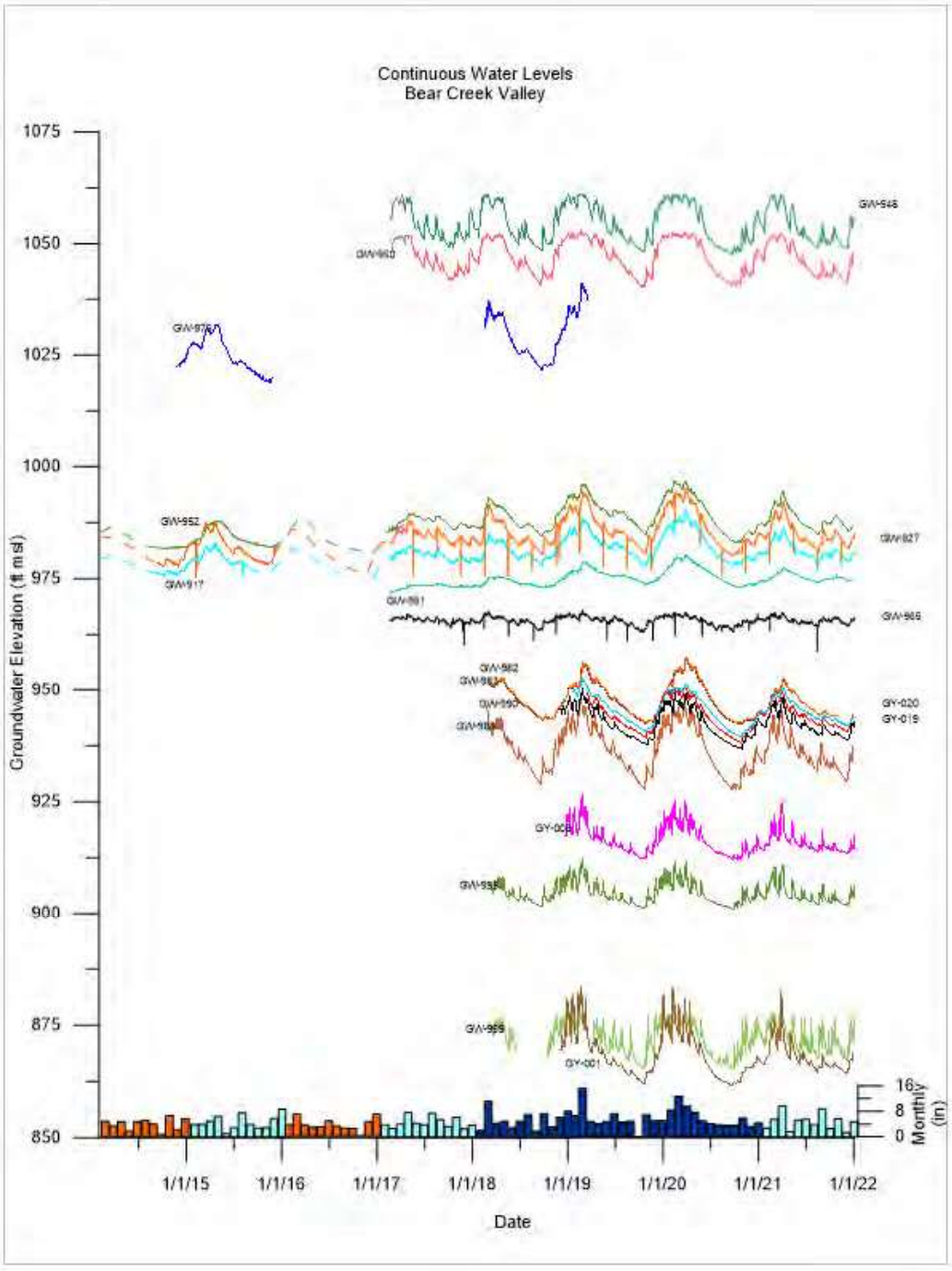


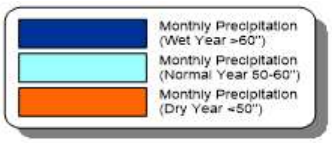


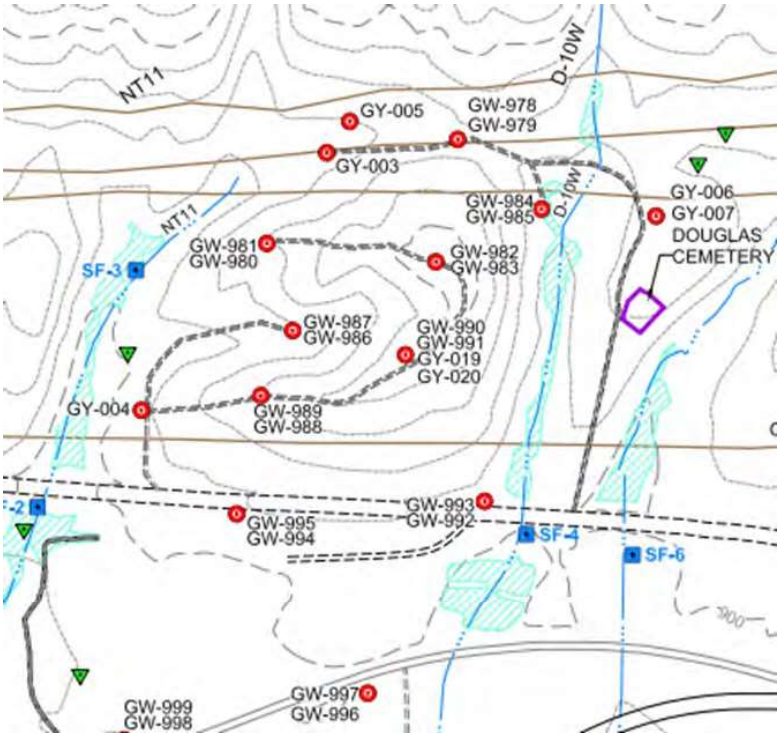
Response: The hydrographs shown below are slightly different than those used by the commenter. However, the same groundwater response has been observed at several locations along Bear Creek Valley and reflects the surface conditions/geomorphology more than subsurface conditions. The composite figure of the Bear Creek Valley hydrographs show that GW-982/GW-983 and GW-991/GY-019/GY-020 are similar to GW-979, GW-952, GW-951, GW-917, and GW-927.

These wells all are located adjacent to a lower saddle area or liner covered area (EMWMF) that restricts groundwater flow from a topographic high or source area. Thus, the only groundwater input is precipitation that falls on a localized area near the piezometer.

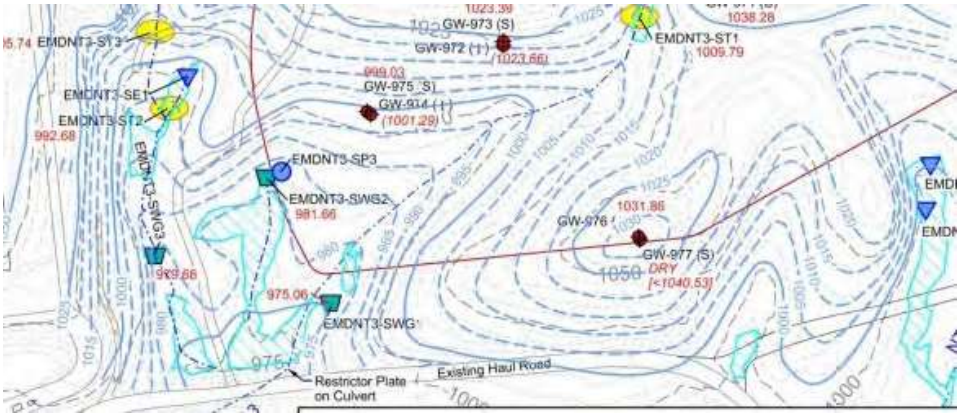
As a result, the groundwater levels increase at the same time, but these responses look different in different piezometers because of the differences in where these are located topographically. The response in a piezometer at the top of a knoll is different than the response in a piezometer downgradient from the knoll or hill top.


Continuous Water Levels
Bear Creek Valley
Groundwater Elevation (ft msl)
1075
1050
1025
1000
975
950
925
900
875
850
GW-548
GW-960
GW-976
GW-952
GW-917
GW-827
GW-961
GW-969
GW-962
GW-963
GW-590
GW-964
GY-020
GY-019
GY-021
GW-958
GW-965
GY-001
16
8
0
Monthly (in)
1/1/15
1/1/16
1/1/17
1/1/18
1/1/19
1/1/20
1/1/21
1/1/22
Date


Monthly Precipitation (Wet Year >60")
Monthly Precipitation (Normal Year 50-60")
Monthly Precipitation (Dry Year <50")



EMDF CBCV Knoll Piezometers GW-990/GY-019/GW-020 and GW-982/GW-983



EMDF Site 7 Piezometer GW-976

EMWMF wells/piezometers GW-952, GW-927, GW-917

8) The Site Groundwater Characterization fact sheet also discusses conducting a field demonstration project to inform the design.

a) TM#2 suggests that auger refusal represents the top of bedrock. Using this criteria, GW-982 and GW-983 groundwater levels represented in TM#2 are always below the top of bedrock. Groundwater at or below the top of bedrock in moderate to steeply dipping strata can be expected to typically move along geologic strike (i.e., bedding) and fractures. Thinking about water levels in GW-982 and GW-983 as a water balance, water enters the system as rainwater percolating into the ground from above and as deeper groundwater moving upward. The accumulated water leaves the system through conduits likely along geologic strike and through fractures that transmit water. Under this conceptual model, groundwater declines to a level where water entering the system and water leaving the system are in balance. Then at the start of the rainy season, water enters the system both as infiltrating rainfall and upward moving groundwater and maintains that water level until the conduits are full. When the conduits cannot transmit all the water, the water level rises until additional overflow conduits are sufficient to balance water entering the system. Groundwater rises until water entering the system equals water exiting the system. As rainfall decreases, water level drops as conduits continue to transmit water out of the system

b) Under this site conceptual model, the proposed field demonstration may imply how high deeper groundwater moving upward may rise in the GW-982/GW-983 area under current conditions, if the conduit system is not disturbed. If the conduit system is either removed by excavation or restricted by the weight of the landfill, it is likely deeper groundwater rising under the proposed landfill will be different than projected by the filed demonstration.

c) Under this site conceptual model, the proposed field demonstration may indicate whether there is sufficient “epikarst” in the area of GW-988 to prevent groundwater from rising into the proposed geologic buffer. Similar to the comment above, if the conduit system is either removed by excavation or restricted by the weight of the landfill, it is likely deeper groundwater rising under the proposed landfill will be different than projected by the filed demonstration.

Response:

a) No response required.

b) and c) The conceptual model described by the commenter is different than the physical observations and investigations from various sites along Bear Creek Valley. Conduit flow and deep groundwater flow circulation as described in the comment are not evident in Bear Creek Valley. Specifically, no deep flow circulation or other causes have been observed discharging highly conductive groundwater in the northern tributaries or springs of Bear Creek. There are only pseudo-upward gradients tied to the bedding planes and Ridge/Valley setting of Bear Creek Valley (see response to Additional Comment 54 [this comment], Part 2 Comment #5). If deep flow circulation was present, then there would be enough potential energy with the water levels to have recorded observable discharges of springs in the tributaries or creeks, yet there are not.

In addition, the purpose of the GWFD is to determine how groundwater responds to placement of an impermeable liner system.

9) Pneumatic piezometers used at EMWMF required a lot of interpretation and explanation. Even with the field demonstration project, instead of pneumatic piezometers, a method(s) of direct measurement of groundwater levels at the proposed EMDF site is needed.

Response: Research is being conducted into how groundwater may be best measured beneath the cell. The approach will be provided in the Remedial Design Report and Remedial Action Work Plan, which will be submitted to EPA and TDEC for review and approval.

10) The Site Groundwater Characterization fact sheet also references waivers and exceptions for 2 TSCA rules and one TDEC NRC rule.

a) The fact sheet references a TSCA rule exception or waiver that there is no hydraulic connection between the site and standing or flowing surface water. As state in comments on PCBs to the Water Quality Protection for Bear Creek fact sheet the existing EMWMF is authorized to accept TSCA PCB waste and control of discharge of PCBs to surface water has not been a priority for almost 20 years. The Focus Feasibility for Water Management even screened PCBs out from being a contaminant of concern for the proposed EMDF based on the number of detections of PCBs where detection and reporting limits were 100 to 1000 times higher than promulgated recreational use water quality criteria. Isolation of the EMDF site from surface water is needed during landfill operations, closure, and post closure to protect human health and the environment from PCB pollution and this applicable requirement should not be waived.

b) The fact sheet also references a TSCA rule exception or waiver that the bottom of the landfill liner system be at least 50 feet from the historical high-water table. As shown in the above comments, the high-water table in both the GW-982/GW-983 and GW-988 areas rose to elevations of the proposed liner and even to proposed waste elevations during monitoring for TM#2. Irrespective of the results of the field demonstration project or the thickness of the multi-layer base, it should be hard to rationalize justification for waiving this applicable TSCA requirement at a location with rising groundwater.

c) A waiver or exception from TDEC NRC disposal siting rule that "The hydrogeologic unit used for disposal shall not discharge groundwater to the surface within the disposal site" is requested. It is my understanding that this requirement is meant to ensure that, if there were a release, there would be sufficient real estate to perform corrective action at the site prior to discharge of groundwater to the

surface. That is not the basis for which a waiver is requested or justified in this fact sheet. Prior to authorizing a waiver, it is suggested that the purpose for the regulation be established and then see if the justification achieves the purpose of the regulation. If the purpose is to have sufficient room for corrective action, a discussion of engineered liner and limits on waste acceptance criteria (WAC) do not meet the mark. Further, WAC has not been shown to be protective of human health based on CERCLA.

Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

A Toxic Substances Control Act of 1976 (TSCA) waiver for two parts of TSCA 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

- **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding PCB management and disposal practices on the ORR. Compliance with the RCRA Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the EPA determination that the remedy is protective of human health and the environment.**

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.**

An exemption to TDEC 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

See responses to Additional Comment 54 (this comment), Part 1 Comment #14 and Part 4 Comment #4.

WAC protectiveness is described in Additional Comment 54 (this comment), Part 1, including Part 1 Comment #1.

11) TDEC Rule 0400-20-11-.17(1)(g) "*The disposal site must provide sufficient depth to the water table that ground water intrusion, perennial or otherwise, onto waste will not occur. … In no case will waste disposal be permitted in the zone of fluctuation of the water table.*" As shown by evaluating TM#2 groundwater elevation data placed in OREIS after the previous public comment period, disposal proposed in the Remedial Investigation and Feasibility Study does not meet this relevant and appropriate requirement and no waiver for this requirement was requested.

Response: As noted in several previous comments, including responses to Additional Comment 54 (this comment), Part 2 Comments #1 and #2, the GWFD is designed to confirm the groundwater elevations will drop when an impermeable liner system is place over the area. If this assumption is not confirmed, then the design will be modified to achieve this ARAR.

[Note: Exhibit associated with Andy Binford's Part 2 Comment 5]

Eagon & Associates, Inc.

EMDF Characterization Project Oak Ridge, TN	**BOREHOLE LOG**	Boring Number GW-982

Remarks:

Depth (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
46	NS			Light yellowish brown (2.5Y 6/3 - 6/4) and light olive brown (2.5Y 5/3 - 5/6) highly weathered SHALE (SAPROLITE). (Cont'd.)		No indication of water on drilling rods or sampler to 47.3'.	CL
	SS-24	0.2	50/1	Trace calcite appears to be 1 to 5 mm fracture infilling. Sample is pulverized.		SS-24 Strong reaction with HCl.	
47	NS			Change at 47.3'.			
48	C-1	1.5' 32%	0%	Olive gray to dark olive gray (5Y 4/2 - 3/2) and gray dark gray (5Y 5/1 - 4/1) SHALE and LIMESTONE. Limestone beds appear silty in places and may classify as a calcareous siltstone. Thinly bedded, sample is very broken (40° bedding angle). Trace white calcite veins (up to 5 mm). Trace black and brownish yellow iron/manganese oxide precipitate along bedding breaks and possible fractures. Gray-grayish beds are limestone. Olive colored beds are generally shale. Highly weathered. Moderate to very strong strength. Most of the lost recovery is expected to be within shale beds that have low field strength. C-1 recovery, bottom piece has reddish brown interbeds (<0.05'). Beds appear deformed with slight displacement along healed fractures (white calcite in-fill). Bottom of recovery has a fracture face that is perpendicular to bedding.		1128, 2/8/18, Auger refusal at 47.3'. 1308 Borehole measured dry at 46.2'. Set up to core. Set temporary 4 1/2" steel flush threaded casing, HQ3 core, water circulation. 1425 Start washing core bit to depth. C-1 47.3' - 52.0' 1450-1536. Cannot position C-1 core loss, sample is too broken. No reaction with HCl within shale, strong reaction with calcite fracture infilling and within limestone beds.	
52	C-2	2.8' 100%	0%	Below 52.0' higher percentage of shale, mostly shale. Limestone beds generally have calcite veins or healed fractures. Continues to be highly weathered. Predominate olive gray to dark olive color. Trace thin limestone interbeds below 54.1'.		C-2 Run, fractured throughout, faces are coated with iron and/or manganese oxide. C-2 52.0' - 54.8' 1555-1655. C-3 54.8' - 55.8' 1710-1730. End 2/8/18, 1730 at 55.8'. Water level at 10.1', 1745 most if not all drilling water was recirculated during drilling.	
55	C-3	1.0' 100%	0%				
56	C-4	1.1' 92%	0%	Below 55.8 slight increase in brown color. Some dark olive gray to olive gray (5Y 4/2 - 3/2). Primarily shale or mudstone composition. Bedding angle is approximately 40°. Continues to be thinly bedded with limestone partings and thin seams (<0.05'). Moderate field strength. Limestone layers are strong to very strong. Moderately decomposed/weathered.		Begin 2/9/18 0830, driller changing out bit style, HQ3 still. Start coring at 0955. 0840, WL: 16.82 from GS. No reaction with HCl. Continues to be highly fractured with iron oxide precipitates on fracture faces. Breaks along bedding planes and angular fractures. Intensely to moderately fractured. Sample is generally very broken and fracture orientation and fracture traces are hard to follow.	
57	C-5	2.7' 54%	0%	Below 57.4' Trace to few dark greenish gray to very dark greenish gray (5GY 4/1 - 3/1) layers. Becoming less weathered. Stronger olive color associated with weathered areas. Core is very broken from 58.0' - 59.7'. Lost core probably from bottom of run. Below 58.4' limestone interbeds are deformed (soft sediment) irregular surfaces and thickness, generally less than 0.1' thick. Near 59.7', trace pink calcite, up to 5mm thick, appears to be fracture infilling.			
62	C-6	4.5' 90%	0%	Below 62.4' predominately dark gray to very dark gray (N 4/ - 3/) with trace olive gray/dark olive gray (5Y 4/2 - 3/2) zones associated with weathered areas. Trace gray (5Y 6/1 - 5/1) partings/thin limestone seams. Continues to be intensely fractured. 64.6' - 64.8', 65.2' - 65.4', 65.6' - 65.8' bedding plane fractures/breaks with iron oxide and trace calcite. 65.6' - 65.8' Fracture is polished (slickenside). 65.9' - 66.5' Recovery is very broken, some angular pieces with slickenside surfaces.		C-6 Run, bedding angle varies between 45° to 50° limestone seams are typically deformed and have wavy surfaces/contacts. 62.9' - 63.4' Oxidized bedding break, 3/4" olive gray weathering have faces coated with iron oxide. 63.6' - 64.0' Bedding break, calcite coating on face, no oxidation . Possible indication of saturation. Broken oxidized fractures above and below.	
67	C-7	2.3' 46%	0%	Below 67.0' primarily limestone and siltstone recovery. Few shale seams. Lost recovery (C-7 run) may be mostly shale. Highly broken interval, intensely fractured/broken. Fracture/bedding break faces are all oxidized with mostly iron oxide coatings; trace black manganese oxide. Mostly olive gray to dark olive gray (5Y 4/2 - 3/2). Some dark gray to very dark gray areas.		C-4 55.8' - 57.0' 0955-1010. C-5 57.0' - 62.0' 1018-1124. C-6 62.0' - 67.0' 1133-1220. C-7 67.0' - 72.0' 1429-1541.	

BOREHOLE LOG V.2 OAK RIDGE .GPJ CONTAINER CRAFT TEMPLATE WITH PID.GDT 4/4/18

Eagon & Associates, Inc.

EMDF Characterization Project Oak Ridge, TN	**BOREHOLE LOG**	Boring Number GW-982

Remarks:

Depth (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
71	C-7	2.3' 46%	0%	Interbedded olive gray to dark olive gray (5Y 4/2 - 3/2), dark gray to very dark gray (N 4/ - 3/) SHALE and LIMESTONE. (Cont'd.) Trace to few limestone seams (<0.2' thick). 72.7' - 73.1', 0.15' Thick silty limestone seam. Strong reaction with HCl.		Lost recovery in C-7 run is assumed to be shale. Bedding angle is between 45° - 50°.	
72	C-8	1.2' 100%	0%	Highly fractured and broken. Generally has associated iron oxide coatings. Trace calcite precipitates. Change at 73.3'.		Most of C-8 recovery is shale. C-8 72.0' - 73.2' 1555-1621. 73.3' - 73.5; fracture oriented perpendicular to bedding. Face appears oxidized.	
73							
74	C-9	3.8' 100%	16%	Dusky red (5R 3/3) OOLITIC LIMESTONE. Trace to few glauconite nodules (~1mm). Red color possibly associated with hematite. Massive. Field strength is strong, competent. Trace white calcite healed fractures. Fresh to slightly weathered. Change at 74.0'. Very dark gray to black (N 3/ - 2 1/2/) SHALE. Thinly bedded, ~45° - 50° angle. Trace gray ~1mm siltstone partings. Fresh. Intensely fractured or broken, mostly along bedding planes (some may be mechanical). Unweathered/no oxidation. Below 77.0' bedding angle is between 55° - 60°. Moderately to intensely fractured.		End 2/9/18, 0710 at 77.0' WL at 1724 = 23.72' from ground. C-9 73.2' - 77.0' 1633-1710. 2/10/18, 0805, WL = 63.0'. Begin 2/10/18, 0830, 45°F, overcast, tract light rain. Continue HQ core, using core barrel liner. C-10 77.0' - 79.9' 0833-0920. Broken zones are identified fractures in C-10 interval appear to be mechanical, probably associated with wedging and difficulty with sample. Feeding, typically core wear indicates core was turning. Bottom of C-10 recovery mechanically fractured (broken), bit plugged at end of run. End 2/10/18, 1004, rain, at 80.2'. Begin 2/12/18, 0920 continue C-11 run. 0907 WL = 35.05' from GS. 45°F, Overcast, wet. C-11 Run, lost recovery mostly from bottom of run. ~55° - 60° bedding angle At 81.4' fracture at 90° to bedding, iron oxide on face. Adjacent rock is not oxidized. 83.1' - 83.5' Broken zone, probable fracture or fractures, no oxidation. 83.3' - 83.5' 1/4" to 1/2" thick pink calcite filled fracture. 84.7' - 84.9' Set of fractures 45° to bedding angle, surfaces have slickensides. No precipitate or oxidation. C-11 79.9' - 82.0' 0920-0935. C-12 ~50° bedding angle. At 87.8' oxidized (iron oxide) bedding contact. Strong reaction with HCl. At 88.0' fracture, 45° to bedding, oxidized (iron oxide on face). Limestone reacts strong with HCl. Shale has no reaction. 92.0' - 92.3', 93.1' - 93.4', and 93.4' - 93.7' Bedding plane breaks, slickenside surface. No oxidation or precipitates. 92.85' - 92.95' ~45° fracture, slickenside surface. No oxidation or precipitates. 45° - 50° Bedding angle. C-12 82.0' - 87.0' 1044-1105. C-13 87.0' - 92.0' 1140-1159.	
75							
76							
77	C-10	2.9' 100%	35%	77.0' - 77.3' Bedding break, slickenside surface. No weathering or precipitates. 77.7' - 77.9' Bedding break surface has white noncarbonate precipitate, trace fine (<1mm) pyrite. Slickenside surface. 77.9' - 78.2' Bedding break, slightly polished surface. Trace thin (<1mm) calcite and clay (maybe from drilling) on face. No oxidation. Maybe open. 79.0' - 79.3' Set of bedding breaks, polished (slickenside) surfaces. Within interval, perpendicular fracture appears healed with white noncarbonate infilling (hairline). Change at 79.9'.			
78							
79							
80	C-11	1.5' 71%	0%	Interbedded gray to very dark gray (N5/ to N3/) SHALE and LIMESTONE. Thinly bedded, generally between 0.1' - 0.3'. Limestone and shale partings are common. Shale beds are typically darker gray and soft while limestone beds are lighter gray and hard. Bedding appears to vary between 50° to 60°. Trace healed fractures, while calcite filled, generally oriented perpendicular to bedding, hairline to 2 mm width. Unweathered to slightly weathered (fresh). Mostly shale, 20 - 30% limestone.			
81							
82							
83							
84	C-12	4.2' 84%	38%	Below 82.0' primarily shale, trace lighter (gray) limestone or siltstone partings (<1/4"). 85.0' - 85.9' Bluish gray to dark bluish gray (5PB 5/1 to 4/1) Interclastic Limestone Seam - elongated elliptical, clasts oriented parallel with bedding (long axis), up to 1" high and 1 3/4" wide. 45° - 50° bedding angle. Hard, unweathered except for lower contact which is oxidized yellowish brown. Trace fine (<1 mm) glauconite nodules.			
85							
86							
87				Below 87.8' becomes interbedded limestone and shale, thinly bedded, somewhat deformed. Trace glauconitic beds/partings. Change at 87.8'.			
88	C-13	3.2' 64%	35%	Bluish gray to dark bluish gray (5PB 5/1 - 4/1) LIMESTONE. Fine grained. Few 1 mm or less glauconite nodules. Trace stylolites, dark gray to black, jagged, trace. Thinly bedded. Fresh. Basal contact has rip up clasts, elliptical and elongated with bedding. Becoming interclastic. Change at 89.5'.			
89							
90				Interbedded very dark gray to black (N 3/ - N 2 1/2) SHALE and gray to dark gray (N 5/ - 4/) LIMESTONE. Generally thinly bedded (0.1' or less). Trace white calcite filled fractures (healed). Limestone seams are generally deformed, wavey, uneven bedding. Fresh, no oxidation. Intensely broken along bedding planes, most are mechanical. Limestone is hard to moderately hard. Shale is soft.			
91							
92	C-14	4.0' 100%	10%	92.0' - 93.7' Predominately shale, trace limestone partings. Below 93.7' trace bioturbation.			
93							
94							

BOREHOLE LOG V2 OAK RIDGE GPJ CONTAINER CRAFT TEMPLATE WITH PID.GDT 4/4/18

Eagon & Associates, Inc.

EMDF Characterization Project Oak Ridge, TN	**BOREHOLE LOG**	Boring Number GW-989

Remarks: Borehole installed for the collection of geotech samples and installation of shallow piezometer.

Depth (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
21				SHALE (SAPROLITE). (Cont'd.)			
22				Below 22.0' auger cutting returns are very moist. No free water.			
23							
24							
25							
26	NS						
27							
28							
29				Below 30.0' auger cutting returns are wet.		C-1 32.0' - 35.6' 1630-1701.	
30				Contact with underlying interbedded shale and limestone is higher than 32.0'.		C-2 35.6 - 36.7' 0930-0941.	
31						C-3 36.7' - 40.0' 0952-1050.	
32				Change at 32.0'.		C-4 40.0' - 45.0' 1108-1130.	
33	C-1	2.9' 80%	13%	Interbedded dark gray to olive gray (5Y 4/1 - 4/2) SHALE and LIMESTONE. Some of the limestone seams may actually classify as calcareous siltstone. Thinly bedded, generally <0.1' beds and partings are not uncommon. Bedding angle is 45°. Limestone seams are hard and react strongly with HCl. Microcrystalline to fine crystalline. Shale seams are soft, do not react with HCl. Moderate to highly decomposed. Intensely fractured.		Contacts between limestone and shale beds are wavey/deformed. Soft sediment deformation trace bioturbidation. Approximately 40% to 60% limestone.	
34				With depth picking up gray color hues, becoming unweathered. Below 33.3' consistent gray to very dark gray (N 5/ - N 3/) color. Fresh to slightly decomposed. Limestone seams have lighter gray color hues. Becoming unweathered/competent.		32.0' - 33.6' Most bedding breaks are oxidized with iron oxide precipitates on fracture surfaces.	
35							
36	C-2	1.1' 100%	0%			34.1' - 34.3' Broken zone, bedding break and fracture perpendicular to bedding. Oxidized with iron oxide precipitates on fracture faces. End 2-27-18, 1701 at 35.6'. 2/28/18, 0810 WL = 5.4', 49°F, Light rain. Start coring at 0930.	
37				33.5' - 34.4' Primarily limestone, trace shale partings and thin seams. Bedding contacts are deformed and bioturbated.			
38	C-3	1.5' 45%	30%	Below 35.6' oxidized zones/fractures are rare and called out where observed. Continues to be thinly bedded with common mechanical breaks at shale/limestone bedding contacts. Secondary mineralization along breaks is generally not observed.		The increase in white calcite filled fractures below 36.0' appears to correlate with the increase in the bedding angle.	
39							
40				Below 36.0' bedding angle increases to 65° - 70°. Healed fractures (white calcite filled) increase, up to 1/4" width, generally oriented perpendicular to bedding, often more prominent within limestone beds and typically dissipate or terminate within shale beds.		41.9' - 42.3' Broken zone with iron oxide along bedding planes and perpendicular fractures. Secondary calcite does not appear to be present. Zone may account for some C-4 lost recovery.	
41				By 41.0' bedding is approaching vertical. Healed (calcite filled) fractures oriented perpendicular to bedding are prominent within limestone beds. Local deformation, contorted bedding (small scale folds) are present. Below 41.5' beds may be slightly overturned.		The core bit/lifter was stuffed, indicating that the majority of lost C-4 recovery was most likely from the bottom of the run.	
42	C-4	3.2' 64%	0%			Overdrilled corehole with 4 1/4" ID HSA.	
43				Below 42.3' some limestone beds are almost brecciated. At a minimum, highly deformed.			
44				Below 42.8' considerable white calcite filled fractures, highly deformed.			

BOREHOLE LOG V2 OAK RIDGE.GPJ CONTAINER CR4FT TEMPLATE WITH PID.GDT 4/4/18

Eagon & Associates, Inc.

EMDF Characterization Project Oak Ridge, TN	**BOREHOLE LOG**	Boring Number GW-988

Remarks:

Depth (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
46	C-6	2.0' 100%	27.5%	Medium gray to medium dark gray (N5 - N4) to dark gray to grayish black (N3 - N2) INTERBEDDED LIMESTONE and SHALE. (Cont'd.) 46.2' Horizontal fracture (~1 inch thick) healed with calcite.		C-6: 44.6' - 46.6', 1559-1610. 44.6' - 46.6' Multiple hairline fractures healed with calcite.	
47	C-7	3.0' 85.7%	12.9%	Shale beds becoming dominant with depth. Contacts between shale and limestone are deformed, have a wavy appearance.		47.3' Fracture perpendicular to bedding plan healed with calcite. C-7: 46.6' - 50.1', 1620-1642. Driller noted no loss of water/circulation while drilling.	
50	C-8	1.5' 100%	0%	Below 50.0' shale and limestone content is approximately 50%. Rock is fresh, moderately to very intensely fractured. Fractures along bedding planes (45°) are mechanically induced. Multiple thin horizontal and vertical fractures that are healed with calcite. Shale has abundant slickensided surfaces along bedding planes.		C-8: 50.1' - 51.6', 1650-1710. 2/8/18 @ 1719 WL = 19.45 BGS. 2/9/18 @ 0835 DTW - 15.58 BGS.	
52	C-9	4.0' 80%	36.4%	52.8' Fracture along bedding plane healed with calcite. 53.2' - 53.4' Multiple hairline fractures perpendicular to bedding planes completely healed with calcite. Trace pyrite nodules and stringers within shale. 54.6' Fracture perpendicular to bedding plane healed with calcite. 56.8' - 57.1' Shale and limestone are deformed with turbidation, approaching a brecciated appearance.		C-9: 51.6' - 56.6', 0933-1012.	
57	C-10	5.0' 100%	17.2%	Below 57.0' bedding varies between 45° and 60°. 59.0' - 59.1' Fracture perpendicular to bedding plane healed with calcite. 61.2' - 61.5' Hairline fractures perpendicular to bedding plane healed with calcite. 61.7' - 61.8' Fracture perpendicular to bedding plane healed with calcite.		C-10: 56.6' - 61.6', 1029-1055.	
62	C-11	3.8' 76%	0%	From 62.2' - 62.3' fine glauconite nodules oriented along bedding plane. Only found in layers of limestone. 63.6' - 63.8' Fine glauconite nodules oriented along bedding planes only within limestone. Pyrite nodules associated near glauconite grains/nodules. 63.9' - 64.1' Fracture perpendicular to bedding plane healed with calcite. 64.4' - 64.7' Fracture perpendicular to bedding plane healed with calcite. Below 65.0' limestone beds are up to 3" thick. Slickensides present perpendicular to bedding plane in shale. Shale beds becoming dominant.		C-11: 61.6' - 66.6'. 1108-1150. Driller noted pressure fluctuations while drilling. No loss of water/circulation during drilling.	
67	C-12	2.3' 92%	14.8%	66.6' - 67.0' Multiple fractures along bedding plane healed with calcite. 67.2' - 67.4' 1/4" thick fracture healed with calcite. Calcite is mostly white, some pink/orange in color. 68.2' - 68.5' Multiple horizontal and vertical hairline fractures filled with calcite.		C-12: 66.6' - 69.1', 1358-1417. Driller noted rock feeding poorly. Pulled run.	
69	C-13	1.5' 100%	0%				

BOREHOLE LOG V2. OAK RIDGE .GPJ CONTAINER CRAFT TEMPLATE WITH PID.GDT 4/4/18

Eagon & Associates, Inc.

EMDF Characterization Project Oak Ridge, TN	**BOREHOLE LOG**	Boring Number GW-988

Remarks:

Depth (feet)	Sample Method	Sample Recovery (feet or %)	Blows/6 in or RQD	SAMPLE DESCRIPTION	Graphic Log	Remarks	USCS
71	C-13	1.5' 100%	0%	At 69.7' bedding turns near vertical with a fracture going from 69.9' to 72.3'. Fracture is healed with mudstone and calcite. Some limestone and shale rip-up clasts present within the mudstone. Highly deformed along bedding planes with some small-scale folds observed. Abundant horizontal fractures healed with calcite. Most breaks were probably mechanically induced. From 71.8' - 72.3' very intensely fractured zone. Healed with mudstone. Some healed with calcite. Below 72.3' bedding turns back to 40° to 50°.		C-13: 69.1' - 70.6', 1428-1444. C-14: 70.6' - 71.6', 1454-1504. C-15: 71.6' - 73.6', 1513-1531. Driller noted approximately 5% water loss in circulation. C-16: 73.6' - 75.0', 1542 - 1552. 2/9/18 at 1600 DTW = 6.79 BGS. 2/10/18 @ 0755, DTW = 4.88'.	
72	C-14	1.0' 100%	0%				
73	C-15	2.0' 100%	0%				
74	C-16	1.3' 92.9%	0%				
75							
76	NS						
77							
78							
79				Bottom of Borehole = 78.5'. Piezometer GW-988 installed in borehole. See Monitoring Well Installation Report GW-988 for details.		On 2/22/18 used T3W rotary rig to ream corehole and advance borehole to 78.5' using 5 7/8" tricone bit with air and water circulation. Finished drilling at 1120.	
80							
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BOREHOLE LOG V2 OAK RIDGE .GPJ CONTAINER CRAFT TEMPLATE WITH PID.GDT 4/4/18

Part 3 – Comments primarily related to the Water Quality Protection of Bear Creek fact sheet concerning discharge limits for radionuclides including values and how they are calculated referenced on page 1 of the fact sheet

On November 4, 2021, several former TDEC employees sent a letter concerning the Environmental Management Disposal Facility (EMDF) to EPA Administrator Michael S. Regan. The December 29, 2021, response from Acting Assistant Administrator Barry N. Breen stated the EPA, DOE, and TDEC will solicit and consider public comments on new information before EPA and DOE finalize the ROD. This letter encouraged us to review the new information that will be added to the Administrative Record file as well as provided to the public on a dedicated website. The website includes the following new information:

EMDF Site Groundwater Characterization fact sheet
EMDF Waste Acceptance Criteria fact sheet
EMDF Water Quality Protection for Bear Creek fact sheet
Draft Record of Decision – July 2021
Draft 1 ROD Responsiveness Summary
Technical Memo #1: Phase 1 Field Sampling Results (July 2, 2018)
Technical Memo #2: Phase 1 Monitoring (May 23, 2019)
Development of Fish Tissue and Surface Water Preliminary Remediation Goals (April 28, 2022) (EMDF PRG Development)
Performance Assessment for the Environmental Management Disposal Facility at the Y-12 National Security Complex, Oak Ridge, Tennessee (April 23, 2020) (EMDF Performance Assessment)
Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee (April 16, 2022)
Link to the Oak Ridge Environmental Information System (OREIS)

1) These comments on the Water Quality Protection for Bear Creek fact sheet identify a series of complexities, uncertainties, and issues associated with discharging landfill wastewater containing radionuclides from the proposed Environmental Management Disposal Facility (EMDF) to surface water. A conclusion from these comments is that failure of the Record of Decision to require effective treatment for radionuclides in landfill wastewater before discharge to surface water would show a preference for minimizing treatment cost over ensuring protection of human health.

Response: As noted in the second paragraph of the fact sheet, DOE will treat all contaminated wastewater from EMDF to ensure compliance with all regulatory limits and full protection of human health and environment.

2) EPA Administrator Andrew R. Wheeler's December 31, 2020, final dispute decision concerning the *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) and discharge of radionuclides to Bear Creek surface water is new information substantive to the Water Quality Protection for Bear Creek fact sheet and determining radionuclide discharge levels and should have been included on the dedicated website.

Response: The key points of this Dispute Decision are contained in the referenced fact sheet. Additional detailed information was also included for public review in *Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR 2022).

3) During DOE's presentation on the fact sheets at the May 17, 2022, public meeting, DOE's presenter said that they will be putting basically the same stuff in the proposed new landfill (i.e., EMDF) as the current facility (i.e., EMWMF). As was pointed out by at least one commentor, who retired from Oak Ridge

National Laboratory (ORNL), the proposed site will receive waste from ORNL which is significantly different than most of the previous disposed waste.

To clarify further, the Environmental Management Waste Management Facility (EMWMF) is not indicative of a future Environmental Management Disposal Facility (EMDF). K-25 (East Tennessee Technology Park or ETTP), Y-12, and X-10 (Oak Ridge National Lab or ORNL) have different radionuclide and Clean Water Act (CWA) pollutant waste profiles. K-25 (ETTP) has been the major focus for many years and is the source of most of the recent waste disposed in the EMWMF. Wastes from Y-12 and ORNL proposed to be disposed in a future EMDF are orders of magnitude more contaminated with CWA pollutants (e.g., Y-12 - mercury) and radionuclides than wastes from ETTP disposed in the EMWMF. Radionuclide activity concentrations in EMDF landfill wastewater are also projected to be orders of magnitude greater than radionuclide activity concentrations measured in EMWMF landfill wastewater. The EMDF Performance Assessment[i] and EMWMF/EMDF Composite Analysis[ii] show that waste disposed in EMWMF is not indicative of future waste proposed to be disposed at EMDF. DOE proposes to dispose a significantly greater inventory of radionuclides at EMDF than EMWMF.

Radionuclide Inventory Identified for Disposal in EMDF is Significantly Greater than Radiological Inventory Disposed at EMWMF			
	EMDF/EMWMF Composite Analysis Table B.1		EMDF Performance Assessment Table B.6[iii]
Isotope Name	Reported EMWMF Activity at FY 19 (Curies)	Composite Analysis Estimated Waste Inventory Activity at EMWMF Closure (Curies)	EMDF Estimated Waste Inventory Activity at closure for a subset of Radionuclides (Curies decayed to 2047)
Am-241	20.2	25.5	**152**
C-14^	2.77	3.5	**7.43**
Cm-244	-----	-----	**326**
Cs-137	-----	-----	**3040**
Eu-152	-----	-----	**74**
Eu-154	-----	-----	**16.7**
H-3^	12.1	15.3	**28.8**
I-129^	0.00115	0.00145	**1.05**
K-40	-----	-----	**8.46**
Ni-63	-----	-----	**1740**
Np-237	1.4	1.77	0.837
Pb-210	-----	-----	**9.5**
Pu-238	-----	-----	**242**
Pu-239/240	14	18	**310**
Pu-241	-----	-----	**525**
Pu-242	-----	-----	**0.445**
Ra-226	-----	-----	**2.07**
Sr-90	-----	-----	**496**
Tc-99^	170	215	7.23
Th-229	-----	-----	**14.7**
Th-230	-----	-----	**4.94**
Th-232	-----	-----	**9.07**
Th-234*	-----	-----	-----
U-232	-----	-----	**26.3**
U-233/234	433	547	**1727**
U-235/236	42	53	**125.2**
U-238	258	326	**983**

^Radionuclides that EMDF PA Table G.9 adjusts for activity loss due to leaching during the 25-year operational period.
*Th-234 should be in secular equilibrium with U-238.

Further, average leachate activity concentrations projected in the EMDF Performance Assessment at landfill closure are significantly greater than maximum leachate and contact water activity concentrations measured at EMWMF from October 2015 through June 2021.

Comparison of Maximum Measured Activity Concentration in EMWMF Leachate and Contact Water for the period of October 2015 to June 2021 with the Average Leachate Activity Concentration Projected in EMDF at Closure.			
	Maximum Activity Concentration Measured from October 2015 through June 2021 and Reported in OREIS Data		EMDF Projected Leachate Activity Concentrations at EMDF Landfill Closure
Isotope Name	EMWMF Leachate (pCi/L) Activity concentration >1 rounded to a whole number	EMWMF Contact Water (pCi/L) Activity concentration >1 rounded to a whole number	EMDF Performance Assessment Table C.5. at T=0 (pCi/L)
Am-241	0.708	0.245	29
C-14	20	22	2,450
Cm-244	Undetected at 0.473	Undetected at 0.201	6,230
4 Cs-137	5	Undetected at 5.89	787
Eu-152	14	16	1,420
Eu-154	9	6	321
H-3	10300	4,790	21,000
I-129	3	2	158
K-40	65	67	215
Ni-63	65	53	673
Np-237	Undetected at 0.207	0.685	16
Pb-210	2	0.987	73
Pu-238	Undetected at 0.457	Undetected at 0.458	4,640
Pu-239/240	Undetected at 0.235	Undetected at 0.364	5,950
Pu-241	Undetected at 47.5	Undetected at 18.6	10,100
Pu-242	Undetected at 0.476	Undetected at 0.286	9
Ra-226	1	1	0.5
Sr-90 / radioactive strontium	44 (Sr-90)	8 (radioactive strontium - total)	12,600 (Sr-90)
Tc-99	2120	28,500	2,690
Th-229	Undetected at 0.503	Undetected at 0.241	4
Th-230	2	0.586	1
Th-232	0.201	0.361	2
Th-234*	28	41	
U-232	0.455	Undetected at 0.263	404
U-233/234	2200	676	26,650
U-235/236	226	48	1,926
U-238	100	41	15,100

*Th-234 should be in secular equilibrium with U-238.

Response: Duplicate comment – same as Additional Comment 54 (this comment), Part 1 Comment #4.

All waste intended for the EMDF will be derived from CERCLA cleanup at the ORR, primarily resulting from weapons development, nuclear energy research and development, and other ORNL and Y-12 research activities. A substantial volume of cleanup waste from both ORNL and Y-12 has been safely disposed at EMWMF

While the majority of the EMWMF waste came from ETTP, the EMWMF received and will continue to receive waste from all sites listed.

Hazardous waste concentrations (including mercury) are limited by the EMDF WAC to less than RCRA hazardous levels. Mercury is additionally limited to concentrations in waste that do not require treatment.

Potential differences between EMWMF waste and EMDF waste are consistent with the assumptions in the technical analyses provided on the DOE EMDF information website, including the PA and the CA. Appendix B of the PA provides detailed justification for the use of data representing expected Y-12 and ORNL waste streams to estimate the EMDF radionuclide inventory.

The estimated leachate concentrations from PA (Table C.5) do not represent expected EMDF wastewater concentrations. Table C.5 concentrations are based on a simple solid-aqueous partition applied to average EMDF post-closure waste concentrations and are not representative of operational period wastewater concentrations. Estimated wastewater radionuclide concentrations have been developed to support wastewater treatment system design that are much lower than the values in Table C.5.

4) TDEC contracted with Neptune and Company, Inc. to evaluate the EMDF Performance Assessment (PA). Neptune's review[iv] states *uncertainty in the inventory of disposed radionuclides is likely to be one of the more significant sources of uncertainty in the PA results.* This means there is significant uncertainty in how much of what radionuclides will be disposed in the proposed EMDF.

Response: Duplicate of Additional Comment 54 (this comment), Part 1 Comment #10.

Section 2.12.2.3 of the D2 ROD addresses the process for waste acceptance including how EMDF radionuclide inventories will be tracked relative to the final inventory limits documented in the D2 ROD to ensure CERCLA protectiveness. Final WAC and WAC compliance procedures will be documented post-ROD in the EMDF WAC Compliance Plan, an FFA primary document to be submitted to EPA and TDEC for review and approval.

5) CERCLA at 42 U.S. Code § 9621(d)(1) requires that "Remedial actions selected under this section or otherwise required or agreed to by the President under this chapter shall attain a degree of cleanup of hazardous substances, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment." (Emphasis added) Plain reading of CERCLA at 42 U.S. Code § 9621(d)(1) should forbid a remedial action consisting of building a combination hazardous waste, toxic waste, and radioactive waste landfill; consolidating waste in the landfill; and then releasing or discharging landfill wastewater containing radionuclides and pollutants to surface water in a manner that does not protect human health (e.g., results in exceeding the 10^{-4} and 10^{-6} CERCLA risk range or a hazard index of 1) and does not protect the environment. The Water Quality Protection for Bear Creek fact sheet states Bear Creek joins with East Fork Poplar Creek, then flows into Poplar Creek and eventually enters the Clinch River. For EMDF, protection of human health and the environment applies to any stream reach downstream of EMDF whether it is in Bear Creek, East Fork Poplar Creek, Popular Creek, or the Clinch River. Radionuclides without fish tissue and corresponding water quality PRGs in the EMDF PRG Development[v] document would appear to be able to be discharged pursuant to DOE Orders up to Derived Concentration Standard (DCS) values. Consumption of fish were not considered in derivation of DCS values. Radiation Risk Assessment at CERCLA Sites: Q & A, Directive 9200.4-40, EPA 540-R-012-13, May 2014 specifies "[a]t CERCLA remedial sites, excess cancer risk from both radionuclides and chemical carcinogens should be summed to provide an estimate of the combined risk presented by all carcinogenic contaminants as specified in OSWER directive 9200.4-18 (U.S. EPA 1997a)." It is not demonstrated in the Water Quality Protection for Bear Creek fact sheet or the

supporting EMDF PRG Development that the combined release of carcinogenic chemical pollutants (e.g., PCBs) and radionuclides will not result in exceeding the CERCLA required risk range.

Response: The EMDF will be designed, constructed and operated to be within the CERCLA risk range, including wastewater management, treatment, and discharge. Operational and environmental monitoring will be performed to verify the EMDF remains within the CERCLA risk range.

The radioisotopes selected were developed by a working group of DOE, EPA, and TDEC staff and represent the expected radiological constituents with the agreed upon level of concern. This list may be modified in the future based on sampling results of an extended list of contaminants of concern (COCs), per agreement with the FFA parties.

Non-radiological discharge limits for the key EMDF COCs will be developed in post-ROD documents to meet the most restrictive of the applicable TDEC water quality criteria (WQC) (TDEC 0400-40-03-.03, General Water Quality Criteria, "Criteria for Water Uses") and antidegradation requirements (TDEC 0400-40-03-.06, General Water Quality Criteria, "Antidegradation Statement") in accordance with the Clean Water Act and other ARARs. The WQC are based on 10^{-5} risk, which is within the CERCLA risk range of 10^{-4} to 10^{-6}. Monitoring for discharges will be in accordance with ARARs and will be detailed in a post-ROD document (Remedial Action Work Plan) provided for EPA and TDEC review and approval, and will ensure compliance within the CERCLA risk range.

6) Radionuclides without fish tissue and corresponding water quality PRGs in the EMDF PRG Development document would appear to be able to be discharged from EMDF pursuant to DOE Orders up to Derived Concentration Standard (DCS) values. Consumption of fish were not considered in derivation of DCS values. These radionuclides are not exempt from complying with the 10-5 cancer risk level relevant and appropriate requirement and contributing to the total cancer risk compared to the CERCLA risk range.

Response: See response to Additional Comment 54 (this comment), Part 3 Comment #5.

7) EPA Administrator Wheeler's December 31, 2020, final dispute resolution designated regulations that establish water quality based effluent limitations under the Clean Water Act National Pollution Discharge Elimination System program as well as Tennessee 's NPDES regulations for establishing water quality-based effluent limitation, certain Tennessee Water Quality Standards regulations, and certain Nuclear Regulatory Commission regulations for low-level radioactive waste disposal as relevant and appropriate requirements for discharge of radionuclides from CERCLA landfills at the Oak Ridge Reservation. Several relevant and appropriate requirements include:

a) **TDEC Rule 0400-40-05-.08(1) EFFLUENT LIMITATIONS AND STANDARDS**

(g) *All pollutants shall receive treatment or corrective action … to insure compliance with any approved water quality standard, …*

(k) All permit effluent limitations, standards, and prohibitions shall be established for each outfall or discharge point of the permitted facility, except as otherwise provided for BMPs where limitations on effluent or internal waste streams are infeasible.

(m) For continuous discharges, all permit effluent limitations, standards, and prohibitions shall be expressed as maximum daily, weekly average (for POTWs only) and monthly average, unless impracticable.

(n) Non-continuous discharges shall be limited in terms of frequency, total mass, maximum rate of discharge, and mass or concentrations of specified pollutants, as appropriate.

(q) When permit effluent limitations or standards imposed at the point of discharge are impractical or infeasible, effluent limitations or standards for discharges of pollutants may be imposed on internal waste streams before mixing with other waste streams or cooling water streams. In those instances, the monitoring required shall also be applied to the internal waste streams. Limits on internal waste streams will be imposed only when the rationale sets forth the exceptional circumstances which make such limitations necessary, such as when the final discharge point is inaccessible (for example, under water), the wastes at the point of discharge are so diluted as to make monitoring impracticable, or the interferences among pollutants at the point of discharge would make detection or analysis impracticable.

(r) Instantaneous maximum concentration or similar limitations may be imposed in permits when: 1. Toxic or harmful parameters are present in such significant amounts or concentrations as to represent a threat to the possibility of maintaining receiving waters in accordance with established classifications; and 2 The discharge is characterized as irregular, such as high peak, short duration flow.

(s) *Any discharge or activity authorized by a permit which is not a minor discharge or activity, or the regional administrator requests, in writing, be monitored, or contains a toxic pollutant for which an effluent standard has been established shall be monitored by the permittee for the following: 1. Flow (in million gallons per day); and 2. Any of the following pollutants: (i) Pollutants (either directly or indirectly through the use of accepted correlation coefficients or equivalent measurements determined to be applicable to the discharge to which they are applied) which are subject to reduction or elimination under the terms and conditions of the permit; (ii) Pollutants which the commissioner finds, on the basis of information available, could have a significant impact on the quality of waters; (iii) Pollutants specified by the administrator, in regulations issued pursuant to the Federal Water Pollution Control Act, as subject to monitoring; and (iv) Any pollutants, in addition to those identified in subparts (i) through (iii) of this part, which the regional administrator or the Commissioner request be monitored*

b) **TDEC Rule 0400-40-05-.10 WATER QUALITY-BASED PERMITTING** (1) *Effluent limitations on toxic substances will be required in accordance with the General Water Quality Criteria, Chapter 0400-40-03, using the LC50 and/or IC25 criteria and appropriate application factor for each toxic parameter*

c) **TDEC Rulee 0400-40-10-.03(3) Text of Cited Federal Regulations 40 CFR § 122.45 Calculating NPDES permit conditions (applicable to State NPDES programs, see § 123.25)**

(a) Outfalls and discharge points. All permit effluent limitations, standards and prohibitions shall be established for each outfall or discharge point of the permitted facility, except as otherwise provided under § 122.44(k) (BMPs where limitations are infeasible) and paragraph (i) of this section (limitations on internal waste streams).

(d) Continuous discharges. For continuous discharges all permit effluent limitations, standards, and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated as:

(1) Maximum daily and average monthly discharge limitations for all dischargers other than publicly owned treatment works;

(e) Non-continuous discharges. Discharges which are not continuous, as defined in § 122.2, shall be particularly described and limited, considering the following factors, as appropriate:

(1)Frequency (for example, a batch discharge shall not occur more than once every 3 weeks);

(2) Total mass (for example, not to exceed 100 kilograms of zinc and 200 kilograms of chromium per batch discharge);

(3) Maximum rate of discharge of pollutants during the discharge (for example, not to exceed 2 kilograms of zinc per minute); and

(4) Prohibition or limitation of specified pollutants by mass, concentration, or other appropriate measure (for example, shall not contain at any time more than 0.1 mg/L zinc or more than 250 grams (¼ kilogram) of zinc in any discharge).

(f) Mass limitations.

(1) All pollutants limited in permits shall have limitations, standards or prohibitions expressed in terms of mass except:

(i) For pH, temperature, radiation, or other pollutants which cannot appropriately be expressed by mass;

(ii) When applicable standards and limitations are expressed in terms of other units of measurement; or

(iii) If in establishing permit limitations on a case-by-case basis under § 125.3, limitations expressed in terms of mass are infeasible because the mass of the pollutant discharged cannot be related to a measure of operation (for example, discharges of TSS from certain mining operations), and permit conditions ensure that dilution will not be used as a substitute for treatment.

(2) Pollutants limited in terms of mass additionally may be limited in terms of other units of measurement, and the permit shall require the permittee to comply with both limitations.

(h) Internal waste streams

(1) When permit effluent limitations or standards imposed at the point of discharge are impractical or infeasible, effluent limitations or standards for discharges of pollutants may be imposed on internal waste streams before mixing with other waste streams or cooling water streams. In those instances, the monitoring required by § 122.44(i) shall also be applied to the internal waste streams.

(2) Limits on internal waste streams will be imposed only when the fact sheet under § 124.56 sets forth the exceptional circumstances which make such limitations necessary, such as when the final discharge point is inaccessible (for example, under 10 meters of water), the wastes at the point of discharge are so diluted as to make monitoring impracticable, or the interferences among pollutants at the point of discharge would make detection or analysis impracticable.

d) **TDEC Rule 0400-40-03-.03(4)(j)** Recreation use paragraph (4)(j) water quality standards are based on 10^{-5} excess lifetime cancer risk for individual contaminants (or groups of contaminants, e.g., Total PCBs)

e) **TDEC Rule 0400-40-03-.05(4)** specifies discharge requirements in permits for discharge to surface water designated as recreational use are based on 30-day minimum five-year recurrence interval stream flow. (This may be estimated by USGS StreamStats.)

f) **TDEC Rule 0400-40-03-.05(6)** All discharges of sewage, industrial waste, and other waste shall receive the degree of treatment or effluent reduction necessary to comply with water quality standards.

g) **TDEC Rule 400-40-03-.03(4)(l)** Fish Consumption Advisories - A public fishing advisory will be considered when the calculated risk of additional cancers exceeds 10-4 for typical consumers or 10-5 for atypical consumers

h) **TDEC Rule 0400-40-03-.05(2)** … Mixing zones shall not apply to the discharge of bioaccumulative pollutants to waters of the state where the risk-based factors in Rule 0400-40-03-.03(4)(l) are exceeded for the pollutant group.

i) **Rule 0400-40-03-.03 (3) The criteria for the use of Fish and Aquatic Life**

(d) Turbidity, Total Suspended Solids, or Color - There shall be no turbidity, total suspended solids, or color in such amounts or of such character that will materially affect fish and aquatic life. In wadeable streams, suspended solid levels over time should not be substantially different than conditions found in reference streams.

(g) Toxic Substances - The waters shall not contain substances or a combination of substances including disease - causing agents which, by way of either direct exposure or indirect exposure through food chains, may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), physical deformations, or restrict or impair growth in fish or aquatic life or their offspring.

(m) Biological Integrity - The waters shall not be modified through the addition of pollutants or through physical alteration to the extent that the diversity and/or productivity of aquatic biota within the receiving waters are substantially decreased or, in the case of wadeable streams, substantially different from conditions in reference streams in the same ecoregion. The parameters associated with this criterion are the aquatic biota measured. These are response variables.

j) **Rule 0400-40-05-.10 WATER QUALITY-BASED PERMITTING**.

(1) Effluent limitations on toxic substances will be required in accordance with the General Water Quality Criteria, Chapter 0400-40-03, using the LC50 and/or IC25 criteria and appropriate application factor for each toxic parameter.

(2) Appropriate limitations on organic related and other oxygen demanding parameters will be required in any permit to insure adequate dissolved oxygen in the state's waters in accordance with the General Water Quality Criteria, Chapter 0400-40-03.

(3) When a treatment process greater than BAT or conventional unit treatment processes is required by application of these rules, a set of effluent limitations will be required in any permit which will completely describe expected results of such treatment process.

(4) Effluent limitations may be required in any permits to insure compliance with the Antidegradation Statement, Rule 0400-40-03-.06.

k) **EPA Administrator Wheeler's December 31, 2020, final dispute decision** requires apportioning dose to various sources under NRC regulations and using ALARA to ensure that application of a NRC regulation also achieves a risk level no less stringent than 10^{-5} (Final Dispute Decision Pages 2 and 7 with reference to footnote 20.)

Response: No response is required to this listing of regulations and excerpts from the Dispute Decision Letter.

8) The Water Quality Protection for Bear Creek fact sheet specifies the goal is to establish discharge levels safe for recreational use. That is an important exposure pathway for this site. However, CERCLA requires protection of both human health and the environment. The Record of Decision should also ensure protection of the environment as demonstrated through effluent toxicity testing, biological integrity monitoring, and other appropriate measures.

Response: Additional monitoring requirements will be developed as part of the Remedial Action Work Plan/Sampling and Analysis Plan for the EMDF. As required by Section 121 of CERCLA, 5-year reviews will be performed to ensure continued protection of the environment.

9) Once the Record of Decision includes activity concentrations for radionuclides in fish that relate to 10-5 cancer risk for Bear Creek, it is likely those activity concentrations will also be applied to East Fork Poplar Creek, Poplar Creek, and Clinch River. The quantity of fish consumed from Bear Creek should be significantly lower than the quantify of fish consumed from East Fork Poplar Creek, Poplar Creek, and the Clinch River meaning using Bear Creek fish ingestion rates for these downstream streams likely underestimates how much fish is consumed and the associated cancer risk. EMDF PRG Development[vi] references a non-promulgated TDEC instream value as justification to reduce the fish ingestion rate value from 155.9 grams per day to 17.5 grams per day in Table A.2. Joanna Burger & Kym Rouse Campbell (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 includes an evaluation of people fishing and consuming fish caught in the Clinch River and in Poplar Creek in the area of the confluence of East Fork Poplar Creek down to the Clinch River. Pollution and radionuclides discharged into Bear Creek should move downstream with surface water into East Fork Poplar Creek, Poplar Creek, and the Clinch River. **The 17.5 gram/day fish consumption rate is less than the mean (37 +/- 6 grams/day) identified in Joanna Burger & Kym Rouse Campbell (2008) for people who consume fish caught in the Clinch River and Poplar Creek and therefore does not represent a reasonable maximum exposure for these downstream water bodies. The evaluation of consumption of fish under CERCLA in lower East Fork Poplar Creek, Poplar Creek, and the Clinch should at least be based on the upper end of the mean developed by the site-specific study (e.g., 42 grams of fish per day) or, even better, the default CERCLA reasonable maximum exposure of 54 grams of fish per day.**

Response: As per the EPA Administrator's Dispute Decision Letter (December 2020), "the individual with the potential maximum exposure to radionuclides in effluent from ORR landfills would be a recreational fisherman who fishes from Bear Creek, if the fish are contaminated by radionuclides." The fish consumption rate used to develop the surface water and fish PRGs/cleanup levels is based on the applicable Tennessee ARAR and is consistent with the fish consumption rate used for recreational exposure in the current Tennessee WQC. This site-specific approach is consistent with the EPA Administrator's Dispute Decision Letter (December 2020) and was determined to be protective.

10) EPA Administrator Wheeler's December 31, 2020, final dispute decision requires that *"Cleanup levels for discharges of carcinogens from a NPL site also cannot be less stringent than the CERCLA risk range."* This did not say cleanup levels from a remedial action, it says cleanup levels from a NPL site. That means the cumulative[vii] of all carcinogenic chemical (e.g., PCBs) and radionuclide cleanup levels for discharges from the NPL site shall be apportioned so that the resulting cancer risk is not less stringent than the CERCLA risk range[viii]. With the number of radionuclides present, this likely results in the need to reduce discharge limits for individual radionuclides to levels less than the 10-5 cancer risk level.

Response: See response to Additional Comment 54 (this comment), Part 3 Comment #5.

11) In addition to the recreational fishing pathway, incidental ingestion of uranium as a metal by young children playing in Bear Creek should be included in the *Water Quality Protection for Bear Creek fact sheet* and EMDF PRG Development as an additional exposure pathway.

a) Radiation Risk Assessment At CERCLA Sites: Q & A, Directive 9200.4-40 EPA 540-R-012-13, May 2014 states: *Uranium, in soluble form, is a kidney toxin at mass concentrations slightly above background levels. It is the only radionuclide for which the chemical toxicity has been identified to be comparable to or greater than the radiotoxicity and for which an oral reference dose (RfD) has been established to evaluate chemical toxicity. To properly evaluate human health risks, both effects (radiogenic cancer risk and chemical toxicity) should be considered for radioisotopes of uranium.*

b) Using uranium activity for in stream surface water in EMDF PRG Development Table 1, a total uranium concentration of about 836 ug/L may be calculated.

Radionuclide	EMDF PRG Development Table 1 Proposed Surface Water instream PRG in pCi/L	PRG in ug/L Calculated with www.radprocalculator.com/Grams.aspx
U-233/U-234 (Calculated as U-234)	317	5.11E-8 grams/liter 0.051 ug/L
U-235/U-236 (Calculated as U-235)	455	0.000211 grams/liter 211 ug/L
U-238	210	0.000625 grams/liter 625 ug/L
Total Uranium	-------	836 ug/L

c) TN H2O[ix] TENNESSEE'S ROADMAP TO SECURING THE FUTURE OF OUR WATER RESOURCES includes *"Tennessee's climate is changing …. Average annual rainfall is increasing, and a rising percentage of that rain is falling on the four wettest days of the year …. The data clearly indicate an increasing trend in precipitation across Tennessee. This trend is expressed by more frequent heavy rainfall, and greater annual precipitation amounts, contrasted with dry spells that are more likely to be more severe because very hot days will be more frequent - even though annual precipitation is increasing."*

d) With more frequent very hot days, it is possible that families with young children (i.e., children age less than 6 years) will utilize Bear Creek (e.g., at the greenway) as an area to cool down. At a total uranium concentration of 836 ug/L in Bear Creek surface water, young children playing in surface water for only 11 to 36 hours per year approximates a non-carcinogenic hazard quotient of 1. Hazard quotients were calculated using default values (e.g., child incidental ingestion rate) in https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. With increasing temperature associated with climate change, exposure to children playing in the Bear creek to cool down should be evaluated as an exposure pathway.

Response:

a) Per previous agreement between the FFA parties, uranium toxicity will be included as a chemical COC as part of the non-radiological AWQC and AWQC-like limits. These will be described in the post-ROD decision documents such as the Remedial Action Work Plan for Operations following approval by the FFA parties.

b) No response required.

c) No response required.

d) The uranium concentrations in EMDF discharge will be limited by instream PRGs/cleanup levels for the uranium isotopes, and are further limited by treatment of all landfill wastewater

prior to discharge, as stated in the *Water Quality Protection for Bear Creek* fact sheet. These PRGs/cleanup levels assume full access to Bear Creek and account for both child and adult exposure. The details are provided in *Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR 2022).

While not related to the EMDF, other sources of uranium to Bear Creek are being addressed by other Decision Documents. In addition, while not relied upon to ensure protection to the public, the public is restricted from entering the Bear Creek Valley area at Highway 95 and to the east, as it serves as a buffer area to Y-12 (No Trespassing is posted at Bear Creek Road and the road is patrolled by DOE security forces on a regular, daily basis).

12) I support the fish sampling program included in the Water Quality Protection for Bear Creek fact sheet coupled with timely public notification of results and contingencies to control exposure and to attain a degree of control of further release[x] at a minimum which assures protection of human health and the environment. Initiating a fish sampling program in Bear Creek for radionuclides was a positive outcome of EPA Administrator Andrew R. Wheeler's December 31, 2020, final dispute decision on the Focus Feasibility Study for Water Management. The Water Quality protection for Bear Creek fact sheet includes, *"Though not expected, if future monitoring identifies fish tissue levels approaching protective limits, DOE will implement additional protective measures."* Given the levels of radionuclides in waste projected for disposal (EMDF Performance Assessment Table B.5.), the levels of radionuclides projected to be in EMDF landfill wastewater at closure in FY2047 (EMDF Performance Assessment Table C.5), and the described wastewater treatment with chemical flocculation/precipitation and sediment removal, I don't understand why either exceeding the 10-5 excess lifetime cancer risk for individual radionuclides or the CERCLA risk range for the cumulative of carcinogenic chemicals and radionuclides is not expected. The question should not be if these levels are exceeded, but when will these levels be exceeded? Of course, radionuclides not sampled for will be missed and not included in the evaluation of compliance with the 10-5 cancer risk recreational use relevant and appropriate requirement or evaluation of the CERCLA cumulative risk. It is suggested that there be comprehensive sampling of radionuclides in landfill wastewater and that the fish sampling program be updated at least annually to include additional radionuclides identified in landfill wastewater. Unfortunately, this process is like closing the barn door after the horse has already left the barn. Many radionuclides have half-lives sufficient that when the radionuclides have accumulated in fish, it will take many years for the radionuclides to either decay to levels that are protective of human health or to not be available in the food web.

Table B.5. Arithmetic average activity concentrations for EMDF waste streams

	EMDF waste stream average activity concentration (pCi/g)					
Radioisotope	ORNL D&D	ORNL RA	Y-12 D&D Alpha-4 and Alpha-5	Y-12 D&D Biology	Y-12 D&D Remaining Facilities	Y-12 RA
Ac-227	3.88E-02					
Am-241	2.10E+02	6.14E+02	1.61E-02	1.82E-01	5.96E-02	6.86E-01
Am-243	2.73E+00	3.95E+01				
C-14	8.53E+00	2.55E+01		4.18E+01		
Cf-249	1.44E-05					
Cf-250	9.82E-05					
Cf-251	2.79E-06					
Cf-252	1.74E-06					
Cm-243	5.18E+00	5.65E-01				
Cm-244	1.67E+03	1.40E+01	3.93E-03			
Cm-245	5.08E-01					
Cm-246	2.11E+00					
Cm-247	1.38E-01					
Cm-248	7.43E-03					
Co-60	2.18E-01	4.38E-02	6.47E-03			7.98E-04
Cs-134	2.79E-08	1.21E-07				
Cs-137	2.11E+03	1.46E+04	1.99E-01	1.32E-01	4.68E-02	5.40E+00
Eu-152	3.73E+02	8.08E+00				
Eu-154	8.49E+01	1.39E+00				
Eu-155	8.87E-02	7.95E-04				
Fe-55		1.28E-05				
H-3	1.30E+02	1.97E+01		2.23E+00		
I-129	4.92E+00	5.18E-01				
K-40	5.53E+00	1.90E+01		2.23E+01		6.33E+00
Mo-100	5.58E-05					
Na-22	1.08E-05	1.45E-07				
Nb-94	2.16E-01					
Ni-59	4.04E+01					
Ni-63	6.02E+02	8.97E+03		1.72E+00		
Np-237	4.59E-01	2.81E+00	4.90E-02	2.15E-01		4.32E-01
Pa-231	3.17E+00					
Pb-210	4.68E+01	2.26E+00				
Pm-146	1.17E-03					
Pm-147	2.83E-03	9.38E-05				
Pu-238	7.37E+02	5.46E+02	1.84E-01		3.95E-01	8.77E-03
Pu-239	2.37E+02	5.76E+02			7.62E-02	5.93E-01
Pu-240	3.51E+02	5.08E+02	6.77E-02	1.80E-01		
Pu-241	6.87E+01	2.83E+03				
Pu-242	1.83E-01	2.27E+00				
Pu-244	4.89E-02					
Ra-226	2.92E+00	3.92E+00		9.97E-01		1.45E+00

Table B.5. Arithmetic average activity concentrations for EMDF waste streams (cont.)

	EMDF waste stream average activity concentration (pCi/g)					
Radioisotope	ORNL D&D	ORNL RA	Y-12 D&D Alpha-4 and Alpha-5	Y-12 D&D Biology	Y-12 D&D Remaining Facilities	Y-12 RA
Ra-228	6.54E-03	1.39E-02			1.71E-01	2.68E-03
Re-187	2.27E-05					
Sb-125	4.02E-07					
Sr-90	2.16E+03	4.15E+02		1.75E+00	1.66E-01	
Tc-99	1.32E+01	3.94E+00	1.08E+00	4.06E+01	7.78E-01	4.61E+00
Th-228	1.16E-06	1.88E-09	5.93E-07	1.27E-05	1.58E-05	
Th-229	1.73E+00	7.96E+01			4.71E-02	
Th-230	1.70E+00	2.11E+01	4.32E-01		7.85E-02	1.37E+00
Th-232	1.19E+00	9.36E+00	3.74E-01	7.96E-01	6.54E-01	1.31E+01
U-232	8.34E-01	1.45E+02				
U-233	2.65E+02	2.92E+02		9.65E+01	1.10E+00	
U-234	1.11E+01	1.51E+02	9.10E+00	8.33E+01	5.23E+03	1.56E+01
U-235	4.20E-01	2.34E+00	7.47E-01	7.18E+00	3.16E+02	1.11E+01
U-236	2.65E-01	1.08E+00	3.80E-01	4.23E+00	7.47E+01	2.26E-01
U-238	6.79E+00	2.92E+01	3.43E+01	3.40E+02	2.91E+03	1.51E+02

D&D = deactivation and decommissioning
EMDF = Environmental Management Disposal Facility
ORNL = Oak Ridge National Laboratory
RA = remedial action
Y-12 = Y-12 National Security Complex

Response: As noted in the responses to Additional Comment 54 (this comment), Part 3 Comments #3 and #4, the estimates of inventory used in the PA are high.

As noted in the response to Additional Comment 54 (this comment), Part 3 Comment #5, the EMDF will be designed, constructed and operated to be within the CERCLA risk range. Monitoring will be performed to verify this approach as described in the response to Additional Comment 54 (this comment), Part 3 Comment #8.

13) The fish sampling program and risk calculations assume people only cook and eat fish fillets. I don't know if this protects people who cook whole fish or eat other portions of fish.

Response: Cancer risk estimates were calculated for consumption of whole-body fish at the Bear Creek and Brushy Fork (background) points of exposure (POE). The cancer risk estimate at the Bear Creek POE was 3E-05 and at Brushy Fork was 1E-04. Therefore, the risk from consumption of whole fish (minus the entrails, fins, and scales) is less than background, within EPA's Risk Management Range, and is considered protective.

14) Even though Administrator Wheeler's December 31, 2020, final dispute resolution to the Focus Feasibility Study for Water Management "*determined that* [Clean Water Act (CWA)] *technology-based effluent limitations are not appropriate requirements to apply to a discharge of radionuclides from this CERCLA site*" there are multiple lines of evidence that demonstrate that effective treatment of radionuclides will be needed at a new EMDF to ensure protection of human health required by CERCLA. The following comments concern lines of evidence that effective water treatment for radionuclides should be required in the Record of Decision for all wastewater released from a future EMDF.

Response: Effective treatment is planned for the EMDF, as stated in the second paragraph of the referenced fact sheet.

15) The Water Quality Protection for Bear Creek fact sheet proposes using fish sampling to determine if either enhanced water treatment or restricting waste streams to the EMDF landfill are necessary. This means

detection limits of radionuclides in fish and associated rad error must be low enough to make an irrefutable determination whether the 10-5 cancer risk level is exceeded.

The following table includes Fish PRG activities from *Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee* (UCOR-5550) dated 4-28-22 (EMDF PRG Development) Table 1 and ranges of detection limits and radiological error for fish samples in the Oak Ridge Environmental Information System (OREIS) database for the 5-year period of calendar year (CY) 2017 through CY 2021. Several additional radionuclides of interest are also included in the following table. Note that some PRGs are within the range of laboratory detection limits and sample radionuclide error. For these radionuclides, at least part of the time, it will be undeterminable whether the 10-5 cancer risk level relevant and appropriate requirement is exceeded. Radium-226 (Ra-226) and Radium-228 (Ra-228) PRGs were always exceeded by detection limits. These radionuclides are identified in the following table in bold red font.

International Atomic Energy Agency April 2015 freshwater to fish transfer values are also included in the table for reference. Given equal activities of radionuclides in surface water and other variables, the greater the freshwater to fish transfer factor the more of the radionuclide that should be expected to transfer from surface water into fish.

Isotope	Fish Tissue PRG TR=10-5 EMDF Development Table1* (pCi/g)	Aquatic Animal Detection Limit range in OREIS for fish collected from CY2017 through CY2021 (pCi/g)	Aquatic Animal Rad Error range in OREIS for fish collected from CY2017 through CY2021 (pCi/g)	IAEA April 2015 Geometric Mean BCF Values (L/kg)
Am-241	0.451	0.007 to 0.093	0.00269 to 0.0249	5.7E+02
C-14	30.1	1.96 to 5.75	1.15 to 3.38	6.8E+04
Cl-36	13.6	0.248 to 0.862	0.135 to 0.521	1.3E+03
Co-60	2.7	0.0386 to 1.47	0.0196 to 0.847	7.4E+01
Cs-137	**1.61**	**0.0296 to 2.88**	**0.189 to 1.69**	**1.7E+03**
Eu-154	4.25	0.092 to 0.954	0.0359 to 0.477	4.5E+01
H-3	418	0.0131 to 19.9	0.0594 to 12.3	
I-129	**0.306**	**0.0203 to 2.32**	**0.0104 to 1.18**	**2.0E+02**
Np-237	0.656	0.00205 to 0.156	0.000786 to 0.0781	
Pu-238	0.355	0.0034 to 0.0396	0.00107 to 0.0128	1.4E+02
Pu-239/240	0.346	0.00338 to 0.0969	0.00141 to 0.0388	1.4E+02
Ra-226	**0.0152**	**0.0311 to 0.413**	**0.0282 to 0.318**	**6.1E+01**
Ra-228	**0.0422**	**0.0531 to 0.994**	**0.0231 to 0.59**	**6.1E+01**
Sr-90	0.632	0.0174 to 0.492	0.0109 to 0.347	1.5E+02
Tc-99	15.1	0.377 to 3.86	0.224 to 2.12	7.1E+01
Th-228	**0.142**	**0.021 to 0.16**	**0.00447 to 0.104**	**1.2E+02**
Th-230	0.505	0.0249 to 0.221	0.0104 to 0.0663	1.2E+02
Th-232	0.452	0.00591 to 0.131	0.00374 to 0.035	1.2E+02
U-233/234	0.559	0.0057 to 0.0917	0.00277 to 0.041	1.0E+01
U-235/236	0.601	0.00502 to 0.0967	0.00199 to 0.03312	1.0E+01
U-238	0.499	0.00406 to 0.0905	0.0019 to 0.041	1.0E+01
Additional Radionuclides of Interest				
Ra-226 (individual)	**0.117**	**0.0311 to 0.413**	**0.0282 to 0.318**	**6.1E+01**
Ra-228 (individual)	**0.0423**	**0.0531 to 0.994**	**0.0231 to 0.59**	**6.1E+01**
Pb-210 (individual)	**0.0512**	**0.0337 to 1.34**	**0.0202 to 0.653**	**1.0E+02**
Po-210	0.0267	No data	No data	5.9E+02
Pb-210 (SE)	**0.0175**	**0.0337 to 1.34**	**0.0202 to 0.653**	
K-40	**1.76**	**0.244 to 44.7**	**0.458 to 78.6**	**4.7E+03**

*These PRGs were calculated assuming someone eats an average of 17.5 grams of fish per day. For downstream East Fork Poplar Creek, Poplar Creek, and Clinch River this likely underestimates the amount of fish eaten by a factor of about 3 meaning these fish tissue PRGs may need reducing to a third of these values to evaluate risk from eating fish downstream.

Response: As is common with AWQC for chemicals with higher risk, PRGs were sometimes set at concentrations that are not possible to detect using current laboratory methods. Over time, analytical methods are expected to improve to allow detection at these very low levels. For the fish sampling performed per the Dispute Decision, the lowest practical detection limits were selected.

The default bioaccumulation factors were used in the PRG calculator to determine the radionuclide transfer from surface water to fish.

Also see response to Additional Comment 54 (this comment), Part 3 Comment #9 for the amount of fish consumed.

16) To determine whether additional treatment is needed, it will also be necessary to determine whether the cancer risk is greater than 10-5 over naturally occurring risk levels. Consider Ra-226. Ra-226 is important because EMDF PRG Development proposed that Ra-226 is in secular equilibrium with its progeny Pb-210 and Po-210 and analysis for Pb-210 and Po-210 isotopes would not be needed. Ra-226, Pb-210, and Po-210 are of concern because each poses a 10-5 cancer risk to people consuming fish at very low activities in fish. Ra-226 data for lower Bear Creek, East Fork Poplar Creek between Bear Creek and Poplar Creek, and the reference reach (BFK 7.6) for CY 2021 available from the Oak Ridge Environmental Information System (OREIS) are included in the endnote[xi]. EMDF PRG Development Table 1 shows a Ra-226 activity in fish of 0.0152 pCi/g equates to a 10-5 cancer risk and it would therefore be necessary to determine a 0.0152 pCi/g activity increase in fish to classify the activity as not naturally occurring. As shown in the above comment, rad measurement error in fish samples analyzed for Ra-226 should be expected in the range of 0.0282 to 0.318 pCi/g. With the range of detects and associated rad measurement error in the reference reach, Bear Creek, East Fork Poplar Creek, an increase of 0.0152 pCi/g over background appears indistinguishable. Without being able to irrefutably determine a 0.0152 pCi/g increase in Ra-226 activity concentrations over the background reference stream, ensuring compliance with ARARs and protection of human health required by CERCLA are not met.

Response: Lead-210 and polonium-210 are progeny of radium-226, and radium-226 is assumed to be in secular equilibrium with its progeny. The radium-226 PRG accounts for the risk associated with all the progeny in its decay chain. Therefore, polonium-210 and lead-210 are accounted for and do not require stand-alone PRGs. Including these isotopes as separate PRGs would double count these isotopes.

17) It is possible to mathematically calculate the risk from consumption of fish contaminated with radionuclides that relate to specific concentrations of radionuclides in waste disposed in the EMDF landfill. However, results of the calculations depend on assumptions and uncertainties, and it is undeterminable whether calculated activities in fish and surface water represent actual conditions in a specific water body or stream reach. For example, identification of radionuclides in waste, activities of radionuclides in waste disposed, assumed soil and waste to water partitioning coefficients (kd), dilution of landfill wastewater in the receiving stream, activities of radionuclides in surface water, physiological status of fish (e.g., rapidly growing fish may accumulate higher levels of biologically active radionuclides than fish in stationary growth periods (Argonne National Laboratory (ANL) RESRAD Data Collection Handbook[xii])), transfer of radionuclides from freshwater to fish, bioconcentration or bio-dilution of radionuclides in the food web, parent-progeny relationships, radioactive half-live and decay, how long fish live in water contaminated with radionuclides, what parts of fish are eaten, how fish are prepared, quantity of fish eaten, and other factors

likely influence the cancer risk to people who consume fish contaminated by radionuclides released from a future EMDF.

Response: Given the assumptions and uncertainties described in the comment, the EMDF takes a defense-in-depth protection approach with:

- **Protective siting requirements**
- **Robust design with double (RCRA-compliant) liner system**
- **Treatment of all landfill wastewater (contact water and leachate) prior to discharge to ensure it is protective of recreational use (human health), specifically fish ingestion.**
- **Protective WAC**
- **Environmental monitoring**
- **Institutional controls.**

18) As an example, consider freshwater to fish transfer factors. The April 2015 summary table of freshwater to fish transfer values is available from the International Atomic Energy Agency (IAEA) at www.wildlifetransferdatabase.org. This summary is given below and shows that the difference in maximum and minimum freshwater to fish transfer values for some radionuclides may vary by 3 to 5 orders of magnitude (i.e., factors of 1,000 to 100,000). Freshwater to fish transfer factors applicable to various habitats in Bear Creek and downstream are unknown.

IAEA Freshwater to Fish Transfer Values (L/kg)								
Wildlife	**Radionuclide**	**Arithmetic Mean**	**Arithmetic SD**	**Geomean**	**Geo SD**	**Min**	**Max**	**n**
Fish	**Al**	1.2E+02	2.3E+02	**5.3E+01**	3.5E+00	1.0E+00	1.5E+03	400
Fish	**Am**	7.6E+02	6.7E+02	**5.7E+02**	2.1E+00	2.4E+00	1.5E+03	17
Fish	**As**	2.7E+02	3.7E+02	**1.5E+02**	2.8E+00	5.8E+00	2.0E+03	221
Fish	**Au**	6.3E+01	9.4E+01	**3.5E+01**	2.9E+00	1.3E+01	2.4E+02	14
Fish	**Ba**	1.7E+02	2.7E+02	**9.3E+01**	3.1E+00	3.0E-01	1.4E+03	640
Fish	**C**	1.8E+05	4.4E+05	**6.8E+04**	4.1E+00	1.0E+03	4.0E+06	85
Fish	**Ca**	1.4E+03	1.8E+03	**8.9E+02**	2.6E+00	1.6E+01	1.6E+04	511
Fish	**Cd**	2.1E+03	1.3E+04	**3.3E+02**	6.8E+00	5.7E+00	1.1E+05	282
Fish	**Ce**	1.7E+02	3.9E+02	**6.8E+01**	3.9E+00	1.8E+00	2.3E+03	306
Fish	**Cl**	1.3E+03	3.8E+02	**1.3E+03**	1.3E+00	1.3E+02	1.8E+03	17
Fish	**Cm**	2.4E-01	3.0E-09	**2.4E-01**	1.0E+00			7
Fish	**Co**	2.6E+02	9.0E+02	**7.4E+01**	4.9E+00	7.4E-01	9.0E+03	571
Fish	**Cr**	2.0E+02	1.4E+02	**1.6E+02**	1.9E+00	3.0E-01	9.0E+02	531
Fish	**Cs**	3.6E+03	6.8E+03	**1.7E+03**	3.4E+00	1.3E+01	8.2E+04	752
Fish	**Cu**	4.0E+02	4.2E+02	**2.8E+02**	2.3E+00	3.1E+00	2.8E+03	793
Fish	**Dy**	1.6E+02	1.6E+02	**1.1E+02**	2.3E+00	4.0E+01	4.2E+02	16
Fish	**Er**	9.4E+01	1.1E+02	**6.2E+01**	2.5E+00	1.8E+01	2.5E+02	13
Fish	**Eu**	6.5E+01	6.6E+01	**4.5E+01**	2.3E+00	6.2E+00	2.9E+02	82
Fish	**Fe**	5.6E+02	1.2E+03	**2.4E+02**	3.6E+00	6.4E-01	8.0E+03	904
Fish	**Ga**	9.2E+02	7.6E+02	**7.1E+02**	2.0E+00	3.8E+02	1.9E+03	11
Fish	**Gd**	1.2E+03	0.0E+00	**1.2E+03**	1.0E+00			4
Fish	**Hf**	6.5E+02	0.0E+00	**6.5E+02**	1.0E+00			4
Fish	**Hg**	3.5E+02	5.6E+02	**1.9E+02**	3.1E+00	2.7E+01	1.0E+03	3
Fish	**Ho**	1.4E+02	1.9E+02	**8.7E+01**	2.7E+00	3.1E+01	4.6E+02	16
Fish	**I**	3.1E+02	3.7E+02	**2.0E+02**	2.6E+00	9.0E+00	1.3E+03	165
Fish	**K**	6.6E+03	6.4E+03	**4.7E+03**	2.3E+00	2.4E+02	4.7E+04	312
Fish	**La**	1.3E+02	2.6E+02	**5.9E+01**	3.5E+00	3.3E-01	1.5E+03	280
Fish	**Li**	1.2E+01	6.1E+00	**1.1E+01**	1.6E+00	8.0E+00	2.2E+01	16

Fish	**Lu**	4.7E+02	3.7E+02	**3.7E+02**	2.0E+00	2.0E+02	9.4E+02	11
Fish	**Mg**	1.6E+02	2.0E+02	**9.7E+01**	2.7E+00	4.1E+00	9.7E+02	183
Fish	**Mn**	2.9E+03	1.7E+04	**5.2E+02**	6.5E+00	3.3E+00	2.6E+05	1050
Fish	**Mo**	2.2E+01	4.2E+01	**9.8E+00**	3.5E+00	1.8E-01	3.1E+02	385
Fish	**Na**	2.0E+02	2.3E+02	**1.3E+02**	2.5E+00	2.0E+00	9.8E+02	410
Fish	**Nb**	3.2E+01	1.1E+01	**3.1E+01**	1.4E+00	2.3E+01	5.5E+01	25
Fish	**Nd**	2.8E+02	3.2E+02	**1.9E+02**	2.5E+00	2.9E+01	7.9E+02	16
Fish	**Ni**	2.0E+02	3.5E+02	**9.9E+01**	3.3E+00	1.6E+00	3.0E+03	430
Fish	**P**	6.8E+05	2.5E+05	**6.4E+05**	1.4E+00	3.5E+05	1.2E+06	163
Fish	**Pb**	3.6E+02	1.2E+03	**1.0E+02**	4.9E+00	2.0E+00	9.3E+03	606
Fish	**Po**	2.0E+03	6.6E+03	**5.9E+02**	4.8E+00	4.9E+01	3.7E+04	203
Fish	**Pr**	7.3E+03	0.0E+00	**7.3E+03**	1.0E+00			4
Fish	**Pu**	8.3E+02	4.9E+03	**1.4E+02**	6.6E+00	4.0E-01	4.7E+04	106
Fish	**Ra**	1.8E+02	5.0E+02	**6.1E+01**	4.4E+00	1.4E-01	4.8E+03	295
Fish	**Rb**	4.5E+04	5.3E+04	**2.9E+04**	2.5E+00	1.9E+03	2.0E+05	49
Fish	**Re**	3.3E+01	8.1E+00	**3.2E+01**	1.3E+00	2.1E+01	3.8E+01	10
Fish	**Ru**	1.0E+02	3.5E+02	**2.9E+01**	4.9E+00	1.7E-01	1.4E+03	17
Fish	**Sb**	4.0E+01	9.4E+01	**1.5E+01**	4.0E+00	2.4E-01	7.5E+02	181
Fish	**Sc**	3.3E+00	3.6E+00	**2.2E+00**	2.4E+00	9.2E-01	7.4E+00	15
Fish	**Se**	2.6E+03	3.6E+03	**1.6E+03**	2.8E+00	8.8E+00	1.4E+04	413
Fish	**Sm**	3.5E+02	3.1E+02	**2.6E+02**	2.1E+00	4.4E+01	7.7E+02	16
Fish	**Sn**	4.8E+02	3.2E+02	**4.0E+02**	1.8E+00	1.9E+02	1.1E+03	19
Fish	**Sr**	8.6E+02	4.8E+03	**1.5E+02**	6.4E+00	3.8E+00	1.2E+05	925
Fish	**Ta**	2.6E+01	5.1E+00	**2.6E+01**	1.2E+00	2.1E+01	3.0E+01	7
Fish	**Tb**	5.4E+02	4.0E+02	**4.3E+02**	1.9E+00	2.5E+02	1.2E+03	16
Fish	**Tc**	9.9E+01	9.6E+01	**7.1E+01**	2.3E+00	5.3E+00	2.0E+02	3
Fish	**Te**	3.3E+02	2.1E+02	**2.8E+02**	1.8E+00	9.6E+01	8.9E+02	15
Fish	**Th**	7.1E+02	4.3E+03	**1.2E+02**	6.7E+00	3.3E+01	3.7E+04	73
Fish	**Ti**	6.8E+02	1.4E+03	**3.0E+02**	3.6E+00	6.7E+00	6.1E+03	196
Fish	**Tl**	4.2E+03	3.8E+03	**3.1E+03**	2.2E+00	1.0E+02	1.3E+04	48
Fish	**Tm**	1.8E+03	0.0E+00	**1.8E+03**	1.0E+00			4
Fish	**U**	7.2E+01	5.0E+02	**1.0E+01**	7.2E+00	5.1E-01	5.0E+03	1334
Fish	**V**	3.3E+01	3.4E+01	**2.2E+01**	2.4E+00	1.1E+00	2.2E+02	222
Fish	**W**	1.2E+03	0.0E+00	**1.2E+03**	1.0E+00			4
Fish	**Y**	9.0E+01	1.6E+02	**4.4E+01**	3.3E+00	2.5E-01	5.2E+02	36
Fish	**Yb**	1.0E+03	0.0E+00	**1.0E+03**	1.0E+00			4
Fish	**Zn**	7.9E+03	5.8E+03	**6.3E+03**	1.9E+00	1.6E+01	3.4E+04	882
Fish	**Zr**	1.3E+03	2.9E+03	**5.1E+02**	3.9E+00	9.2E+00	1.5E+04	77

Response: As noted in the response to Additional Comment 54 (this comment), Part 3 Comment #15, the default bioaccumulation factors were used in the PRG calculator to determine the transfer from surface water to fish, consistent with use at EPA sites.

19) EMDF PRG Development and the EMDF Performance Assessment use different bioconcentration factors for some isotopes. For example, EMDF PRG Development uses a BCF values from the ORNL Risk Assessment Information System (RAIS) of 0.96 L/kg for uranium isotopes and 6 L/kg for thorium isotopes. The EMDF Performance Assessment references a source with a uranium BCF of 10 L/kg. ANL RESRAD Onsite also uses a BCF value of 10 L/kg for uranium isotopes and IAEA 2015 freshwater to fish transfer factors includes 10 L/kg as the geometric mean for uranium. The ORNL RAIS references a 2010 IAEA report[xiii] as the basis for the 0.96 L/kg uranium BCF for fish muscle and said report shows the uranium BCF is a geometric mean of 9 samples with BCF values ranging from 0.2 to 20. The same 2010 IAEA report shows the 6 L/kg BCF for thorium was based on 3 samples. The following table compares the result for U-238 using BCF values for uranium of 0.96 L/kg and thorium of 6 L/kg with results from BCF values for uranium of 10 L/kg and thorium of 120 L/kg. The process followed is the same process used in the EMDF PRG Development.

This table shows the importance of BCF values. Basing the conversion of Th-234 activity in fish to surface water and vice versa on a BCF value based on only 3 samples is a gamble. If the gamble is wrong, it could result in cancer risks associated from U-238 and its progeny Th-234 on the order of 10-4 rather than 10-5 at the 211 pCi/L PRG. Further, Th-234 is not analyzed for in fish, so if the gamble is wrong, the cancer risk from Th-234 is hidden and not included in determining whether release of carcinogenic pollutants and radionuclides exceed the CERCLA risk range.

Thorium-234 has a half-life of 24.1 days and the reasonable maximum exposure should assume people eat the fish on the same day as caught. With the uncertainty in BCF values, it is anticipated similar analysis could also be performed for other parent-progeny radionuclide groupings.

Comparison of U-238 PRGs using different BCF Values						
	Isotope	10-5 PRG in Fish in (pCi/g)	10-5 PRG in Fish in (pCi/kg)	BCF (L/kg)	PRG for Surface Water pCi/L	BCF Source
PRG	U-238	0.695	695	0.96	724	EMDF PRG Development (0.96) ORNL RAIS (0.96)
PRG	Th-234	1.770	1,770	6	295	EMDF PRG Development (6) ORNL RAIS (6)
Combined		0.499			210	
IAEA 2015	U-238	0.695	695	10	69.5	EMDF PA, (10) RESRAD (10) IAEA 2015 (10)
IAEA 2015	Th-234	1.770	1,770	120	14.8	EMDF PA (100) RESRAD (100) IAEA 2015 (120)
Combined		0.499			12	
PRG	U-238	0.695	695	0.96	724	EMDF PRG Development (0.96) ORNL RAIS (6)
IAEA 2015	Th-234	1.770	1,770	120	14.8	EMDF PA (100) RESRAD (100) IAEA 2015 (120)
Combined		0.499			15	
		Surface Water (pCi/L)	BCF (L/kg)	Fish (pCi/kg)	Fish (pCi/g)	Excess Cancer Risk
PRG	U-238	210	0.96	201.6	0.2	2.88E-06
IAEA 2015	Th-234	210	120	25,200	25.2	1.42E-04
Combined						**1.45E-04**

Response: See response to Additional Comment 54 (this comment), Part 3 Comment #18 (first paragraph of comment).

See response to Additional Comment 54 (this comment), Part 3 Comment #5. The FFA parties developed the list of radionuclides considering the waste streams planned for the EMDF. As described in the *Development of Fish Tissue and Surface Water Preliminary Remediation Goals for*

Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee **(UCOR 2022) (which was provided as part of the public information during the public involvement period), the 21 radionuclides and associated progeny which bioaccumulate and have the potential to be present in landfill wastewater at some time during the operational life of the EMDF were identified. As further described in UCOR 2022, short-lived progeny (daughter products) that reach peak activity within the 160-year time period of interest are accounted for at their most conservative activity to develop the PRGs for the parent radionuclide. Therefore, these are accounted for and stand-alone PRGs would in effect double count these radionuclides.**

The radionuclide list may be modified in the future based on sampling results, per agreement with the FFA parties.

20) The EMDF Performance Assessment assumed a release where fish are only exposed to the radionuclide in surface water for 0.0001 year (i.e., mean residence time of about 53 minutes) in determining radionuclide concentrations in fish. For discharges of landfill wastewater to surface water from the proposed future EMDF during landfill operations through 2047 or later, discharges of radionuclides would occur either continually or in batches for the duration of landfill operations. That is, it is likely bioconcentation of some radionuclides could continue throughout the lifetimes of at least some species of fish.

Response: The radiological PRGs used standard default values for the most part and did not use the PA assumptions for release.

For clarification, the average residence time cited from the PA applies to water and contaminants in a finite reach of Bear Creek and specifies the groundwater-to-surface water dilution ratio. This surface water residence time has nothing to do with fish exposure time The bioconcentration factors applied to estimate fish tissue concentration for the PA and surface water PRGs assume that fish tissue concentrations and Bear Creek water concentrations are in instantaneous equilibrium.

21) We don't know what we don't know. Y-12 and X-10 (ORNL) are historic DOE facilities that date back to the Manhattan Project and are still operating. By its nature, there were secret and classified activities. Additional experiments at ORNL may have also likely taken place since the Manhattan Project. Potential carcinogenic contaminants or radionuclides in waste streams may exist that have not been identified or sampled for that, if present, may impact human health or the environment.

Response: Waste will only be accepted from legacy CERCLA cleanup projects. For these projects, a Waste Handling Plan (WHP) is developed that requires regulatory approval by the FFA parties (TDEC, EPA and DOE). As part of the WHP, a Sampling and Analysis Plan (SAP) is developed to support waste characterization. The SAP through the data quality objective/data quality assessment (DQO/DQA) process defines the specific contaminates to be investigated. The DQO/DQA process is performed with regulatory parties including TDEC, EPA, DOE, and EMWMF Waste Acceptance.

One of the objectives of the DQO process is to obtain representative data for a waste stream in accordance with the DQO Step 7. Once all parties are in agreement, the WAC Attainment Team evaluates and determines if the waste lot data meet the form and format required by the EMWMF WAC Attainment Plan and also verifies the existing waste lot characterization data shared in the DQA is sufficient.

22) The EMDF Performance Assessment included screening source concentrations (Performance Assessment Table ES.2) and estimated leachate concentrations at landfill closure in FY 2047 (Performance Assessment Table C.5).

Screening source concentrations are based on arithmetic averages of all available Oak Ridge data, including maximum and upper confidence limit values, without correction for decay prior to EMDF closure.

Source leachate concentrations are aqueous activity concentrations of radionuclides in pCi/L calculated in Appendix C of the EMDF Performance Assessment and are dependent on the assumed solid-aqueous phase partitioning coefficient (kd) for the radionuclide. Source leachate activities in the table below are EMDF Performance Assessment estimates of activities of radionuclides in landfill wastewater at landfill closure in FY 2047. Activities of radionuclides in landfill wastewater between now and FY 2047 should be higher.

PRG in secular equilibrium (SE) and isotope only columns were calculated using the EPA radionuclide PRG calculator available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search. Radionuclides for which PRGs are include in EMDF PRG Development Table 1 are bolded in red font.

Response: For clarification, the average residence time cited from the PA applies to water and contaminants in a finite reach of Bear Creek and specifies the groundwater-to-surface water dilution ratio. This surface water residence time has nothing to do with fish exposure time The bioconcentration factors applied to estimate fish tissue concentration for the PA and surface water PRGs assume that fish tissue concentrations and Bear Creek water concentrations are in instantaneous equilibrium.

All isotopes that the EMDF PA predicts being in landfill wastewater at landfill closure in fiscal year (FY) 2047 are not accounted for in the EMDF PRG Development, Table 1 Fish Tissue and Surface Water PRGs.

Isotope	Screening Source Concentration (pCi/g)	Source Leachate Concentration (pCi/L) at T=0 (FY 2047)	HalfLife (year)	PRG at SE (pCi/g)	Isotope Only PRG
	PA Table ES.2	PA Table C.5	PA Table C.5	17.5 g/day, 365 d/yr, 26 yrs	17.5 g/day, 365 d/yr, 26 yrs
Ac-227	4.89E+04	1.44E-01	2.18E+01	9.21E-02	2.45E-01
Am-241	**2.30E+03**	**2.95E+01**	**4.32E+02**	**5.80E-02**	**4.51E-01**
Am-243	2.29E+01	1.48E+00	7.38E+03	4.66E-02	4.50E-01
Ba-133	2.71E+01	5.67E+01	1.05E+01	6.36E+00	6.36E+00
Be-10	7.16E+05	6.32E-05	1.51E+06	5.85E+00	5.85E+00
C-14	**6.27E+05**	**2.45E+03**	**5.73E+03**	**3.01E+01**	**3.01E+01**
Ca-41	4.11E+06	2.77E+00	1.02E+05	1.18E+02	1.18E+02
Cd-113m	11.E+05		1.36E+01	1.64E+00	1.64E+00
Cf-249	3.92E-04	5.39E-05	3.51E+02	4.49E-02	3.69E-01
Cf-250	1.70E-02	3.66E-04	1.31E+01	1.28E-02	5.22E-01
Cf-251	7.36E-05	1.04E-05	8.98E+02	3.78E-02	3.57E-01
Cf-252	1.25E+03	6.48E-06	2.60E+00	2.06E-02	3.30E-01
Cl-36	**1.00E+00**		**3.01E+05**	**1.36E+01**	**1.36E+01**
Cm-243	4.37E+01	2.13E+01	2.85E+01	4.72E-02	4.87E-01
Cm-244	5.26E+05	6.23E+03	1.81E+01	2.56E-02	5.55E-01
Cm-245	9.80E+01	1.89E+00	8.50E+03	5.12E-02	4.45E-01
Cm-246	1.97E+00	7.86E+00	4.73E+03	1.31E-02	4.53E-01
Cm-247	2.35E+01	5.14E-01	1.56E+07	4.23E-02	4.66E-01
Cm-248	2.29E+01	2.76E-02	3.39E+05	2.12E-02	1.01E-01
Co-60	**1.93E+06**	**5.00E-02**	**5.27E+00**	**2.70E+00**	**2.70E+00**
Cs-134	1.39E+05	< 1.0E-06	2.10E+00	1.16E+00	1.16E+00

Cs-135	2.46E+06		2.30E+06	7.71E+00	7.71E+00
Cs-137	**3.82E+08**	**7.87E+02**	**3.00E+01**	**1.61E+00**	**1.61E+00**
Eu-152	5.84E+05	1.42E+03	1.33E+01	1.45E+00	7.23E+00
Eu-154	**7.85E+05**	**3.21E+02**	**8.80E+00**	**4.25E+00**	**4.25E+00**
Eu-155	9.98E+05	3.33E-01	4.80E+00	2.13E+01	2.13E+01
Fe-55	4.71E+07	1.99E-06	2.70E+00	5.20E+01	5.20E+01
H-3	**4.84E+06**	**2.10E+04**	**1.24E+01**	**4.18E+02**	**4.18E+02**
I-129	**4.86E+05**	**1.58E+02**	**1.57E+07**	**3.06E-01**	**3.06E-01**
K-40	5.65E+01	2.15E+02	1.28E+09	1.76E+00	1.76E+00
Kr-85	1.16E+08		1.1E+01	-	-
Mo-100	2.55E-03	9.29E-05	8.50E+18		
Mo-93	4.99E+03	8.58E+00	4.00E+03	1.21E+01	1.55E+01
Na-22	5.96E-01	1.57E-04	2.60E+00	4.77E+00	4.77E+00
Nb-93m	3.00E+03	4.64E+00	1.61E+01	4.95E+01	4.95E+01
Nb-94	1.90E+05	3.25E-01	2.03E+04	5.42E+00	5.42E+00
Ni-59	1.55E+06	3.04E+00	7.50E+04	1.56E+02	1.56E+02
Ni-63	1.03E+07	6.73E+02	9.60E+01	6.21E+01	6.21E+01
Np-237	**5.63E+01**	**1.61E+01**	**2.14E+06**	**6.65E-02**	**7.27E-01**
Pa-231	3.17E+00	1.19E+00	3.28E+04	6.85E-02	2.67E-01
Pb-210	4.48E+02	7.33E+01	2.23E+01	1.75E-02	5.12E-02
Po-210	Se with Pb-210	7.4E+01		2.67E-02	2.67E-02
Pd-107	3.34E+06		6.50E+06	1.58E+02	1.58E+02
Pm-146	1.24E-01	2.15E-04	5.50E+00	2.55E+00	1.02E+01
Pm-147	2.67E+06	5.36E-04	2.60E+00	1.20E+00	2.43E+01
Pu-238	**7.15E+03**	**4.64E+03**	**8.77E+01**	**1.39E-02**	**3.55E-01**
Pu-239	**1.85E+05**	**2.88E+03**	**2.41E+04**	**5.23E-02**	**3.46E-01**
Pu-240	**8.44E+03**	**3.07E+03**	**6.54E+03**	**2.68E-02**	**3.46E-01**
Pu-241	2.83E+05	1.01E+04	1.44E+01	5.78E-02	2.64E+01
Pu-242	4.98E+01	8.56E+00	3.76E+05	1.35E-02	3.63E-01
Pu-244	1.11E+01	1.82E-01	8.26E+07	2.46E-02	3.20E-01
Ra-226	**1.35E+01**	**5.34E-01**	**1.60E+03**	**1.52E-02**	**1.17E-01**
Ra-228	**3.46E+00**	**1.47E-02**	**5.75E+00**	**3.25E-02**	**4.23E-02**
Re-187	1.94E-03	8.46E-05	4.12E+10	2.52E+03	2.52E+03
Sb-125	1.37E+06	< 1.0E-06a	2.80E+00	8.24E+00	9.69E+00
Se-79	2.47E+06		6.50E+04	6.56E+00	9.69E+00
Sm-151	5.75E+06		9.00E+01	7.40E+01	7.40E+01
Sn-121m	6.41E+01		5.50E+01	1.17E+01	1.75E+01
Sn-126	1.89E+06		1.00E+05	1.50E+00	1.61E+00
Sr-90	**3.93E+08**	**1.26E+04**	**2.91E+01**	**6.32E-01**	**8.75E-01**
Tc-99	**1.35E+06**	**2.69E+03**	**2.13E+05**	**1.51E+01**	**1.51E+01**
Th-228	**1.14E+05**	**1.41E-06**	**1.90E+00**	**1.42E-01**	**4.07E-01**
Th-229	3.48E+03	3.81E+00	7.34E+03	8.40E-02	2.07E-01
Th-230	**1.48E+02**	**1.28E+00**	**7.70E+04**	**1.48E-02**	**5.05E-01**
Th-232	**2.67E+06**	**2.35E+00**	**1.41E+10**	**3.04E-02**	**4.52E-01**
U-232	8.43E+05	4.04E+02	7.20E+01	7.45E-02	1.56E-01
U-233	**5.49E+05**	**1.65E+03**	**1.59E+05**	**7.40E-02**	**6.21E-01**
U-234	**1.67E+03**	**2.50E+04**	**2.45E+05**	**1.44E-02**	**6.31E-01**
U-235	**2.57E+03**	**1.57E+03**	**7.04E+08**	**6.16E-02**	**6.38E-01**
U-236	**4.87E+02**	**3.56E+02**	**2.34E+07**	**2.90E-02**	**6.70E-01**
U-238	**2.07E+09**	**1.51E+04**	**4.47E+09**	**1.40E-02**	**6.95E-01**
Zr-93	5.56E+05		1.53E+06	2.32E+01	4.28E+01

Response: As noted, the EMDF PA used a different process and assumptions than the PRGs. The PRGs are the most appropriate for use to determine future discharge limits.

As described in the response to Additional Comment 54 (this comment), Part 3 Comment #5, these radionuclides were selected by a DOE, EPA, and TDEC working group and represent the expected radiological constituents with the agreed-upon level of concern. This list may be

modified in the future based on sampling results of an extended list of COCs per agreement with the FFA parties.

23) The EMDF PA includes screening level activities of 382,000,000 pCi/g of Cs-137 and 2,460,000 pCi/g for Cs-135. Where Cs-137 has a half-life of about 30 years, Cs-135 has a half-life of about 2,300,000 years. Geometric mean freshwater to fish transfer factors for Cs-137 and Cs-135 are about 1,700 L/kg (IAEA,2015) and the ORNL Risk Assessment Information System (RAIS) shows bioconcentration factors for these isotopes at 2,500 L/kg. This means Cs-135 and Cs-137 discharged to surface water likely transfers to and bioconcentrate in fish. With the Cs-135 half-life, activities of Cs-135 are not going to significantly decrease due to radioactive decay in the next few million years. Since the Fukushima Daiichi Nuclear Power Plant accident, there have been a series of articles published concerning Cs-135/Cs-137 ratios including at least one from the Idaho National Laboratory[xiv]. Many of these articles reference limitations to measuring Cs-135. Just because Cs-135 may be hard to reliably measure does not mean it is not present. Just because Cs-135 may be hard to measure does not mean any cancer risk from Cs-135 should not be incorporated into the remedial action to ensure ARARs and the required CERCLA risk range are not exceeded.

Response: Cesium-135 is likely present with cesium-137 in waste, however at much lower quantities than cesium-137. Cesium-135 is a much lower risk contributor than cesium-137 due to its much lower specific activity; the specific activity of cesium-137 is 80 Ci/g while that of cesium-135 is 0.0009 Ci/g.

Both cesium-137 and cesium-135 were released from the Fukushima accident. The risks from cesium-137 radioactivity from consuming fish collected from just outside the Fukushima accident zone were evaluated and considered to be negligible, even with the higher fish consumption of Japanese people. While only cesium-137 was evaluated, based on the orders of magnitude lower abundance and specific activity of cesium-135, there is a much lower risk from cesium-135. Based on published results, the cesium-135/ cesium-137 atom ratio was determined to be 0.334 at Fukushima. When this is calculated on an activity ratio basis, for every pCi/g of cesium-137, we expect about 0.000004 pCi/g cesium-135. Low (beta) decay energy, lack of gamma radiation, and long half-life of cesium-135 make this isotope much less hazardous than cesium-137. Therefore, while cesium-135 was considered as a COC, it was determined not to be of sufficient abundance or risk to be a COC.

24) EMDF PRG Development includes the assumption on page 1 that "radionuclides of interest were either received or generated at the ORR without their progeny (e.g., uranium was milled and refined, transuranics, and fission products produced from reactor operations.)" The proposed process of evaluating radioactive decay chains in secular equilibrium and segmenting chains for portions in equilibrium for measurement purposes makes sense and helps account for progeny. **However, the list of radionuclides does not account for all radionuclide isotopes produced at ORR including at ORNL. Mischaracterization of isotopes generated or produced at ORR as progeny and not accounting for them separately likely underestimates the cancer risk.**

For example, consider Radium-226 (Ra-226) secular equilibrium proposed in EMDF PRG Development. Radium-226 (Ra-226) identified on page 2 of EMDF PRG Development is identified as reaching secular equilibrium (SE) with progeny within 160 years. Secular equilibrium of Ra-226 is proposed to account for progeny including Lead-210 (Pb-210) and Polonium-210 (Po-210). Ra-226 proposed for disposal in a future EMDF is identified in EMDF Performance Assessment Table B.5 as containing an average activity of 2.92 pCi/g (decayed to 2047) in ORNL D&D waste. Based on analysis run at https://epa-prgs.ornl/gov/gci-bin/radionuclides/chain.pl at about 100 years of radioactive decay 2.92 pCi/g of Ra-226, should have about 2.82 pCi/g of progeny Pb-210 and Po-210. In this example, if the decay is less than 100 years, Pb-210 and Po-210 progeny will be smaller.

Time (yrs)	Ra-226	Rn-222	Po-218	At-218	Rn-218	Pb-214	Bi-214	Po-214	Tl-210	**Pb-210**	Bi-210	**Po-210**	Hg-206	Tl-206
0	3.05													
0.0001	3.05	0.02	0.018	3.68E-06	3.7E-09	7.90E-03	3.30E-03	3.29E-03	6.32E-07	**2.8E-09**	2.8E-12	**9E-17**	3E-17	1.9E-17
0.001	3.05	0.195	0.194	3.87E-05	3.87E-08	0.18	0.169	0.169	3.54E-05	**2.3E-06**	3.4E-08	**1E-11**	4E-14	8.4E-14
0.01	3.05	1.48	1.47	2.95E-04	2.95E-07	1.47	1.46	1.46	3.07E-04	**2.49E-04**	3.84E-05	**2E-07**	5E-12	5.5E-11
0.1	3.05	3.04	3.04	6.09E-04	6.09E-07	3.04	3.04	3.04	6.39E-04	**0.00805**	0.00622	**4E-04**	2E-10	8.4E-09
0.5012	3.05	3.05	3.05	6.09E-04	6.09E-07	3.05	3.05	3.05	6.40E-04	**0.0459**	0.044	**0.014**	9E-10	5.90E-08
1	3.05	3.05	3.05	6.09E-04	6.09E-07	3.05	3.05	3.05	6.40E-04	**0.0923**	0.0904	**0.048**	2E-09	1.21E-07
1.259	3.05	3.05	3.05	6.09E-04	6.09E-07	3.05	3.05	3.05	6.40E-04	**0.116**	0.114	**0.069**	2E-09	1.53E-07
1.585	3.05	3.05	3.05	6.09E-04	6.09E-07	3.05	3.05	3.05	6.40E-04	**0.146**	0.144	**0.097**	3E-09	1.93E-07
1.995	3.05	3.05	3.05	6.09E-04	6.09E-07	3.04	3.05	3.04	6.40E-04	**0.183**	0.181	**0.133**	3E-09	2.42E-07
2.512	3.04	3.04	3.04	6.09E-04	6.09E-07	3.04	3.04	3.04	6.39E-04	**0.228**	0.227	**0.178**	4E-09	3.04E-07
3.162	3.04	3.04	3.04	6.09E-04	6.09E-07	3.04	3.04	3.04	6.39E-04	**0.285**	0.283	**0.235**	5E-09	3.79E-07
3.981	3.04	3.04	3.04	6.09E-04	6.09E-07	3.04	3.04	3.04	6.39E-04	**0.355**	0.353	**0.306**	7E-09	4.73E-07
5.012	3.04	3.04	3.04	6.08E-04	6.08E-07	3.04	3.04	3.04	6.39E-04	**0.44**	0.438	**0.393**	8E-09	5.87E-07
10	3.03	3.03	3.03	6.07E-04	6.07E-07	3.03	3.03	3.03	6.37E-04	**0.814**	0.813	**0.774**	2E-08	1.09E-06
25.119	3.02	3.02	3.02	6.03E-04	6.03E-07	3.01	3.02	3.01	6.33E-04	**1.65**	1.64	**1.62**	3E-08	2.20E-06
50.119	2.98	2.98	2.98	5.97E-04	5.97E-07	2.98	2.98	2.98	6.26E-04	**2.38**	2.38	**2.37**	5E-08	3.18E-06
100 FY2047	**2.92**	**2.92**	**2.92**	**5.84E-04**	**5.84E-07**	**2.92**	**2.92**	**2.92**	**6.13E-04**	**2.82**	**2.82**	**2.82**	**5E-08**	**3.78E-06**
160	2.84	2.84	2.84	5.69E-04	5.69E-07	2.84	2.84	2.84	5.97E-04	**2.86**	2.86	**2.86**	5E-08	3.83E-06

The problem is that Pb-210 identified in EMDF Performance Assessment Table B.5 contains an estimated average activity of 46.8 pCi/g (decayed to FY 2047) in ORNL D&D waste, not 2.82 pCi/g. Based on analysis run at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/chain.pl at secular equilibrium with 46.8 pCi/g of Pb-210, there should also be activity concentrations of Po-210 o about 47.6 pCi/g. Between now and landfill closure in FY 2047, Pb-210 and Po-210 activity concentrations will be higher. In the table below, note that Pb-210 and its progeny Po-210 reach secular equilibrium in about 2 ½ to 3 years.

	Time (yrs)	Pb-210	Bi-210	Po-210	Hg-206	Tl-206
FY 1947	0	1060				
	0.0001	1060	5.34	5E-04	2E-05	2.6E-05
	0.001	1060	52.2	0.048	2E-05	8.8E-05
	0.01	1060	420	4.14	2E-05	0.00058
	0.1	1060	1050	144	2E-05	0.00141
	0.5012	1040	1050	615	2E-05	0.0014
	1	1030	1030	867	2E-05	0.00138
	1.259	1020	1020	927	2E-05	0.00137
	1.585	1010	1010	966	2E-05	0.00135
	1.995	997	998	986	2E-05	0.00134
	2.512	981	982	987	2E-05	0.00131
	3.162	961	962	975	2E-05	0.00129
	3.981	937	938	953	2E-05	0.00126
	5.012	908	908	924	2E-05	0.00122
	10	777	777	791	1E-05	0.00104
	25.119	484	485	493	9E-06	0.00065
	50.119	222	222	226	4E-06	0.0003
	63.096	148	148	151	3E-06	0.0002
	79.433	88.9	89	90.5	2E-06	0.00012
FY 2047	**100**	46.8	**46.8**	47.6	**9E-07**	**6.3E-05**
	125.893	20.8	20.9	21.2	4E-07	2.8E-05
	158.489	7.54	7.54	7.67	1E-07	1E-05
	160	7.19	7.19	7.32	1E-07	9.6E-06

The following table gives secular equilibrium of Ra-226 in EMDF PRG Development including individual isotope contribution to the fish consumption PRG and instream activity PRG in EMDF PRG Development Table 1. To be consistent with EMDF PRG Development, this example used a fish ingestion rate of 17.5 grams per day, 365 days per year for 26 years. This equates to eating about 28 8-ounce servings of fish per year. This example also used both ORNL RAIS and EMDF Performance Assessment assumed soil and waste to water partitioning coefficients (kd) to estimate concentrations in waste that may give a 10-5 risk from eating fish. Waste activities include a dilution factor of 3.95 to account for dilution of an estimated 30 gpm discharge into a 30-day 5-year recurrent flow. The 30-gpm discharge flow is from the Focus Feasibility for Water Management Table 3 Landfill Wastewater Flow Rates. Instream flow of 88.4 gpm at BCK 7.87 was calculated from USGS StreamStats estimated 0.197 cfs. 30 day 5-year recurrent flow interval was used because TDEC Rule 0400-40-03-.05(4) requires this flow for setting discharge standards for recreational use and pursuant to EPA Administrator Wheeler's decision on the Focus Feasibility for Water Management, this rule is a relevant and appropriate requirement for setting discharge standards for radionuclides

	Fish Consumption PRG, TR=10-5 (pCi/g)	BCF (L/kg)	Instream Activity pCi/L	ORNL RAIS Kd (L/Kg)	EMDF PA Assumed waste Kd (L/Kg)	Waste Activity Using RAIS Kd that equates to TR=10-5 (pCi/g)	Waste Activity Using EMDF PA Assumed Waste Kd that equates to TR=10-5 (pCi/g)
Ra-226 SE Individual Isotopes	0.0152						
Ra-226	0.117	4	29.3	1	1500	0.116	173
Rn-222	-						
Po-218	-						
At-218	-						
Rn-218	-						
Pb-214	124	25	4,960	150	50	2,940	980
Bi-214	227	15	15,100	480		28,700	
Po-214	-						
Tl-210	-						
Pb-210	0.051	25	2.05	150	50	1.21	0.4
Bi-210	4.62	15	308	480		584	
Po-210	0.027	36	0.742	210		0.615	
Hg-206	-						
Tl-206	-						
Combined instream Surface Water PRG			0.534				

The assumed soil or waste to water partitioning coefficient (kd) is another significant uncertainty. In the above example assumed Kd values change the activity concentration of Ra-226 in waste by three orders of magnitude. Depending on the Kd selected, in this example, Ra-226 activity in waste that may correspond with a 10-5 cancer risk level in fish varies from 0.116 to 173 pCi/g.

To evaluate this another way, for this example, let's assume waste containing Ra-226 achieves secular equilibrium (SE) with its progeny. In FY 2047, EMDF Performance Assessment Table B.5 shows ORNL D&D Ra-226 activity decays to 2.92 pCi/g. At secular equilibrium (SE), there should also be about 2.82 pCi/g of both Pb-210 and Po-210. The following table incorporates the same BCF values, 3.95 dilution factor, and exposure assumptions as the above table.

Pb-210 was evaluated in SE with progeny Po-210 because Pb-210 in fish appears to approach SE with Po-210 in about 2 ½ to 3 years. Po-210 is also included separately because while the landfill is accepting ORNL waste and landfill wastewater is not treated for radionuclides, the quantity of Po-210 in fish should be the sum of Po-210 decayed from Pb-210 and additional Po-210 transferred from surface water to fish. Further, Pb-210 has a half-life of 22.3 years, therefore once it is in fish, it will pose an excess cancer risk to human health from eating fish with Pb-210 and its progeny Po-210 for many years after release of wastewater associated with ORNL D&D stops or effective treatment of landfill wastewater begins.

Individual or SE	**Isotope**	**Waste activity (pCi/g)**	**EMDF PA assumed Waste Kd (L/kg)**	**ORNL RAIS kd (L/kg)**	**Instream Activity @ Kd in EMDF PA (pCi/L)**	**Instream Activity @ RAIS Kd (pCi/L)**	**Fish Activity, Kd in EMDF PA (pCi/g)**	**Fish Activity, RAIS Kd (pCi/g)**	**Cancer Risk @ EMDF PA Kd**	**Cancer Risk @ RAIS Kd**
Individual	**Ra-226**	**2.92**	**1500**	**1**	**0.49**	**739**	**0.00197**	**2.96**	**1.68E-07**	**2.53E-04**
SE	**Pb-210**	**2.82**	**50**	**150**	**14.3**	**4.76**	**0.357**	**0.119**	**2.04E-04**	**6.80E-05**

Individual	**Po-210**	**2.82**		**210**		**3.4**	**SE with Pb-210**	**0.122**	**1.34E-04**	**4.57E-05**
Risk Sum									**3.38E-04**	**3.67E-04**

Now consider the same ORNL D&D waste where it is not assumed Pb-210 progeny and Pb-210 activity in waste estimated in the EMDF Performance Assessment is included.

Individual or SE	**Isotope**	**Waste activity (pCi/g)**	**EMDF PA assumed Waste Kd (L/kg)**	**ORNL RAIS kd (L/kg)**	**Instream Activity @ Kd in EMDF PA (pCi/L)**	**Instream Activity @ RAIS Kd (pCi/L)**	**Fish Activity, Kd in EMDF PA (pCi/g)**	**Fish Activity, RAIS Kd (pCi/g)**	**Cancer Risk @ EMDF PA Kd**	**Cancer Risk @ RAIS Kd**
Individual	**Ra-226**	**2.92**	**1500**	**1**	**0.49**	**739**	**0.00197**	**2.96**	**1.68E-07**	**2.53E-04**
SE	**Pb-210**	**46.8**	**50**	**150**	**237**	**79**	**5.92**	**1.97**	**3.39E-03**	**1.13E-03**
Individual	**Po-210**	**47.6**		**210**		**57.4**	**SEwith Pb-210**	**2.07**	**2.22E-03**	**7.75E-04**
Risk Sum									**5.61E-03**	**2.16E-03**

The above example, using ORNL D&D waste activities decayed to FY 2047 presented in the EMDF Performance Assessment, shows that assuming radionuclides produced at ORR are progeny and not produced at ORR underestimates the cancer risk.

Response: See response to Additional Comment 54 (this comment), Part 3 Comment #16. Please note that the risk from these radionuclides is included in the risk calculated for radium-226.

25) A comment to the Waste Acceptance Criteria fact sheet is that as shown in the above example, the assumed kd can dramatically impact the cancer risk associated with eating fish. This demonstrates the significant uncertainty that assumed kds add to calculating waste acceptance criteria that protects groundwater and surface water users.

Response: See response to Additional Comment 54 (this comment), Part 1 Comment #9.

26) Comments concerning Ra-226 also show that analyzing fish samples for Ra-226 and not also analyzing for Pb-210 and Po-210 likely underestimates risk from Pb-210 and Po-210 at ORR.

Response: The PRGs were developed using default values for fish consumption and the risk from the isotopes, not from actual fish sampling results.

[i] Performance Assessment for the Environmental Management Disposal Facility at the Y-12 National Security Complex, Oak Ridge, Tennessee (UCOR-5094/R2)
[ii] Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee (UCOR-5095/R2)
[iii]

Table B.6. Total EMDF radionuclide inventory (Ci decayed to 2047) (cont.)

Waste mass (g)	ORNL D&D 1.94E+11	ORNL RA 1.81E+11	Y-12 D&D Alpha-4 and Alpha-5 1.37E+11	Y-12 D&D Biology 2.81E+10	Y-12 D&D Remaining Facilities 3.03E+11	Y-12 RA 5.26E+11	EMDF Waste Total Inventory (Ci) 1.37E+12	EMDF waste average activity concentration (pCi/g)
Radio-isotope	**EMDF activity by waste stream (Ci)**							
Na-22	2.09E-06	2.63E-08					2.12E-06	1.55E-06
Nb-93m	Refer to Attachment B.3 for basis of inventory estimate						6.01E-01	4.39E-01
Nb-94	4.20E-02						4.20E-02	3.07E-02
Ni-59	7.84E+00						7.84E+00	5.73E+00
Ni-63	1.17E+02	1.62E+03		4.84E-02			1.74E+03	1.27E+03
Np-237	8.92E-02	5.08E-01	6.72E-03	6.04E-03		2.27E-01	8.37E-01	6.12E-01
Pa-231	6.15E-01						6.15E-01	4.49E-01
Pb-210	9.09E+00	4.08E-01					9.50E+00	6.93E+00
Pm-146	2.28E-04						2.28E-04	1.66E-04
Pm-147	5.49E-04	1.69E-05					5.66E-04	4.13E-04
Pu-238	1.43E+02	9.86E+01	2.52E-02		1.20E-01	4.62E-03	2.42E+02	1.77E+02
Pu-239	4.61E+01	1.04E+02			2.31E-02	3.12E-01	1.50E+02	1.10E+02
Pu-240	6.81E+01	9.18E+01	9.29E-03	5.07E-03			1.60E+02	1.17E+02
Pu-241	1.33E+01	5.12E+02					5.25E+02	3.83E+02
Pu-242	3.55E-02	4.10E-01					4.45E-01	3.25E-01
Pu-244	9.49E-03						9.49E-03	6.93E-03
Ra-226	5.68E-01	7.08E-01		2.80E-02		7.63E-01	2.07E+00	1.51E+00
Ra-228	1.27E-03	2.52E-03			5.17E-02	1.41E-03	5.69E-02	4.15E-02
Re-187	4.40E-06						4.40E-06	3.21E-06
Sb-125	7.82E-08						7.82E-08	5.71E-08
Sr-90	4.21E+02	7.50E+01		4.93E-02	5.02E-02		4.96E+02	3.62E+02
Tc-99	2.57E+00	7.11E-01	1.48E-01	1.14E+00	2.36E-01	2.43E+00	7.23E+00	5.28E+00
Th-228	2.25E-07	3.40E-10	8.14E-08	3.58E-07	4.78E-06		5.45E-06	3.98E-06
Th-229	3.36E-01	1.44E+01			1.43E-02		1.47E+01	1.08E+01
Th-230	3.30E-01	3.81E+00	5.92E-02		2.38E-02	7.20E-01	4.94E+00	3.61E+00
Th-232	2.32E-01	1.69E+00	5.14E-02	2.24E-02	1.98E-01	6.87E+00	9.07E+00	6.62E+00
U-232	1.62E-01	2.61E+01					2.63E+01	1.92E+01
U-233	5.15E+01	5.27E+01		2.71E+00	3.33E-01		1.07E+02	7.83E+01
U-234	2.15E+00	2.72E+01	1.25E+00	2.34E+00	1.58E+03	8.24E+00	1.62E+03	1.19E+03
U-235	8.15E-02	4.23E-01	1.02E-01	2.02E-01	9.57E+01	5.84E+00	1.02E+02	7.47E+01
U-236	5.14E-02	1.95E-01	5.22E-02	1.19E-01	2.26E+01	1.19E-01	2.32E+01	1.69E+01
U-238	1.32E+00	5.27E+00	4.71E+00	9.56E+00	8.83E+02	7.92E+01	9.83E+02	7.18E+02

D&D = deactivation and decommissioning
EMDF = Environmental Management Disposal Facility
ORNL = Oak Ridge National Laboratory
RA = remedial action
Y-12 = Y-12 National Security Complex

Table B.6. Total EMDF waste radionuclide inventory (Ci decayed to 2047)

Waste mass (g)	ORNL D&D	ORNL RA	Y-12 D&D Alpha-4 and Alpha-5	Y-12 D&D Biology	Y-12 D&D Remaining Facilities	Y-12 RA	EMDF Waste Total Inventory (Ci)	EMDF waste average activity concentration (pCi/g)
	1.94E+11	1.81E+11	1.37E+11	2.81E+10	3.03E+11	5.26E+11	1.37E+12	
Radio-isotope	EMDF activity by waste stream (Ci)							
Ac-227	7.54E-03						7.54E-03	5.50E-03
Am-241	4.09E+01	1.11E+02	2.20E-03	5.11E-03	1.80E-02	3.61E-01	1.52E+02	1.11E+02
Am-243	5.30E-01	7.12E+00					7.65E+00	5.59E+00
Ba-133	Refer to Attachment B.3 for basis of inventory estimate						4.14E+00	3.02E+00
Be-10	Refer to Attachment B.3 for basis of inventory estimate						6.52E-05	4.76E-05
C-14	1.66E+00	4.60E+00		1.17E+00			7.43E+00	5.43E+00
Ca-41	Refer to Attachment B.3 for basis of inventory estimate						1.09E-01	7.92E-02
Cf-249	2.80E-06						2.80E-06	2.05E-06
Cf-250	1.91E-05						1.91E-05	1.39E-05
Cf-251	5.42E-07						5.42E-07	3.96E-07
Cf-252	3.37E-07						3.37E-07	2.46E-07
Cm-243	1.01E+00	1.02E-01					1.11E+00	8.10E-01
Cm-244	3.23E+02	2.53E+00	5.39E-04				3.26E+02	2.38E+02
Cm-245	9.87E-02						9.87E-02	7.21E-02
Cm-246	4.10E-01						4.10E-01	2.99E-01
Cm-247	2.68E-02						2.68E-02	1.96E-02
Cm-248	1.44E-03						1.44E-03	1.05E-03
Co-60	4.23E-02	7.90E-03	8.87E-04			4.20E-04	5.15E-02	3.76E-02
Cs-134	5.41E-09	2.19E-08					2.73E-08	1.99E-08
Cs-137	4.11E+02	2.63E+03	2.73E-02	3.71E-03	1.42E-02	2.84E+00	3.04E+03	2.22E+03
Eu-152	7.25E+01	1.46E+00					7.40E+01	5.40E+01
Eu-154	1.65E+01	2.52E-01					1.67E+01	1.22E+01
Eu-155	1.72E-02	1.44E-04					1.74E-02	1.27E-02
Fe-55		2.31E-06					2.31E-06	1.68E-06
H-3	2.52E+01	3.56E+00		6.25E-02			2.88E+01	2.10E+01
I-129	9.56E-01	9.35E-02					1.05E+00	7.66E-01
K-40	1.07E+00	3.43E+00		6.27E-01		3.33E+00	8.46E+00	6.18E+00
Mo-100	1.08E-05						1.08E-05	7.92E-06
Mo-93	Refer to Attachment B.3 for basis of inventory estimate						1.00E+00	7.30E-01

[iv] A Review of the Performance Assessment and Composite Analysis for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee, October 12, 2020 (NAC-0131_R1)

[v] Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee (UCOR-5550)

[vi] Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee (UCOR-5550)

[vii] Radiation Risk Assessment At CERCLA Sites: Q & A Directive 9200.4-40, EPA 540-R-012-13, May 2014 specifies that "[a]t CERCLA remedial sites, excess cancer risk from both radionuclides and chemical carcinogens should be summed to provide an estimate of the combined risk presented by all carcinogenic contaminants as specified in OSWER directive 9200.4-18 (U.S. EPA 1997a)."

[viii] EPA Administrator Wheeler's December 31, 2020, final dispute decision footnote specifies that *"For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10−4 and 10−6 using information on the relationship between dose and response. 40 C.F.R. § 300.430(e)(2)(i)(A)(2). See also 55 Fed. Reg. 8666, 8717-8718 (Mar. 8, 1990)."*

[ix] https://www.tn.gov/content/dam/tn/environment/water/tn-h2o/documents/plan-%26-appendices/wr-tnh2o_plan-report.pdf

[x] CERCLA at 42 U.S. Code § 9621(d)(1) requires that "Remedial actions selected under this section or otherwise required or agreed to by the President under this chapter shall attain a degree of cleanup of hazardous substances, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment." (Emphasis added)

[xi]

Location	Common Name	Date Collected	Results	Units	Results Qualifier	Detection Limit	Rad Error
BCK 3.3	rock bass	5/12/2021	1.0065	pCi/g		0.128	0.254
EFK 0.0	redbreast sunfish	5/18/2021	0.339	pCi/g		0.261	0.204
BFK 7.6	**redbreast sunfish**	**5/26/2021**	**0.298**	**pCi/g**		0.244	0.187
BFK 7.6	**rock bass**	**5/26/2021**	**0.294**	**pCi/g**		0.123	0.117
EFK 0.0	bluegill sunfish	5/18/2021	0.277	pCi/g		0.0774	0.0862
BFK 7.6	**bluegill sunfish**	**5/26/2021**	**0.261**	**pCi/g**		0.154	0.153
BFK 7.6	**warmouth sunfish**	**5/26/2021**	**0.238**	**pCi/g**	J	0.286	0.191

BFK 7.6	**warmouth sunfish**	**5/26/2021**	**0.207**	**pCi/g**		0.191	0.144
BFK 7.6	**redbreast sunfish**	**10/20/2021**	**0.189**	**pCi/g**		0.0902	0.098
BCK 0.5	redbreast sunfish	10/27/2021	0.177	pCi/g		0.122	0.101
BCK 3.3	redbreast sunfish	11/3/2021	0.157	pCi/g		0.129	0.0982
EFK 0.0	walleye	5/18/2021	0.1538	pCi/g		0.0453	0.0713
BFK 7.6	**rock bass**	**10/20/2021**	**0.149**	**pCi/g**		0.127	0.0982
EFK 0.0	spotted bass	5/18/2021	0.148	pCi/g		0.132	0.0965
EFK 0.0	warmouth sunfish	5/18/2021	0.146	pCi/g	J	0.151	0.106
BCK 0.5	rock bass	5/17/2021	0.14	pCi/g		0.122	0.0963
BCK 0.5	largemouth bass	10/27/2021	0.136	pCi/g	J	0.178	0.116
BFK 7.6	**rock bass**	**5/26/2021**	**0.135**	**pCi/g**		0.0925	0.0803
BFK 7.6	**redbreast sunfish**	**5/26/2021**	**0.131**	**pCi/g**	J	0.201	0.128
BFK 7.6	**rock bass**	**5/26/2021**	**0.131**	**pCi/g**		0.0716	0.0734
EFK 0.0	yellow bass	5/18/2021	0.129	pCi/g		0.103	0.0843
BCK 0.5	rock bass	10/27/2021	0.124	pCi/g	J	0.172	0.11
EFK 0.0	bluegill sunfish	10/26/2021	0.123	pCi/g	J	0.127	0.0881
BCK 0.5	rock bass	5/17/2021	0.122	pCi/g		0.0586	0.0636
BCK 3.3	rock bass	5/25/2021	0.121	pCi/g		0.071	0.0704
EFK 0.0	bluegill sunfish	10/26/2021	0.12	pCi/g		0.0962	0.0787
BCK 0.5	green sunfish	5/17/2021	0.117	pCi/g		0.0747	0.0716
BCK 0.5	largemouth bass	5/17/2021	0.112	pCi/g		0.0657	0.0652
BCK 3.3	rock bass	5/25/2021	0.11	pCi/g	J	0.144	0.094
BCK 3.3	green sunfish	5/12/2021	0.11	pCi/g	J	0.121	0.086
BCK 0.5	rock bass	5/17/2021	0.104	pCi/g		0.0817	0.0621
BCK 0.5	rock bass	5/17/2021	0.103	pCi/g	J	0.173	0.107
EFK 0.0	yellow bass	5/18/2021	0.102	pCi/g		0.0853	0.0636
EFK 0.0	spotted bass	10/26/2021	0.0974	pCi/g	U	0.175	0.106
BFK 7.6	**bluegill sunfish**	**10/20/2021**	**0.0962**	**pCi/g**		0.0775	0.057
EFK 0.0	white crappie	5/18/2021	0.0953	pCi/g	J	0.13	0.0855
BFK 7.6	**redbreast sunfish**	**10/20/2021**	**0.0949**	**pCi/g**		0.0568	0.052
BCK 0.5	green sunfish	5/17/2021	0.0941	pCi/g		0.0514	0.0527
BFK 7.6	**rock bass**	**10/20/2021**	**0.092**	**pCi/g**		0.0391	0.0448
BFK 7.6	**rock bass**	**10/20/2021**	**0.0894**	**pCi/g**		0.0757	0.0555

BFK 7.6	**rock bass**	**10/20/2021**	**0.088**	**pCi/g**		0.0696	0.0617
EFK 0.0	warmouth sunfish	5/18/2021	0.0877	pCi/g	J	0.0945	0.0638
BFK 7.6	**rock bass**	**5/26/2021**	**0.0866**	**pCi/g**		0.0461	0.0442
BCK 3.3	green sunfish	10/25/2021	0.0861	pCi/g		0.0366	0.0419
BCK 3.3	rock bass	11/3/2021	0.0855	pCi/g	J	0.117	0.0767
BFK 7.6	**rock bass**	**5/26/2021**	**0.0814**	**pCi/g**		0.0643	0.051
BCK 0.5	bluegill sunfish	10/27/2021	0.0791	pCi/g		0.0752	0.0524
BCK 0.5	rock bass	5/17/2021	0.0776	pCi/g	J	0.175	0.115
BCK 3.3	green sunfish	11/3/2021	0.0757	pCi/g		0.0414	0.0424
EFK 0.0	largemouth bass	10/26/2021	0.0735	pCi/g	J	0.0803	0.0544
EFK 0.0	bluegill sunfish	10/26/2021	0.0731	pCi/g		0.0311	0.0356
BCK 3.3	rock bass	11/3/2021	0.07215	pCi/g		0.0491	0.0487
EFK 0.0	largemouth bass	10/26/2021	0.0711	pCi/g	U	0.191	0.109
BCK 3.3	green sunfish	11/3/2021	0.0704	pCi/g	U	0.135	0.0809
BCK 3.3	warmouth sunfish	5/12/2021	0.0689	pCi/g	U	0.248	0.135
BFK 7.6	**redbreast sunfish**	**5/26/2021**	**0.0688**	**pCi/g**		0.0412	0.0377
BCK 0.5	rock bass	5/17/2021	0.0682	pCi/g		0.0645	0.0471
BCK 3.3	redbreast sunfish	5/12/2021	0.067	pCi/g	J	0.0684	0.0472
BCK 3.3	bluegill sunfish	11/3/2021	0.0664	pCi/g		0.0545	0.0416
BCK 0.5	rock bass	10/27/2021	0.0644	pCi/g	J	0.107	0.072
BCK 0.5	rock bass	5/17/2021	0.0641	pCi/g	U	0.132	0.0782
EFK 0.0	largemouth bass	10/26/2021	0.06305	pCi/g		0.0808	0.059
BFK 7.6	**rock bass**	**5/26/2021**	**0.061955**	**pCi/g**	J	0.127	0.0862
BFK 7.6	**rock bass**	**10/20/2021**	**0.0609**	**pCi/g**	J	0.0848	0.0543
BCK 3.3	redbreast sunfish	5/12/2021	0.0597	pCi/g	J	0.0653	0.0502
BCK 0.5	bluegill sunfish	10/27/2021	0.0579	pCi/g	J	0.085	0.0536
BFK 7.6	**bluegill sunfish**	**10/20/2021**	**0.0578**	**pCi/g**	U	0.311	0.165
EFK 0.0	spotted bass	10/26/2021	0.0539	pCi/g		0.0431	0.0352
BFK 7.6	**redbreast sunfish**	**10/20/2021**	**0.0538**	**pCi/g**		0.0411	0.0365
BCK 3.3	green sunfish	5/25/2021	0.0527	pCi/g	U	0.118	0.0689
BCK 3.3	redbreast sunfish	11/3/2021	0.0521	pCi/g	J	0.0524	0.0383
BCK 3.3	redbreast sunfish	11/3/2021	0.0511	pCi/g		0.0445	0.0353
EFK 0.0	white crappie	5/18/2021	0.0504	pCi/g	J	0.0675	0.0442
BCK 3.3	redbreast sunfish	5/12/2021	0.0486	pCi/g	U	0.163	0.089
BCK 3.3	redbreast sunfish	5/12/2021	0.0486	pCi/g	J	0.0544	0.0378
EFK 0.0	yellow bass	5/18/2021	0.0482	pCi/g		0.041	0.0348
BCK 0.5	redbreast sunfish	5/17/2021	0.0477	pCi/g	J	0.0571	0.0405
BCK 0.5	rock bass	10/27/2021	0.0474	pCi/g	J	0.0636	0.0416
EFK 0.0	spotted bass	5/18/2021	0.0453	pCi/g		0.0386	0.0328
EFK 0.0	bluegill sunfish	5/18/2021	0.0442	pCi/g	U	0.135	0.0755
EFK 0.0	largemouth bass	10/26/2021	0.0439	pCi/g	J	0.054	0.0365
EFK 0.0	redbreast sunfish	5/18/2021	0.0422	pCi/g	J	0.0578	0.0392

BCK 3.3	green sunfish	5/12/2021	0.0408	pCi/g	J	0.078	0.049
EFK 0.0	bluegill sunfish	10/26/2021	0.039	pCi/g	J	0.0617	0.0394
BCK 0.5	redbreast sunfish	5/17/2021	0.0372	pCi/g	U	0.119	0.0643
BFK 7.6	**bluegill sunfish**	**5/26/2021**	**0.0364**	**pCi/g**	U	0.0873	0.0505
BCK 0.5	largemouth bass	10/27/2021	0.0352	pCi/g	U	0.0712	0.0423
BCK 3.3	redbreast sunfish	11/3/2021	0.0326	pCi/g	J	0.052	0.0336
BCK 0.5	green sunfish	5/17/2021	0.0322	pCi/g	U	0.0711	0.0418
BCK 0.5	rock bass	10/27/2021	0.0316	pCi/g	U	0.0757	0.0437
EFK 0.0	yellow bass	5/18/2021	0.0311	pCi/g	J	0.0596	0.0366
EFK 0.0	yellow bass	5/18/2021	0.0297	pCi/g	J	0.0454	0.0308
EFK 0.0	walleye	5/18/2021	0.0291	pCi/g	U	0.0931	0.0504
EFK 0.0	spotted bass	10/26/2021	0.0281	pCi/g	J	0.0448	0.029
EFK 0.0	largemouth bass	10/26/2021	0.0261	pCi/g	U	0.0536	0.0319
BCK 0.5	redbreast sunfish	5/17/2021	0.0242	pCi/g	J	0.0463	0.029
BCK 3.3	largemouth bass	5/25/2021	0.0203	pCi/g	U	0.0487	0.0282
BCK 0.5	rock bass	10/27/2021	0.02	pCi/g	U	0.153	0.0783
BFK 7.6	**redbreast sunfish**	**5/26/2021**	**0.0193**	**pCi/g**	U	0.0926	0.0464
BCK 0.5	redbreast sunfish	10/27/2021	0.0192	pCi/g	U	0.0774	0.042
BFK 7.6	**rock bass**	**10/20/2021**	**0.0155**	**pCi/g**	U	0.0694	0.0366
BCK 3.3	bluegill sunfish	11/3/2021	0.00985	pCi/g	U	0.159	0.0796
EFK 0.0	bluegill sunfish	10/26/2021	0.00838	pCi/g	U	0.0603	0.0307
BFK 7.6	**redbreast sunfish**	**10/20/2021**	**0.00549**	**pCi/g**	U	0.0607	0.0285
BCK 0.5	redbreast sunfish	10/27/2021	0.00428	pCi/g	U	0.0692	0.0346
BCK 3.3	rock bass	11/3/2021	0	pCi/g	U	0.0772	0.0364
BCK 3.3	rock bass	5/25/2021	0	pCi/g	U	0.0675	0.0318
BCK 0.5	bluegill sunfish	10/27/2021	-0.00982	pCi/g	U	0.159	0.0745
BCK 3.3	largemouth bass	5/25/2021	-0.0108	pCi/g	U	0.155	0.07
BCK 3.3	green sunfish	5/25/2021	-0.0353	pCi/g	U	0.143	0.0599

[xii] Argonne National Laboratory, Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil and Building Structures (ANL/EVS/TM-14/4)

[xiii] IAEA, Technical Reports Series No. 472, Handbook of Parameter Values for the Prediction of Radionuclide Transfer in Terrestrial and Freshwater Environments, 2010

[xiv] 137Cs activities and 135Cs/137Cs isotopic ratios from soils at Idaho National Laboratory: a case study for contaminant source attribution in the vicinity of nuclear facilities

Part 4 – Comments primarily related to the Water Quality Protection of Bear Creek fact sheet, page 4 concerning mercury discharge limits, PCBs, and antidegradation and the TSCA ARAR exemption or waiver in the Site Groundwater Characterization fact sheet. These were provided jointly by Andy Binford and Steve Goins.

On November 4, 2021, several former TDEC employees sent a letter concerning the Environmental Management Disposal Facility (EMDF) to EPA Administrator Michael S. Regan. The December 29, 2021, response from Acting Assistant Administrator Barry N. Breen stated the EPA, DOE, and TDEC will solicit and consider public comments on new information before EPA and DOE finalize the ROD. This response letter encouraged us to review new information added to the Administrative Record file as well as provided to the public on a dedicated website. The website includes the following new information:

EMDF Site Groundwater Characterization fact sheet
EMDF Waste Acceptance Criteria fact sheet
EMDF Water Quality Protection for Bear Creek fact sheet
Draft Record of Decision – July 2021
Draft ROD Responsiveness Summary
Technical Memo #1: Phase 1 Field Sampling Results (July 2, 2018)
Technical Memo #2: Phase 1 Monitoring (May 23, 2019)
Development of Fish Tissue and Surface Water Preliminary Remediation Goals (April 28, 2022)
Performance Assessment for the Environmental Management Disposal Facility at the Y-12 National Security Complex, Oak Ridge, Tennessee (April 23, 2020)
Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee (April 16, 2022)
Link to the Oak Ridge Environmental Information System (OREIS)

The Water Quality Protection for Bear Creek fact sheet discusses setting protective limits for Bear Creek and on page 4 discusses mercury discharge limits and specifies the State's antidegration rule applies to methylmercury and PCBs. The following comments focus on mercury and PCBs and Water Quality Protection for Bear Creek and downstream.

1) If Clean Water Act pollutants in addition to mercury and PCBs are present in the EMDF discharge, CERCLA requires that applicable CWA requirements apply to those pollutants.

Response: Detailed information on how the radiological PRGs were developed was provided for public review during the recent public involvement period for EMDF siting, Bear Creek water quality and WAC, both as a link in the *Water Quality Protection for Bear Creek fact sheet* and as a document on the public access website (*Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee* [UCOR 2022]). In addition, the public has access to both EPA Administrator Wheeler's dispute decision letter, available in the Administrative Record since May 2021, and the previous versions of the Focused Feasibility Study (FFS). These documents were available to the public during the additional public involvement period as part of the Administrative Record and through the DOE Information Center. Approval of the FFS is planned prior to ROD signature.

While the mercury effluent limit has been set in the D2 ROD, in accordance with the Clean Water Act and other ARARs, final PCB discharge limits will be developed in post-ROD documents to meet the most restrictive of the applicable TDEC WQC (TDEC 0400-40-03-.03, General Water Quality Criteria, "Criteria for Water Uses") and antidegradation requirements (TDEC 0400-40-03-.06, General Water Quality Criteria, "Antidegradation Statement").

This approach is consistent with but does not depend on the FFS and is in accordance with the EPA Administrator Dispute Decision that allows for concurrent development of the FFS and ROD as stated: "It is my expectation that fish tissue studies and development of PRGs for effluent limitations for radionuclides will occur in parallel with Region 4's review of the draft ROD to continue progress on the remedial actions for establishing additional landfill capacity at ORR." Because the PRGs are included in both the FFS and the EMDF ROD, concurrent development of both documents is reasonable and expected.

2) The *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) was in formal dispute during the previous EMDF Proposed Plan public comment period and was not available for public comment. This

focus feasibility study was supposed to determine discharge levels for the existing Environmental Management Waste Management Facility (EMWMF) and the proposed Environmental Management Disposal Facility (EMDF), which is the subject of this public comment period. The dispute resolution to this formal dispute is relevant to discharge of CWA pollutants including mercury and PCBs and even though the resolution was after the previous comment period that information is not included as new information on the dedicated website. An additional version of the focused feasibility study was submitted after the Proposed Plan comment period that was not approved by EPA and TDEC. Seeking public comment on the Water Quality Protection for Bear Creek fact sheet prior to resolution of said Focus Feasibility Study for Water Management puts the cart before the horse.

Response: Detailed information on how the radiological PRGs were developed was provided for public review during the recent public involvement period for EMDF siting, Bear Creek water quality and WAC, both as a link in the *Water Quality Protection for Bear Creek fact sheet* and as a document on the public access website (*Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee* [UCOR 2022]). In addition, the public has access to both EPA Administrator Wheeler's dispute decision letter, available in the Administrative Record since May 2021, and the previous versions of the FFS. These documents were available to the public during the additional public involvement period as part of the Administrative Record and through the DOE Information Center. Approval of the FFS is planned prior to ROD signature.

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3) The *Strategic Plan for Mercury Remediation at the Y-12 National Security Complex Oak Ridge Tennessee* (DOE/OR/01-2605&D2/R1) states that mercury contamination at the Y-12 National Security Complex (Y-12) was identified as the greatest environmental risk on the Oak Ridge Reservation (ORR) and Table 1 shows 2 million pounds of mercury, much of which was apparently lost to the environment or in building structures, was unaccounted for. The Focus Feasibility for Water Management includes an analysis that shows disposing Y-12 waste in EMDF may cause significant mercury concentrations in EMDF landfill wastewater[i]. **It does not make sense for the federal government to spend hundreds of millions of dollars on a mercury treatment plant to reduce mercury releases to East Fork Poplar Creek during decommissioning, demolition, and remediation of Y-12 and then to move waste containing mercury to the proposed EMDF, not correctly apply the State's antidegradation rules, and release the mercury into the same watershed via Bear Creek.**

Response: Mercury waste will be strictly restricted for disposal in the EMDF. As stated in the *EMDF Waste Acceptance Criteria fact sheet*, which was available for public review and comment, elemental mercury and RCRA mercury characteristic hazardous waste will not be allowed to be

disposed in the EMDF. In addition, the mercury strategy detailed in the D2 ROD describes how the antidegradation requirements will be applied.

4) **The current Environmental Management Waste Management Facility (EMWMF) is authorized to accept TSCA PCB waste yet controlling release of Clean Water Act (CWA) pollutant PCBs to surface water has not been a priority.** The Focus Feasibility Study for Water Management[ii] was supposed to determine discharge criteria for a future EMDF and the existing EMWMF. This Focus Feasibility Study screened out PCBs from being a contaminant of concern due to the number of non-detected values for PCBs in EMWMF landfill wastewater discharge even though PCB detection limits and reporting limits of said discharge samples were generally 100 to 1000 times greater than promulgated recreational use water quality criteria. Bear Creek is designated for recreational use and promulgated water quality criteria for total PCBs in surface water designated for recreational use is 0.00064 ug/L. EMWMF discharges to Bear Creek surface water during February 2003 utilized a detection limit for PCB-1260 of about 2 times the water quality criteria at 0.00125 ug/L. Oak Ridge Environmental Information System (OREIS) data shows that since March 2003 detection limits for PCB-1260 in EMWMF landfill wastewater discharges ranged from 0.0311 to 0.532 ug/L with reporting limits ranging from 0.0317 to 0.61ug/L. Wastes containing PCBs such as Disposal Area Remedial Action (DARA) soil and debris were disposed in EMWMF and wastewater discharge sampling has been insufficient to monitor PCBs at recreational use water quality criteria in wastewater discharged to Bear Creek. PCB-1260 is found in fish in Bear Creek and there are higher concentrations in fish upstream near EMWMF than downstream.

Response: See response to Additional Comment 54 (this comment), Part 1 Comment #14.

DOE disagrees that control of PCBs is not a priority. PCB waste disposed in the EMWMF is primarily painted surfaces where PCB was present in the paint. This form of PCBs is not soluble. No PCB liquids are allowed in the EMWMF. As described in the response Additional Comment 54 (this comment), Part 3 Comment #15, AWQC for chemicals with higher risk were sometimes set at concentrations that are not possible to detect using current laboratory methods. Over time, analytical methods are expected to improve to allow detection at these very low levels.

Sources of more mobile forms of PCBs are found associated with legacy waste sites in Bear Creek Valley and are the sources for the PCBs found in fish tissue.

5) **The proposed landfill discharge as presented in the Water Quality Protection for Bear Creek fact sheet is impermissible because it violates the Antidegradation Statement (Rule 0400-40-03-.06) of Tennessee's water quality standards and thus also violates the Water Quality Control Act.**

Tennessee's water quality standards are found in regulation and are composed of three parts: stream-use classifications, general water quality criteria, and the Antidegradation Statement. The latter regulates when and if degradation, the movement of water quality from better to worse quality, can be authorized. Tennessee's water quality standards have been approved by EPA, apply for any action subject to the Clean Water Act (CWA) in Tennessee, and unless officially waived are applicable requirements for CWA pollutants under CERCLA at the Oak Ridge Reservation (ORR).

DOE's Water Quality Protection for Bear Creek fact sheet addresses antidegradation and correctly states that it applies, particularly in regard to bioaccumulative substances like PCBs and mercury. But it then vaguely states that the requirements of this rule will be addressed by later water quality improvements, such as studying the processes in which methylation occurs.

That is simply not how antidegradation in TDEC rules works.

According to this rule, if a stream has unavailable parameters for a substance proposed as a new or increased discharge, that additional substance loading can only be allowed if it has been shown to be neither measurable nor bioaccumulative. Clearly, Bear Creek and downstream East Fork Poplar Creek are impacted for PCBs and mercury and are unavailable for new loadings of those substances.

Thus, any new or increased discharge of mercury and/or PCBs into Bear Creek is impermissible. An increased discharge refers to increased loading or adding additional parameters at an existing discharge irrespective of whether there is an increase or decrease in discharge volume.

The way we understand the new EMDF, it proposes a new or increased discharge of bioaccumulative unavailable parameters and approval of the discharge violates the antidegradation rule.

To make sure the antidegradation rule concerning unavailable parameters mercury and PCBs is clear, it states at TDEC Rule 0400-40-03-.06(2)(a) the following:

> In waters with unavailable parameters, new or increased discharges that would cause measurable degradation of the parameter that is unavailable shall not be authorized. Nor will discharges be authorized in such waters if they cause additional loadings of unavailable parameters that are bioaccumulative or that have criteria below current method detection levels.

Note that the rule also includes the requirement that discharges are impermissible if unavailable parameters in the discharge cannot be measured to the water quality criteria or there is increased loading of an unavailable bioaccumulative pollutant. Therefore, discharges of PCBs and mercury to Bear Creek at a future EMDF are also impermissible due to current detection and reporting limits DOE uses at the existing CERCLA landfill (i.e., EMWMF) for those parameters.

The fact sheet also suggests that since fish in Bear Creek are small and current recreational use is limited, the concern about bioaccumulative substances is mitigated. This is an improper suggestion. While the size of existing fish and public recreational access might be factors in whether the State issues a fish consumption advisory, it is not a factor in whether or not recreational criteria or the antidegradation rule apply. Bear Creek is classified for this use and the criteria and antidegradation rule properly apply at full strength.

> **Response: DOE disagrees that the fact sheet approach is impermissible because it violates the Antidegradation Statement. As noted in the responses to Additional Comment 54 (this comment), Part 4 Comments #1 and #2, while the mercury effluent limit has been set in the D2 ROD, in accordance with the Clean Water Act and other ARARs, PCB discharge limits will be developed in post-ROD documents to meet the most restrictive of the applicable TDEC WQC (TDEC 0400-40-03-.03, General Water Quality Criteria, "Criteria for Water Uses") and antidegradation requirements (TDEC 0400-40-03-.06, General Water Quality Criteria, "Antidegradation Statement").**

6) **The Site Groundwater Characterization fact sheet references a request to waive a TSCA requirement at 40 CFR 761.75(b)(3), that *"There shall be no hydraulic connection between the site and standing or flowing surface water*". This is not protective of human health and should not be granted.** The existing EMWMF is authorized to accept TSCA PCB waste and as stated in another comment, control of discharge of PCBs to surface water has not been a priority for almost 20 years. Recall that the Focus Feasibility for Water Management screened PCBs out from being a contaminant of concern for the proposed EMDF based on the number of detections of PCBs when detection and reporting limits were 100 to 1000 times higher than promulgated recreational use water quality criteria. Isolation of the EMDF

site from surface water is needed during landfill operations, closure, and post closure to protect human health and the environment from PCB pollution.

Response: See responses to Additional Comment 54 (this comment), Part 1 Comment #14 and Part 4 Comment #4.

7) **Waste containing PCBs should not be disposed in a future EMDF. EMDF should not be approved for disposal of TSCA waste, the TSCA waiver requested in the Site Groundwater Characterization fact sheet should not be granted, and TSCA waste containing PCBs should be shipped offsite to a permitted facility.** CERCLA at 42 U.S. Code § 9621(d)(1) requires that "Remedial actions selected under this section or otherwise required or agreed to by the President under this chapter shall attain a degree of cleanup of hazardous substances, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment." (Emphasis added). With an existing 10^{-4} excess lifetime cancer risk (ELCR) from PCBs[iii] in fish in Bear creek, moving waste containing PCBs from elsewhere on the Oak Ridge Reservation (ORR) to EMDF and releasing additional PCBs to Bear Creek surface water is inconsistent with said control of further release required by CERCLA.

Response: See response to Additional Comment 54 (this comment), Part 4 Comment #4.

8) Consistent with the Water Quality Protection of Bear Creek fact sheet, DOE stated at the May 17th public meeting that the discharge criteria for mercury into Bear Creek is 51 parts per trillion (ppt). The fact sheet also states that antidegradation applies to methylmercury instead of mercury. Setting discharge criteria at 51 ppt mercury with antidegradation based on methylmercury instead of mercury violate applicable requirements. To be consistent with applicable requirements, mercury discharge limits would be based on:

EPA Comment 104 on the EMDF D1 Record of Decision (ROD) states *"In order to meet the CWA requirements and be consistent with the NCP, the discharge must meet the most stringent of either the [Technology Based Effluent Limits (TBEL)] (which has yet to be determined), a [Water Quality Based Effluent Limit (WQBEL)], or an antidegradation-based limit."*

Bear Creek is listed on the 303(d) list of impaired and threated waters for mercury, not methylmercury. Antidegradation applies to mercury.

51 ppt is the promulgated water criteria that, when combined with maximum flow rate, can be used to develop the water quality-based effluent limit for mercury.

Water Quality Protection for Bear Creek fact sheet specifies treatment will include, at a minimum, chemical flocculation/precipitation, and sediment removal. This is likely not an appropriate methodology to establish the TBEL for mercury. To be consistent with applicable CWA requirements, a TBEL for mercury must be established.

Antidegradation-based limits for mercury based on applicable requirement TDEC Rule 0400-40-03-.06(2)[iv] should also incorporate:

i) New or increased discharges of unavailable parameters, such as mercury, shall not be authorized if the discharge would cause measurable degradation of surface water for the unavailable parameter. Bear Creek is included on the 303(d) list for mercury and a 95% UCL mercury concentration of 5.17 ng/L (ppt) with a median of 3.3 ng/L (ppt) can be calculated in Bear Creek surface water near the proposed EMDF.[v] Authorizing discharges of mercury that would increase mercury in-stream concentrations violates antidegradation based limits. And

ii) Discharges of bioaccumulative parameters, such as mercury, will not be authorized if they cause additional loading of the unavailable parameter (e.g., mercury). Neither the Focus Feasibility for Water

Management[vi] nor the EMDF D1 ROD include competent loading analysis that verifies proposed discharge criteria do not increase mercury loading to Bear Creek. Without that analysis, antidegradation based discharge criteria are not determined and any approval of discharge limits is inconsistent with the Clean Water Act (CWA) applicable requirement and the NCP. A competent baseline mercury loading analysis for EMWMF is needed to determine anti-degradation-based limits for a future EMDF.

To help understand the impact of using concentration based limits verses mass based limits, consider the following example. These increases of mercury in Bear Creek would all be allowable if the discharge standard is based solely on 51 ppt without consideration of mass limitations and antidegradation.

i) Discharges at 51 ppt (ng/L) at 1 gallon per minute would release a mass of about 193 nanograms (ng) of mercury per minute to surface water. A 193 ng/minute discharge mixed in 335 L/min results in an increase of in-stream mercury of about 0.57 ppt.

ii) Discharges at 51 ppt at 30 gallons per minute would release a mass of about 5,792 ng of mercury per minute to surface water. A 5,792 ng/minute discharge mixed in 436 L/min results in an increase of in-stream mercury of about 13.3 ppt.

iii) Discharges at 51 ppt at 172 gpm would release a mass of about 33,205 ng of mercury per minute to surface water. A 33,205 ng/minute discharge mixed in 986 L/min results in an increase of in-stream mercury of about 33.7 ppt.

The 95% UCL for flow from EMWMF for the period of calendar year (CY) 2016 through CY 2020 was about 172 gpm. The 30-day 5-year recurrent flow in Bear Creek near the proposed EMDF is estimated at about 335[vii] liters per minute (L/min). For each example, instream water volume to calculate the in-stream concentration increase was the sum of 335 L/min and the discharge flow rate.

Response: DOE disagrees with this comment. As stated in the *Water Quality Protection for Bear Creek fact sheet*, the EMDF approach not only reduces mercury loading to Bear Creek but restores the stream to the designated recreational use by reducing legacy mercury contamination. See response to Part 4 (this comment) Comment #5.

9) **The 51 ppt concentration-based discharge limit for mercury proposed by DOE in the Water Quality Protection of Bear Creek fact sheet violates applicable TDEC rule 0400-40-10-.03(3)(f) requiring mass limitations**.

Response: See responses to Additional Comment 54 (this comment), Part 4 Comments #5 and #8.

10) **Setting discharge limits for protection of water quality in Bear Creek is good. However, irrespective of the limits, if monitoring of discharges are not consistent with applicable monitoring requirements for NPDES discharges, Water Quality Protection for Bear Creek and downstream is not ensured.** Developing discharge standards that are protective of human health and the environment and that meet applicable or relevant and appropriate requirements (ARARs) are required by CERCLA and the NCP. However, if monitoring is not improved compared to current activities at EMWMF, even with discharge standards, the impact on human health and environment is uncertain. For example, for calendar year (CY) 2020, 2 samples of landfill wastewater effluent discharged from EMWMF to surface water were analyzed for mercury. Similarly, for CY 2021, 2 samples of landfill wastewater effluent discharged from EMWMF to surface water were analyzed for mercury. Laboratory methods, method detection limits, and reporting limits for these samples were insufficient to quantify mercury released. Methods such as EPA method 1631 or 1631E are available with lower detection limits than those used. Analyzing only 2 samples per year of landfill wastewater discharge for mercury with detection limits higher than levels of mercury released leaves a lot of room for mercury pollution in discharges to be missed. Further, at EMWMF, contact

water is accumulated in contact water tanks and ponds and the contact water is batch released to the sedimentation basin. Landfill wastewater flows from the sedimentation basin to surface water. Releases from contact water tanks and ponds to the sedimentation basin are not documented in OREIS and it is unknown whether the 2 samples analyzed per year were collected before, during, after, or between releases from contact water ponds and tanks to the sedimentation basin.

Response: Monitoring for discharges will be in accordance with ARARs and will be detailed in a post-ROD document (Remedial Action Work Plan) provided for EPA and TDEC review/ approval.

DOE strongly disagrees with the comment that only two samples per year are provided in the Oak Ridge Environmental Information System (OREIS) database. As provided in the OREIS database, all EMWMF landfill wastewater discharged from the contact water ponds and tanks is analyzed for mercury and other COCs, with results demonstrating compliance with discharge limits obtained prior to release. The analytical methods have low enough detection limits to detect mercury to below 51 ppt. These methods are in accordance with the EMWMF SAP/Quality Assurance Project Plan, which is approved by the FFA parties. All contact water sample data are included in OREIS; DOE suggests searching using the contact water ponds and tanks locations to provide the commenter with these data.

The contact information to obtain OREIS Support is found on the OREIS main page. OREIS support will help the reviewer retrieve these standard data if additional help is needed. Please note, this is a large quantity of data.

11) The focus in the Water Quality Protection for Bear Creek fact sheet is on Recreational use and protecting humans using surface water is important. However, both CERCLA and Tennessee ARARs require protecting the environment (e.g., fish and aquatic life). **The Record of Decision should also include effluent toxicity testing, biological integrity monitoring, and other measures to ensure protection of the environment.**

Response: See response to Additional Comment 54 (this comment), Part 3 Comment #8.

12) **Several TDEC rules applicable to release of mercury, and PCBs, referenced on page 4 of the Water Quality Protection for Bear Creek fact sheet include:**

a) **TDEC Rule 0400-40-05-.08(1) EFFLUENT LIMITATIONS AND STANDARDS**

(g) All pollutants shall receive treatment or corrective action … to insure compliance with any approved water quality standard, …

(k) All permit effluent limitations, standards, and prohibitions shall be established for each outfall or discharge point of the permitted facility, except as otherwise provided for BMPs where limitations on effluent or internal waste streams are infeasible.

(m) For continuous discharges, all permit effluent limitations, standards, and prohibitions shall be expressed as maximum daily, weekly average (for POTWs only) and monthly average, unless impracticable.

(n) Non-continuous discharges shall be limited in terms of frequency, total mass, maximum rate of discharge, and mass or concentrations of specified pollutants, as appropriate.

(q) When permit effluent limitations or standards imposed at the point of discharge are impractical or infeasible, effluent limitations or standards for discharges of pollutants may be imposed on internal waste streams before mixing with other waste streams or cooling water streams. In those instances, the

monitoring required shall also be applied to the internal waste streams. Limits on internal waste streams will be imposed only when the rationale sets forth the exceptional circumstances which make such limitations necessary, such as when the final discharge point is inaccessible (for example, under water), the wastes at the point of discharge are so diluted as to make monitoring impracticable, or the interferences among pollutants at the point of discharge would make detection or analysis impracticable.

(r) Instantaneous maximum concentration or similar limitations may be imposed in permits when: 1. Toxic or harmful parameters are present in such significant amounts or concentrations as to represent a threat to the possibility of maintaining receiving waters in accordance with established classifications; and 2 The discharge is characterized as irregular, such as high peak, short duration flow.

(s) Any discharge or activity authorized by a permit which is not a minor discharge or activity, or the regional administrator requests, in writing, be monitored, or contains a toxic pollutant for which an effluent standard has been established shall be monitored by the permittee for the following**:** 1. Flow (in million gallons per day); and 2. Any of the following pollutants: (i) Pollutants (either directly or indirectly through the use of accepted correlation coefficients or equivalent measurements determined to be applicable to the discharge to which they are applied) which are subject to reduction or elimination under the terms and conditions of the permit; (ii) Pollutants which the commissioner finds, on the basis of information available, could have a significant impact on the quality of waters; (iii) Pollutants specified by the administrator, in regulations issued pursuant to the Federal Water Pollution Control Act, as subject to monitoring; and (iv) Any pollutants, in addition to those identified in subparts (i) through (iii) of this part, which the regional administrator or the Commissioner request be monitored

b) **TDEC Rule 0400-40-05-.10 WATER QUALITY-BASED PERMITTING** (1) Effluent limitations on toxic substances will be required in accordance with the General Water Quality Criteria, Chapter 0400-40-03, using the LC50 and/or IC25 criteria and appropriate application factor for each toxic parameter

c) **TDEC Rulee 0400-40-10-.03(3) Text of Cited Federal Regulations 40 CFR § 122.45 Calculating NPDES permit conditions (applicable to State NPDES programs, see § 123.25)**

(a) Outfalls and discharge points. All permit effluent limitations, standards and prohibitions shall be established for each outfall or discharge point of the permitted facility, except as otherwise provided under § 122.44(k) (BMPs where limitations are infeasible) and paragraph (i) of this section (limitations on internal waste streams).

(d) Continuous discharges. For continuous discharges all permit effluent limitations, standards, and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated as: (1) Maximum daily and average monthly discharge limitations for all dischargers other than publicly owned treatment works;

(e) Non-continuous discharges. Discharges which are not continuous, as defined in § 122.2, shall be particularly described and limited, considering the following factors, as appropriate:

(1)Frequency (for example, a batch discharge shall not occur more than once every 3 weeks);

(2) Total mass (for example, not to exceed 100 kilograms of zinc and 200 kilograms of chromium per batch discharge);

(3) Maximum rate of discharge of pollutants during the discharge (for example, not to exceed 2 kilograms of zinc per minute); and

(4) Prohibition or limitation of specified pollutants by mass, concentration, or other appropriate measure (for example, shall not contain at any time more than 0.1 mg/L zinc or more than 250 grams (¼ kilogram) of zinc in any discharge).

(f) **Mass limitations.**

(1) All pollutants limited in permits shall have limitations, standards or prohibitions expressed in terms of mass except:

(i) For pH, temperature, radiation, or other pollutants which cannot appropriately be expressed by mass;

(ii) When applicable standards and limitations are expressed in terms of other units of measurement; or

(iii) If in establishing permit limitations on a case-by-case basis under § 125.3, limitations expressed in terms of mass are infeasible because the mass of the pollutant discharged cannot be related to a measure of operation (for example, discharges of TSS from certain mining operations), and permit conditions ensure that dilution will not be used as a substitute for treatment.

(2) Pollutants limited in terms of mass additionally may be limited in terms of other units of measurement, and the permit shall require the permittee to comply with both limitations.

(h) Internal waste streams

(1) When permit effluent limitations or standards imposed at the point of discharge are impractical or infeasible, effluent limitations or standards for discharges of pollutants may be imposed on internal waste streams before mixing with other waste streams or cooling water streams. In those instances, the monitoring required by § 122.44(i) shall also be applied to the internal waste streams.

(2) Limits on internal waste streams will be imposed only when the fact sheet under § 124.56 sets forth the exceptional circumstances which make such limitations necessary, such as when the final discharge point is inaccessible (for example, under 10 meters of water), the wastes at the point of discharge are so diluted as to make monitoring impracticable, or the interferences among pollutants at the point of discharge would make detection or analysis impracticable.

d) **TDEC Rule 0400-40-03-.03(4)(j)** Recreation use water quality standards are based on 10^{-5} excess lifetime cancer risk for individual contaminants (or groups of contaminants, e.g., Total PCBs)

e) **TDEC Rule 0400-40-03-.05(4)** specifies discharge requirements in permits for discharge to surface water designated as recreational use are based on 30-day minimum five-year recurrence interval stream flow. (This may be estimated by USGS StreamStats.)

f) **TDEC Rule 0400-40-03-.05(6)** All discharges of sewage, industrial waste, and other waste shall receive the degree of treatment or effluent reduction necessary to comply with water quality standards.

g) **TDEC Rule 400-40-03-.03(4)(l)** Fish Consumption Advisories - A public fishing advisory will be considered when the calculated risk of additional cancers exceeds 10-4 for typical consumers or 10-5 for atypical consumers

h) **TDEC Rule 0400-40-03-.05(2)** … Mixing zones shall not apply to the discharge of bioaccumulative pollutants to waters of the state where the risk-based factors in Rule 0400-40-03-.03(4)(l) are exceeded for the pollutant group.

i) **Rule 0400-40-03-.03 (3) The criteria for the use of Fish and Aquatic Life**

(d) Turbidity, Total Suspended Solids, or Color - There shall be no turbidity, total suspended solids, or color in such amounts or of such character that will materially affect fish and aquatic life. In wadeable streams, suspended solid levels over time should not be substantially different than conditions found in reference streams.

(g) Toxic Substances - The waters shall not contain substances or a combination of substances including disease - causing agents which, by way of either direct exposure or indirect exposure through food chains, may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), physical deformations, or restrict or impair growth in fish or aquatic life or their offspring.

(m) Biological Integrity - The waters shall not be modified through the addition of pollutants or through physical alteration to the extent that the diversity and/or productivity of aquatic biota within the receiving waters are substantially decreased or, in the case of wadeable streams, substantially different from conditions in reference streams in the same ecoregion. The parameters associated with this criterion are the aquatic biota measured. These are response variables.

j) **Rule 0400-40-05-.10 WATER QUALITY-BASED PERMITTING**.

(1) Effluent limitations on toxic substances will be required in accordance with the General Water Quality Criteria, Chapter 0400-40-03, using the LC50 and/or IC25 criteria and appropriate application factor for each toxic parameter.

(2) Appropriate limitations on organic related and other oxygen demanding parameters will be required in any permit to insure adequate dissolved oxygen in the state's waters in accordance with the General Water Quality Criteria, Chapter 0400-40-03.

(3) When a treatment process greater than BAT or conventional unit treatment processes is required by application of these rules, a set of effluent limitations will be required in any permit which will completely describe expected results of such treatment process.

(4) Effluent limitations may be required in any permits to insure compliance with the Antidegradation Statement, Rule 0400-40-03-.06.

Response: See response to comment in Additional Comment 54 (this comment), Part 3 Comment #7. [Note – the introduction is different for each of the two comments and the quote from the Dispute Decision letter is not included in Part 4 Comment #12 (this comment), otherwise they are identical.]

[i] *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) APPENDIX E. Mercury Concentration in Environmental Management Disposal Facility Leachate includes: *"Untreated soils and debris that pass TCLP will be disposed of in the landfill. Although mercury has naturally high Kds, the amount of mercury-contaminated waste soil and debris expected to be disposed is large enough to result in significant "as-disposed" soil mercury concentrations that may result in measurable mercury concentrations in the leachate (see Fig. E.3). "As-generated" soil/debris mercury concentrations must be adjusted to account for the addition of soil fill, necessary for landfill stability, and the inclusion of other wastes in the landfill resulting in an "as-disposed" mercury concentration. The assumed volume of mercury-contaminated debris and soil to be disposed that will not require treatment to meet LDRs is approximately 300,000 CY. This material will be disposed along with the mercurycontaining debris and soil within the first three cells resulting in a final as-disposed volume of approximately 1.25M CY. Consequently, the as-generated mercury concentrations would be reduced by a factor of about four. Assuming the resulting, as-disposed concentration is in the range of 0.03 to 0.25 mg/kg (equivalent to an as-generated waste mercury concentrations corresponding to 0.1 to ~1 mg/kg), leachate concentrations could exceed the 51 ppt ambient water quality criteria (AWQC) for mercury depending on the Kd exhibited (see Fig. E.3). As noted in the Alpha-5 characterization results, mercury concentrations are highly variable, and 95% of debris samples exhibiting mercury concentrations up to 151 mg/kg may pass TCLP. Taking this as an upper bound of the as-generated mercury concentration and assuming the Kds for contaminated debris would be the same as soil, a leachate mercury concentration in the range of 10,000 (highest Kd) to 90,000 ppt (lowest Kd) might be possible. With the uncertainty in volumes of soil/debris to be disposed, and the variability in as-generated mercury concentrations, predictions are highly uncertain. It is expected that leachate concentrations will vary widely for reasons such as variability in rainfall, sequencing of waste volumes, operations procedures, etc."*

[ii] *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee (*DOE/OR/01-2664&D1) (DOE/OR/01-2664&D2) and (DOE/OR/01-2664&D3)

[iii] The 95% Upper Confidence Level of the sum of PCB-1254 and PCB-1260 in fish collected from Bear Creek for the 5-year interval of Calendar Year (CY) 2017 through CY2021 is 0.782 mg/kg. Using the EPA Regional Screening Level Calculator at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search with 17500 mg/day fish ingestion rate, 365 days per year, for 26 years consistent with assumptions in EMDF PRG Development, an existing excess lifetime cancer risk (ELCR) of 1.27E-04 from ingestion of fish collected from Bear Creek is calculated.

[iv] TDEC Rule 0400-40-03-.06(2)(a) *In waters with unavailable parameters, new or increased discharges that would cause measurable degradation of the parameter that is unavailable shall not be authorized. Nor will discharges be authorized in such waters if they cause additional loadings of unavailable parameters that are bioaccumulative or that have criteria below current method detection levels.*

[v] OREIS data of mercury in surface water at Bear Creek sampling stations BCK 9.2 and BCK 07.87 with mercury analysis performed by EPA method 1631 or 1631E from 2009 through 2020 were evaluated using ProUCL 5.1. This evaluation yielded a mercury concentration 95% UCL of 5.17 ng/L (ppt) and a median mercury concentration of 3.3 ng/L (ppt).
[vi] *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee (*DOE/OR/01-2664&D1) (DOE/OR/01-2664&D2) and (DOE/OR/01-2664&D3)
[vii] Derived from USGS StreamStats

Additional Comment 55: Comment from Juan Dale Rector

Video

0:43 The municipal sewage system was contaminated by doing demolition work this way. DOE recovered the treatment plant sludge, however. Bringing debris down on concrete with no cover subjects the contamination to rain driven runoff. This part of the video illustrates the problem perfectly with the radiation sign in the foreground. Additionally, the structural steel in Manhattan Project buildings was mostly forged prior to the nuclear age, and is about the most volumetrically clean metal in the world. It was about all wasted by disposing it in EMWMF. It became surface contaminated by processes or by intentional mixing of wastes during demolition. EMDF would not be needed if the wastes were properly sorted and segregated and reusable material was surface decontaminated for reuse. Even the concrete could be reprocessed to make more concrete after surface decontamination.

0:45 There are obvious erosion problems on the EMWMF slope. The slope was left unprotected during one or more rainfall events. This leads to more questions about sediment and contaminate transfer.

2:08 “worked with EPA and the State for nearly a decade” DOE has not conformed with requirements of law as stipulated a decade ago.

2:26 No site on the Oak Ridge Federal Properties meets the intrinsic safety requirements for the proposed waste disposal. That is the reason for the DOE request for regulatory waivers. The regulatory requirements are clear in purpose that a disposal site has intrinsic safety in case engineering components fail before the contaminants become inert through attenuation or nuclear decay. Indeed, uranium and transuranic radioisotopes develop long strings of progeny that concentrate and then disperse over centuries and millennia. By the way, some of the administrative limits mentioned are economic discard limits and have no basis on environmental or human health protection. In the old days, if the specific activity was more than a certain amount, it might worth mining the product out in the future. After a long time material sat around until folks realized there was no use for it. It was then designated waste. Transuranic waste is one example. As an example, “transuranic waste” has no environmental context. Much less activities of transuranic isotopes are hazardous.

2:59 I guess DOE did not tell the producer of this video about when contractors spilled radioactive contamination on State Hwy 95 that caused a multiagency response and road closure. It cost more than two million dollars to clean it up. DOE had to remove a lane of the road and repave. I was the emergency response liaison for my Division at TDEC at the time and it kept me and others busy the whole weekend. What a mess! It required DOE to do a “Type B” report because it cost so much money. There are other examples, one of which resulted in a fine to an EMWMF contractor for releasing radioactive water into Bear Creek.

3:30 The present concentration of pollutants in fish is not indicative of future concentrations. There is much more future than past to worry about with this type of disposal. Bioaccumulation factors and bioconcentration factors are very high for many contaminates. Radionuclides such as Po210 have peak risk from fish ingestion after an amount of time that likely also coincides with facility engineering failure. Meanwhile, DOE has not produced a detailed Waste Acceptance Criteria with a detailed construction design with measured environmental parameters. Modeling is very imprecise due to unavailability of validated

parameter data. The required performance assessment was crippled by these factors. The area has not been monitored long enough in a spatially complete manner. Also I suppose other responsible parties around rationalize their actions by saying they are no worse than DOE! Analogy is a faulty and accident prone method of logic.

3:53 Waste lot 84.4 from radioactive liquid waste tank contamination area at ORNL was ineptly characterized in the field. One or more boxes exceeded Class C limits. These boxes are still in EMWMF and represent a hazard to future generations. This problem arose from using bad assumptions in statistical methods. At K25,the old K770 scrap yard waste likely had more "Cs" casks than were accidentally found. The contractors only started looking for them after they accidentally damaged one with heavy equipment. There is a good chance there are more disposed at EMWMF comingled with scrap metal. The contents of the casks are not known precisely, but probably contain other radioisotopes besides Cs and certainly do not pass WAC. The ones discovered were retrieved and isolated in storage in Melton Valley. There are other examples, including the liquid waste from the aforementioned road spill.

4:26 Here are depicted the layers using type for scale top to bottom since the public had comment on the misleading scale of this figure as presented in the video.

One letter equals 1 foot.

Ssssfbbdccfwww

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process.

DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the current Environmental Management Waste Management Facility, provided characterization allows this path. The application of the waste hierarchy will also apply to the Environmental Management Disposal Facility (EMDF). However, the ability to segregate and decontaminate materials for disposal in an industrial landfill must be evaluated in terms of the increased worker risk and increased costs. This evaluation is inherent in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) process.

A new graphic will be developed (post-Record of Decision [ROD]) for public information that shows the geologic buffer, liner system, waste thickness and final cover. The graphics of just the liner system and final cover were intended to show the details of these robust systems. These details are lost when the full thickness of waste is included because of the need to shrink the vertical scale to accommodate the waste thickness.

The EMDF will be a permanent CERCLA waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this ROD. The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Water Quality Protection of Bear Creek fact sheet

CERCLA requires the Record of Decision to identify and comply with Clean Water Act applicable requirements for chemical pollutants including mercury and PCBs. This includes complying with antidegradation rules, establishing water quality-based discharge limits based on the mass not concentrations, and establishing technology-based effluent limits. In this case, the limits are tightly connected to the Waste Acceptance Criteria. This is the analogous to sampling data from a typical superfund site. All data have to be statistically valid and applicable to the time frame of the remediation and its goals. Here the timeframe potentially extents into far out years with proportionally building uncertainty. We can't measure the data from the future, we can only model it. DOE wants way too much leniency on modeling assumptions with inadequate measurement of intrinsic field parameters. The fish sampling completed is useful, but only as a baseline. It means almost nothing about the performance of EMDF or EMWMF.

Breakthrough times for many contaminants are in the future and problems will show up then. Failure of EMDF is a certainly within the life of the contaminants proposed to be disposed. The contaminants will enter all waters of the State, both surface water and groundwater. Uranium and transuranic radionuclides have to be almost completely eliminated from disposed waste to prevent this. The EPA radionuclide rule should be applied since Bear Creek sinks and contributes to groundwater that is a drinking water source for the region. DOE standards are not as applicable or appropriate. Contamination currently extends off the reservation into the public sector and will only extent further without control. Mercury bioaccumulation and bioconcentration is not well understood even after we have tried to do it in East Fork Poplar Creek for about 50 years. It is best to not allow any mercury bearing waste to be disposed. PCBs are all over from bygone years, but these are not bygone years anymore. Any PCB detectable waste should be segregated and treated, as should mercury. Not much is said about pesticides but chlordane is likely still in some buildings and should be screened and segregated for treatment. Chlordane concentrates in fish readily.

Response: This ROD documents the Federal Facility Agreement (FFA) parties' agreed-upon approach for preliminary remediation goals in fish and surface water consistent with the Clean Water Act and CERCLA and determined to be protective. Wastewater discharge limits will be developed following completion of the engineering design, when additional information is available, and prior to operation of the facility. As an additional level of protectiveness and as stated in the fact sheet, all landfill wastewater will be treated prior to discharge to ensure it is protective of recreational use (human health), specifically fish ingestion.

Waste Acceptance Criteria fact sheet

It is clear from the analytical Waste Acceptance Criteria (WAC) in the D1 Record of Decision (which is what the public has to comment on) that WAC is inconsistent with CERCLA threshold criteria and onsite disposal at the proposed EMDF should not be the selected remedial alternative. For onsite disposal to be selected, WAC consistent with CERCLA threshold criteria should be developed and documented. Further, said CERCLA consistent WAC should be presented to the public with another public comment period.

Response: Waste acceptance criteria (WAC) are contained in the D1 and D2 RODs. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation (ORR) indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils), and in accordance with the WAC limits specified in Sect. 2.12.2.3 of the D2 ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

Site Groundwater Characterization fact sheet

The Site Groundwater Characterization fact sheet references a request to waive a TSCA requirement at 40 CFR 761.75(b)(3), that *"There shall be no hydraulic connection between the site and standing or flowing surface water*". This should be an applicable requirement. It should not be waived. It is roughly equivalent to 10 CFR 61.50 requirements for rad waste disposal that DOE claims immunity from. Notably EMWMF fails to meet requirements since groundwater emerges at the disposal site. This is despite the hillside being

covered by plastic and clay liners. DOE impresses that the same engineering will fix groundwater elevation issues at the proposed EMDF site. The track record so far is not good. It is difficult to identify where recharge actually comes from in this strike and dip characteristic geology. The geology tends to flow water as if through a pipe in places and not necessarily from up the hillside either. TSCA requirements at 40 CFR 761.75(b)(3) should not be waived.

Response: Waivers and/or exemptions are available in certain circumstances, including situations where a requirement stipulates use of a particular design, criteria, or operating standard, but where the remedy remains protective.

A TSCA waiver for two parts of TSCA 40 *CFR* 761.75(b)(3) and 40 *CFR* 761.75(b)(5) is part of this ROD to support the selection of the Onsite Disposal Alternative. The TSCA waiver is part of the statute and is commonly granted. A TSCA waiver under TSCA 40 *CFR* 761.75(c)(4) is allowed if evidence can be submitted that the landfill operation *"…will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met."* The basis for this waiver is included in the D2 ROD, Sect. 2.13.2.

- **40 *CFR* 761.75(b)(3) requires a 50-ft separation between the bottom of the landfill liner system and the historical high-water table. Evidence for this waiver includes information that equivalent or better results can be achieved using an alternative design or method of operation, in addition to evidence regarding polychlorinated biphenyl (PCB) management and disposal practices on the ORR. Compliance with the Resource Conservation and Recovery Act of 1976 Subtitle C landfill requirements (identified as ARARs) along with the geologic buffer and waste acceptance requirements for PCB waste disposal for the landfill supports the U.S. Environmental Protection Agency determination that the remedy is protective of human health and the environment.**

- **40 *CFR* 761.75(b)(5) requires landfills used for disposal of PCBs and PCB items be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. The EMDF site in Bear Creek Valley is situated at the slope of Pine Ridge. The landfill in Central Bear Creek Valley can be engineered to remain protective of human health and the environment and will minimize erosion and help prevent landslides/slumping.**

An exemption to TDEC 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is part of the statute and is based on demonstration of an equivalent level of protection as allowed under TDEC 0400-20-04-.08. The basis for the exemption is included in the D2 ROD, Sect. 2.13.2.

Additional Comment 56: Comment from Wolf Naegeli

I saw the announcement for an EMDF Information Public Meeting, but it was unclear from the announcement what purpose this meeting within the NEPA process was intended to fulfill.

I downloaded the factsheets and watched the video and it seemed to me like OREM has hired a public relations company to produce these. They just look like what a company would produce to sell a product or service.

The fact sheets even say "DOE will accept written comments on the EMDF fact sheets"!

It seems DOE is more interested to find out about the effectiveness of their "information" in convincing the public to accept its plan than to hear factual input about the issues under consideration.

I was a member of the End Use Working Group in 1997 and 1998. About two dozen citizen volunteers attended more than 30 meetings that typically lasted more than two hours to learn and consider as much about the contamination and clean up effort that would be necessary.

Why do those factsheets not address the recommendations of that effort?

It was always clear that the uncontaminated great care needed to be taken keep the still uncontaminated areas of the ORR clean!

The area where DOE wants to place the EMDF was extensively debated.

It was called Zone II in the Bear Creek Valley. It is west of Zone III where the legacy landfills were. And it was decided that Zone II should be kept forested and serve as a buffer zone to minimize the amount of contamination from polluted ground water to reach Zone I, still further west, which might be used for future Federal limited purposes. Zone II if clean enough might be made available for limited recreational uses.

It is totally inappropriate to use Zone II for a new disposal area.

Some of the EWUG members did not even want to have the new landfill in Zone III, but we were assured that this would be the last one needed to clean up the entire reservation.

The propaganda (fact) sheets don't even address the mistakes that were made that led to its failure and what was learned from it.

DOE still is delinquent in now having prepared a site-wide EIS for the ORR!

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2

of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

The Oak Ridge NPL Site cleanup is being conducted primarily using CERCLA response authority. In accordance with the DOE "Secretarial Policy Statement on the National Environmental Policy Act (NEPA)," NEPA values have been incorporated into the CERCLA documentation prepared for this project. Some CERCLA evaluation criteria are the same as NEPA review criteria, including protectiveness, long-term effectiveness and permanence, short-term effectiveness, and cost. DOE incorporation of other NEPA values into the evaluation of each alternative contained in the Remedial Investigation/Feasibility Study (RI/FS) is described in the RI/FS, Sect. 7.1.10. The NEPA values included in the evaluation of alternatives, but not specifically required in the CERCLA evaluation criteria, include socioeconomic impacts, land use, environmental justice, irreversible/irretrievable commitment of resources, and cumulative impacts. The incorporation of NEPA values into the evaluation of each alternative is also summarized in the Proposed Plan. The ROD does include another element of the socioeconomic value for offsite disposal that was evaluated since the Proposed Plan was developed. The ability for the public to comment on NEPA values before a decision is made has been a key aspect of every DOE CERCLA decision.

Based on strong State preferences related to site hydrology, the Federal Facility Agreement parties have agreed to the Central Bear Creek Valley site for the waste disposal facility. DOE indicated in the Proposed Plan and this ROD that the land use around and including the Central Bear Creek Valley site would have to be changed to industrial use from that designated in the Bear Creek Valley ROD (consistent with the recommendation of the End Use Working Group). This ROD changes the land use designation for Central Bear Creek Valley as part of this remedy selection. The land use recommendations from the End Use Working Group and eventually documented in the Bear Creek Valley ROD were identified solely to set remediation levels across the valley. There was never any expectation that the land in Bear Creek Valley would be released by DOE for use by others. The land was always intended to be a buffer between DOE activities and the public and to provide future opportunities for DOE use. From the alternatives within Bear Creek Valley considered for locating the EMDF, DOE considered brown field sites first, but ultimately the Central Bear Creek Valley site provided the most beneficial attributes in total over those other sites.

Additional Comment 57: Comment from Steve Goins

Comments primarily related to the Water Quality Protection of Bear Creek fact sheet, page 4 concerning mercury discharge limits, PCBs, and antidegradation and the TSCA ARAR exemption or waiver in the Site Groundwater Characterization fact sheet. These were provided jointly by Andy Binford and Steve Goins.

[Note: Because this is a duplicate of Additional Comment 54, Part 4, the U.S. Department of Energy (DOE) responses will refer to parts of that comment as appropriate.]

On November 4, 2021, several former TDEC employees sent a letter concerning the Environmental Management Disposal Facility (EMDF) to EPA Administrator Michael S. Regan. The December 29, 2021, response from Acting Assistant Administrator Barry N. Breen stated the EPA, DOE, and TDEC will solicit and consider public comments on new information before EPA and DOE finalize the ROD. This response letter encouraged us to review new information added to the Administrative Record file as well as provided to the public on a dedicated website. The website includes the following new information:

EMDF Site Groundwater Characterization fact sheet
EMDF Waste Acceptance Criteria fact sheet
EMDF Water Quality Protection for Bear Creek fact sheet
Draft Record of Decision – July 2021
Draft ROD Responsiveness Summary
Technical Memo #1: Phase 1 Field Sampling Results (July 2, 2018)
Technical Memo #2: Phase 1 Monitoring (May 23, 2019)
Development of Fish Tissue and Surface Water Preliminary Remediation Goals (April 28, 2022)
Performance Assessment for the Environmental Management Disposal Facility at the Y-12 National Security Complex, Oak Ridge, Tennessee (April 23, 2020)
Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee (April 16, 2022)
Link to the Oak Ridge Environmental Information System (OREIS)

The Water Quality Protection for Bear Creek fact sheet discusses setting protective limits for Bear Creek and on page 4 discusses mercury discharge limits and specifies the State's antidegration rule applies to methylmercury and PCBs. The following comments focus on mercury and PCBs and Water Quality Protection for Bear Creek and downstream.

1) If Clean Water Act pollutants in addition to mercury and PCBs are present in the EMDF discharge, CERCLA requires that applicable CWA requirements apply to those pollutants.

Response: Detailed information on how the radiological preliminary remediation goals (PRGs) were developed was provided for public review during the recent public involvement period for the Environmental Management Disposal Facility (EMDF) siting, Bear Creek water quality and Waste Acceptance Criteria (WAC), both as a link in the *Water Quality Protection for Bear Creek fact sheet* and as a document on the public access website (*Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee* [UCOR 2022]). In addition, the public has access to both U.S. Environmental Protection Agency (EPA) Administrator Wheeler's dispute decision letter, available in the Administrative Record since May 2021, and the previous versions of the Focused Feasibility Study (FFS). These documents were available to the public during the additional public involvement period as part of the administrative record and through the U.S Department of Energy (DOE) Information Center. Approval of the FFS is planned prior to Record of Decision (ROD) signature.

While the mercury effluent limit has been set in the D2 ROD, in accordance with the Clean Water Act and other applicable or relevant and appropriate requirements (ARARs), final polychlorinated biphenyl (PCB) discharge limits will be developed in post-ROD documents to meet the most restrictive of the applicable Tennessee Department of Environment and Conservation (TDEC) water quality criteria (WQC) (TDEC 0400-40-03-.03, General Water Quality Criteria, "Criteria for Water Uses") and antidegradation requirements (TDEC 0400-40-03-.06, General Water Quality Criteria, "Antidegradation Statement").

This approach is consistent with but does not depend on the FFS and in accordance with the EPA Administrator Dispute Decision that allows for concurrent development of the FFS and ROD as stated: "It is my expectation that fish tissue studies and development of PRGs for effluent limitations for radionuclides will occur in parallel with Region 4's review of the draft ROD to continue progress on the remedial actions for establishing additional landfill capacity at ORR." Because the PRGs are included in both the FFS and the EMDF ROD, concurrent development of both documents is reasonable and expected.

2) The *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) was in formal dispute during the previous EMDF Proposed Plan public comment period and was not available for public comment. This focus feasibility study was supposed to determine discharge levels for the existing Environmental Management Waste Management Facility (EMWMF) and the proposed Environmental Management Disposal Facility (EMDF), which is the subject of this public comment period. The dispute resolution to this formal dispute is relevant to discharge of CWA pollutants including mercury and PCBs and even though the resolution was after the previous comment period that information is not included as new information on the dedicated website. An additional version of the focused feasibility study was submitted after the Proposed Plan comment period that was not approved by EPA and TDEC. Seeking public comment on the Water Quality Protection for Bear Creek fact sheet prior to resolution of said Focus Feasibility Study for Water Management puts the cart before the horse.

Response: Detailed information on how the radiological PRGs were developed was provided for recent public review during the public involvement period for EMDF siting, Bear Creek water quality and WAC, both as a link in the *Water Quality Protection for Bear Creek fact sheet* and as a document on the public access website (*Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee* [UCOR 2022]). In addition, the public has access to both EPA Administrator Wheeler's dispute decision letter, available in the Administrative Record since May 2021, and the previous versions of the FFS. These documents were available to the public during the additional public involvement period as part of the Administrative Record and through the DOE Information Center. Approval of the FFS is planned prior to ROD signature.

While the mercury effluent limit has been set in the D2 ROD, in accordance with the Clean Water Act and other ARARs, final PCB discharge limits will be developed in post-ROD documents to meet the most restrictive of the applicable TDEC WQC (TDEC 0400-40-03-.03, General Water Quality Criteria, "Criteria for Water Uses") and antidegradation requirements (TDEC 0400-40-03-.06, General Water Quality Criteria, "Antidegradation Statement").

This approach is consistent with but does not depend on the FFS and in accordance with the EPA Administrator Dispute Decision that allows for concurrent development of the FFS and ROD as stated: "It is my expectation that fish tissue studies and development of PRGs for effluent limitations for radionuclides will occur in parallel with Region 4's review of the draft ROD to continue progress on the remedial actions for establishing additional landfill capacity at ORR." Because the PRGs are included in both the FFS and the EMDF ROD, concurrent development of both documents is reasonable and expected.

3) The *Strategic Plan for Mercury Remediation at the Y-12 National Security Complex Oak Ridge Tennessee* (DOE/OR/01-2605&D2/R1) states that mercury contamination at the Y-12 National Security Complex (Y-12) was identified as the greatest environmental risk on the Oak Ridge Reservation (ORR) and Table 1 shows 2 million pounds of mercury, much of which was apparently lost to the environment or in building structures, was unaccounted for. The Focus Feasibility for Water Management includes an analysis that shows disposing Y-12 waste in EMDF may cause significant mercury concentrations in EMDF landfill wastewater[i]. **It does not make sense for the federal government to spend hundreds of millions of dollars on a mercury treatment plant to reduce mercury releases to East Fork Poplar Creek during decommissioning, demolition, and remediation of Y-12 and then to move waste containing mercury to the proposed EMDF, not correctly apply the State's antidegradation rules, and release the mercury into the same watershed via Bear Creek.**

Response: Mercury waste will be strictly restricted for disposal in the EMDF. As stated in the *EMDF Waste Acceptance Criteria fact sheet*, which was available for public review and comment, elemental mercury and Resource Conservation and Recovery Act of 1976 mercury characteristic hazardous waste will not be allowed to be disposed in the EMDF. In addition, the mercury strategy detailed in the D2 ROD describes how the antidegradation requirements will be applied.

4) **The current Environmental Management Waste Management Facility (EMWMF) is authorized to accept TSCA PCB waste yet controlling release of Clean Water Act (CWA) pollutant PCBs to surface water has not been a priority.** The Focus Feasibility Study for Water Management[ii] was supposed to determine discharge criteria for a future EMDF and the existing EMWMF. This Focus Feasibility Study screened out PCBs from being a contaminant of concern due to the number of non-detected values for PCBs in EMWMF landfill wastewater discharge even though PCB detection limits and reporting limits of said discharge samples were generally 100 to 1000 times greater than promulgated recreational use water quality criteria. Bear Creek is designated for recreational use and promulgated water quality criteria for total PCBs in surface water designated for recreational use is 0.00064 ug/L. EMWMF discharges to Bear Creek surface water during February 2003 utilized a detection limit for PCB-1260 of about 2 times the water quality criteria at 0.00125 ug/L. Oak Ridge Environmental Information System (OREIS) data shows that since March 2003 detection limits for PCB-1260 in EMWMF landfill wastewater discharges ranged from 0.0311 to 0.532 ug/L with reporting limits ranging from 0.0317 to 0.61ug/L. Wastes containing PCBs such as Disposal Area Remedial Action (DARA) soil and debris were disposed in EMWMF and wastewater discharge sampling has been insufficient to monitor PCBs at recreational use water quality criteria in wastewater discharged to Bear Creek. PCB-1260 is found in fish in Bear Creek and there are higher concentrations in fish upstream near EMWMF than downstream.

Response: See response to Additional Comment 54, Part 1 Comment #14.

DOE disagrees that control of PCBs is not a priority. PCB waste disposed in the Environmental Management Waste Management Facility (EMWMF) is primarily painted surfaces where PCB was present in the paint. This form of PCBs is not soluble. No PCB liquids are allowed in the EMWMF. As described in the response to Additional Comment 54, Part 3 Comment #15, ambient water quality criteria for chemicals with higher risk were sometimes set at concentrations that are not possible to detect using current laboratory methods. Over time, analytical methods are expected to improve to allow detection at these very low levels.

Sources of more mobile forms of PCBs are found associated with legacy waste sites in Bear Creek Valley and are the sources for the PCBs found in fish tissue.

5) **The proposed landfill discharge as presented in the Water Quality Protection for Bear Creek fact sheet is impermissible because it violates the Antidegradation Statement (Rule 0400-40-03-.06) of Tennessee's water quality standards and thus also violates the Water Quality Control Act.**

Tennessee's water quality standards are found in regulation and are composed of three parts: stream-use classifications, general water quality criteria, and the Antidegradation Statement. The latter regulates when and if degradation, the movement of water quality from better to worse quality, can be authorized. Tennessee's water quality standards have been approved by EPA, apply for any action subject to the Clean Water Act (CWA) in Tennessee, and unless officially waived are applicable requirements for CWA pollutants under CERCLA at the Oak Ridge Reservation (ORR).

DOE's Water Quality Protection for Bear Creek fact sheet addresses antidegradation and correctly states that it applies, particularly in regard to bioaccumulative substances like PCBs and mercury. But it then

vaguely states that the requirements of this rule will be addressed by later water quality improvements, such as studying the processes in which methylation occurs.

That is simply not how antidegradation in TDEC rules works.

According to this rule, if a stream has unavailable parameters for a substance proposed as a new or increased discharge, that additional substance loading can only be allowed if it has been shown to be neither measurable nor bioaccumulative. Clearly, Bear Creek and downstream East Fork Poplar Creek are impacted for PCBs and mercury and are unavailable for new loadings of those substances.

Thus, any new or increased discharge of mercury and/or PCBs into Bear Creek is impermissible. An increased discharge refers to increased loading or adding additional parameters at an existing discharge irrespective of whether there is an increase or decrease in discharge volume.

The way we understand the new EMDF, it proposes a new or increased discharge of bioaccumulative unavailable parameters and approval of the discharge violates the antidegradation rule.

To make sure the antidegradation rule concerning unavailable parameters mercury and PCBs is clear, it states at TDEC Rule 0400-40-03-.06(2)(a) the following:

> In waters with unavailable parameters, new or increased discharges that would cause measurable degradation of the parameter that is unavailable shall not be authorized. Nor will discharges be authorized in such waters if they cause additional loadings of unavailable parameters that are bioaccumulative or that have criteria below current method detection levels.

Note that the rule also includes the requirement that discharges are impermissible if unavailable parameters in the discharge cannot be measured to the water quality criteria or there is increased loading of an unavailable bioaccumulative pollutant. Therefore, discharges of PCBs and mercury to Bear Creek at a future EMDF are also impermissible due to current detection and reporting limits DOE uses at the existing CERCLA landfill (i.e., EMWMF) for those parameters.

The fact sheet also suggests that since fish in Bear Creek are small and current recreational use is limited, the concern about bioaccumulative substances is mitigated. This is an improper suggestion. While the size of existing fish and public recreational access might be factors in whether the State issues a fish consumption advisory, it is not a factor in whether or not recreational criteria or the antidegradation rule apply. Bear Creek is classified for this use and the criteria and antidegradation rule properly apply at full strength.

> **Response: DOE disagrees that the fact sheet approach is impermissible because it violates the Antidegradation Statement. As noted in the responses to Part 4 (this comment) Comments #1 and #2, while the mercury effluent limit has been set in the D2 ROD, in accordance with the Clean Water Act and other ARARs, PCB discharge limits will be developed in post-ROD documents to meet the most restrictive of the applicable TDEC WQC (TDEC 0400-40-03-.03, General Water Quality Criteria, "Criteria for Water Uses") and antidegradation requirements (TDEC 0400-40-03-.06, General Water Quality Criteria, "Antidegradation Statement").**

6) **The Site Groundwater Characterization fact sheet references a request to waive a TSCA requirement at 40 CFR 761.75(b)(3), that *"There shall be no hydraulic connection between the site and standing or flowing surface water*". This is not protective of human health and should not be granted.** The existing EMWMF is authorized to accept TSCA PCB waste and as stated in another comment, control of discharge of PCBs to surface water has not been a priority for almost 20 years. Recall that the

Focus Feasibility for Water Management screened PCBs out from being a contaminant of concern for the proposed EMDF based on the number of detections of PCBs when detection and reporting limits were 100 to 1000 times higher than promulgated recreational use water quality criteria. Isolation of the EMDF site from surface water is needed during landfill operations, closure, and post closure to protect human health and the environment from PCB pollution.

Response: See response to Additional Comment 54, Part 1 Comment #14 and Part 4 (this comment) Comment #4.

7) **Waste containing PCBs should not be disposed in a future EMDF. EMDF should not be approved for disposal of TSCA waste, the TSCA waiver requested in the Site Groundwater Characterization fact sheet should not be granted, and TSCA waste containing PCBs should be shipped offsite to a permitted facility.** CERCLA at 42 U.S. Code § 9621(d)(1) requires that "Remedial actions selected under this section or otherwise required or agreed to by the President under this chapter shall attain a degree of cleanup of hazardous substances, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment." (Emphasis added). With an existing 10^{-4} excess lifetime cancer risk (ELCR) from PCBs[iii] in fish in Bear creek, moving waste containing PCBs from elsewhere on the Oak Ridge Reservation (ORR) to EMDF and releasing additional PCBs to Bear Creek surface water is inconsistent with said control of further release required by CERCLA.

Response: See response to Part 4 (this comment) Comment #4.

8) Consistent with the Water Quality Protection of Bear Creek fact sheet, DOE stated at the May 17th public meeting that the discharge criteria for mercury into Bear Creek is 51 parts per trillion (ppt). The fact sheet also states that antidegradation applies to methylmercury instead of mercury. Setting discharge criteria at 51 ppt mercury with antidegradation based on methylmercury instead of mercury violate applicable requirements. To be consistent with applicable requirements, mercury discharge limits would be based on:

EPA Comment 104 on the EMDF D1 Record of Decision (ROD) states *"In order to meet the CWA requirements and be consistent with the NCP, the discharge must meet the most stringent of either the [Technology Based Effluent Limits (TBEL)] (which has yet to be determined), a [Water Quality Based Effluent Limit (WQBEL)], or an antidegradation-based limit."*

Bear Creek is listed on the 303(d) list of impaired and threated waters for mercury, not methylmercury. Antidegradation applies to mercury.

51 ppt is the promulgated water criteria that, when combined with maximum flow rate, can be used to develop the water quality-based effluent limit for mercury.

Water Quality Protection for Bear Creek fact sheet specifies treatment will include, at a minimum, chemical flocculation/precipitation, and sediment removal. This is likely not an appropriate methodology to establish the TBEL for mercury. To be consistent with applicable CWA requirements, a TBEL for mercury must be established.

Antidegradation-based limits for mercury based on applicable requirement TDEC Rule 0400-40-03-.06(2)[iv] should also incorporate:

i) New or increased discharges of unavailable parameters, such as mercury, shall not be authorized if the discharge would cause measurable degradation of surface water for the unavailable parameter. Bear Creek is included on the 303(d) list for mercury and a 95% UCL mercury concentration of 5.17 ng/L (ppt) with a median of 3.3 ng/L (ppt) can be calculated in Bear Creek surface water near the proposed EMDF.[v] Authorizing discharges of mercury that would increase mercury in-stream concentrations violates antidegradation based limits. And

ii) Discharges of bioaccumulative parameters, such as mercury, will not be authorized if they cause additional loading of the unavailable parameter (e.g., mercury). Neither the Focus Feasibility for Water Management[vi] nor the EMDF D1 ROD include competent loading analysis that verifies proposed discharge criteria do not increase mercury loading to Bear Creek. Without that analysis, antidegradation based discharge criteria are not determined and any approval of discharge limits is inconsistent with the Clean Water Act (CWA) applicable requirement and the NCP. A competent baseline mercury loading analysis for EMWMF is needed to determine anti-degradation-based limits for a future EMDF.

To help understand the impact of using concentration based limits verses mass based limits, consider the following example. These increases of mercury in Bear Creek would all be allowable if the discharge standard is based solely on 51 ppt without consideration of mass limitations and antidegradation.

i) Discharges at 51 ppt (ng/L) at 1 gallon per minute would release a mass of about 193 nanograms (ng) of mercury per minute to surface water. A 193 ng/minute discharge mixed in 335 L/min results in an increase of in-stream mercury of about 0.57 ppt.

ii) Discharges at 51 ppt at 30 gallons per minute would release a mass of about 5,792 ng of mercury per minute to surface water. A 5,792 ng/minute discharge mixed in 436 L/min results in an increase of in-stream mercury of about 13.3 ppt.

iii) Discharges at 51 ppt at 172 gpm would release a mass of about 33,205 ng of mercury per minute to surface water. A 33,205 ng/minute discharge mixed in 986 L/min results in an increase of in-stream mercury of about 33.7 ppt.

The 95% UCL for flow from EMWMF for the period of calendar year (CY) 2016 through CY 2020 was about 172 gpm. The 30-day 5-year recurrent flow in Bear Creek near the proposed EMDF is estimated at about 335[vii] liters per minute (L/min). For each example, instream water volume to calculate the in-stream concentration increase was the sum of 335 L/min and the discharge flow rate.

Response: DOE disagrees with this comment. As stated in the *Water Quality Protection for Bear Creek fact sheet*, the EMDF approach not only reduces mercury loading to Bear Creek but restores the stream to the designated recreational use by reducing legacy mercury contamination. See response to Part 4 (this comment) Comment #5.

9) **The 51 ppt concentration-based discharge limit for mercury proposed by DOE in the Water Quality Protection of Bear Creek fact sheet violates applicable TDEC rule 0400-40-10-.03(3)(f) requiring mass limitations**.

Response: See response to Part 4 (this comment) Comments #5 and #8.

10) **Setting discharge limits for protection of water quality in Bear Creek is good. However, irrespective of the limits, if monitoring of discharges are not consistent with applicable monitoring requirements for NPDES discharges, Water Quality Protection for Bear Creek and downstream is not ensured.** Developing discharge standards that are protective of human health and the environment and that meet applicable or relevant and appropriate requirements (ARARs) are required by CERCLA and the NCP. However, if monitoring is not improved compared to current activities at EMWMF, even with discharge standards, the impact on human health and environment is uncertain. For example, for calendar year (CY) 2020, 2 samples of landfill wastewater effluent discharged from EMWMF to surface water were analyzed for mercury. Similarly, for CY 2021, 2 samples of landfill wastewater effluent discharged from EMWMF to surface water were analyzed for mercury. Laboratory methods, method detection limits, and reporting limits for these samples were insufficient to quantify mercury released. Methods such as EPA method 1631 or 1631E are available with lower detection limits than those used. Analyzing only 2 samples per year of landfill wastewater discharge for mercury with detection limits higher than levels of mercury

released leaves a lot of room for mercury pollution in discharges to be missed. Further, at EMWMF, contact water is accumulated in contact water tanks and ponds and the contact water is batch released to the sedimentation basin. Landfill wastewater flows from the sedimentation basin to surface water. Releases from contact water tanks and ponds to the sedimentation basin are not documented in OREIS and it is unknown whether the 2 samples analyzed per year were collected before, during, after, or between releases from contact water ponds and tanks to the sedimentation basin.

Response: Monitoring for discharges will be in accordance with ARARs and will be detailed in a post-ROD document (Remedial Action Work Plan) provided for EPA and TDEC review/approval.

DOE strongly disagrees with the comment that only two samples per year are provided in the Oak Ridge Environmental Information System (OREIS) database. As provided in the OREIS database, all EMWMF landfill wastewater discharged from the contact water ponds and tanks is analyzed for mercury and other contaminants of concern, with results demonstrating compliance with discharge limits obtained prior to release. The analytical methods have low enough detection limits to detect mercury to below 51 ppt. These methods are in accordance with the EMWMF Sampling and Analysis Plan/Quality Assurance Project Plan, which is approved by the Federal Facility Agreement parties. All contact water sample data are included in OREIS; DOE suggests searching using the contact water ponds and tanks locations to provide the commenter with these data.

The contact information to obtain OREIS Support is found on the OREIS main page. OREIS support will help the reviewer retrieve these standard data if additional help is needed. Please note, this is a large quantity of data.

11) The focus in the Water Quality Protection for Bear Creek fact sheet is on Recreational use and protecting humans using surface water is important. However, both CERCLA and Tennessee ARARs require protecting the environment (e.g., fish and aquatic life). **The Record of Decision should also include effluent toxicity testing, biological integrity monitoring, and other measures to ensure protection of the environment.**

Response: See response to Additional Comment 54, Part 3 Comment #8.

12) **Several TDEC rules applicable to release of mercury, and PCBs, referenced on page 4 of the Water Quality Protection for Bear Creek fact sheet include:**

a) **TDEC Rule 0400-40-05-.08(1) EFFLUENT LIMITATIONS AND STANDARDS**

(g) All pollutants shall receive treatment or corrective action … to insure compliance with any approved water quality standard, …

(k) All permit effluent limitations, standards, and prohibitions shall be established for each outfall or discharge point of the permitted facility, except as otherwise provided for BMPs where limitations on effluent or internal waste streams are infeasible.

(m) For continuous discharges, all permit effluent limitations, standards, and prohibitions shall be expressed as maximum daily, weekly average (for POTWs only) and monthly average, unless impracticable.

(n) Non-continuous discharges shall be limited in terms of frequency, total mass, maximum rate of discharge, and mass or concentrations of specified pollutants, as appropriate.

(q) When permit effluent limitations or standards imposed at the point of discharge are impractical or infeasible, effluent limitations or standards for discharges of pollutants may be imposed on internal waste streams before mixing with other waste streams or cooling water streams. In those instances, the monitoring required shall also be applied to the internal waste streams. Limits on internal waste streams will be imposed only when the rationale sets forth the exceptional circumstances which make such limitations necessary, such as when the final discharge point is inaccessible (for example, under water), the wastes at the point of discharge are so diluted as to make monitoring impracticable, or the interferences among pollutants at the point of discharge would make detection or analysis impracticable.

(r) Instantaneous maximum concentration or similar limitations may be imposed in permits when: 1. Toxic or harmful parameters are present in such significant amounts or concentrations as to represent a threat to the possibility of maintaining receiving waters in accordance with established classifications; and 2 The discharge is characterized as irregular, such as high peak, short duration flow.

(s) Any discharge or activity authorized by a permit which is not a minor discharge or activity, or the regional administrator requests, in writing, be monitored, or contains a toxic pollutant for which an effluent standard has been established shall be monitored by the permittee for the following**:** 1. Flow (in million gallons per day); and 2. Any of the following pollutants: (i) Pollutants (either directly or indirectly through the use of accepted correlation coefficients or equivalent measurements determined to be applicable to the discharge to which they are applied) which are subject to reduction or elimination under the terms and conditions of the permit; (ii) Pollutants which the commissioner finds, on the basis of information available, could have a significant impact on the quality of waters; (iii) Pollutants specified by the administrator, in regulations issued pursuant to the Federal Water Pollution Control Act, as subject to monitoring; and (iv) Any pollutants, in addition to those identified in subparts (i) through (iii) of this part, which the regional administrator or the Commissioner request be monitored

b) **TDEC Rule 0400-40-05-.10 WATER QUALITY-BASED PERMITTING** (1) Effluent limitations on toxic substances will be required in accordance with the General Water Quality Criteria, Chapter 0400-40-03, using the LC50 and/or IC25 criteria and appropriate application factor for each toxic parameter

c) **TDEC Rulee 0400-40-10-.03(3) Text of Cited Federal Regulations 40 CFR § 122.45 Calculating NPDES permit conditions (applicable to State NPDES programs, see § 123.25)**

(a) Outfalls and discharge points. All permit effluent limitations, standards and prohibitions shall be established for each outfall or discharge point of the permitted facility, except as otherwise provided under § 122.44(k) (BMPs where limitations are infeasible) and paragraph (i) of this section (limitations on internal waste streams).

(d) Continuous discharges. For continuous discharges all permit effluent limitations, standards, and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated as: (1) Maximum daily and average monthly discharge limitations for all dischargers other than publicly owned treatment works;

(e) Non-continuous discharges. Discharges which are not continuous, as defined in § 122.2, shall be particularly described and limited, considering the following factors, as appropriate:

(1)Frequency (for example, a batch discharge shall not occur more than once every 3 weeks);

(2) Total mass (for example, not to exceed 100 kilograms of zinc and 200 kilograms of chromium per batch discharge);

(3) Maximum rate of discharge of pollutants during the discharge (for example, not to exceed 2 kilograms of zinc per minute); and

(4) Prohibition or limitation of specified pollutants by mass, concentration, or other appropriate measure (for example, shall not contain at any time more than 0.1 mg/L zinc or more than 250 grams (¼ kilogram) of zinc in any discharge).

(f) **Mass limitations.**

(1) All pollutants limited in permits shall have limitations, standards or prohibitions expressed in terms of mass except:

(i) For pH, temperature, radiation, or other pollutants which cannot appropriately be expressed by mass;

(ii) When applicable standards and limitations are expressed in terms of other units of measurement; or

(iii) If in establishing permit limitations on a case-by-case basis under § 125.3, limitations expressed in terms of mass are infeasible because the mass of the pollutant discharged cannot be related to a measure of operation (for example, discharges of TSS from certain mining operations), and permit conditions ensure that dilution will not be used as a substitute for treatment.

(2) Pollutants limited in terms of mass additionally may be limited in terms of other units of measurement, and the permit shall require the permittee to comply with both limitations.

(h) Internal waste streams

(1) When permit effluent limitations or standards imposed at the point of discharge are impractical or infeasible, effluent limitations or standards for discharges of pollutants may be imposed on internal waste streams before mixing with other waste streams or cooling water streams. In those instances, the monitoring required by § 122.44(i) shall also be applied to the internal waste streams.

(2) Limits on internal waste streams will be imposed only when the fact sheet under § 124.56 sets forth the exceptional circumstances which make such limitations necessary, such as when the final discharge point is inaccessible (for example, under 10 meters of water), the wastes at the point of discharge are so diluted as to make monitoring impracticable, or the interferences among pollutants at the point of discharge would make detection or analysis impracticable.

d) **TDEC Rule 0400-40-03-.03(4)(j)** Recreation use water quality standards are based on 10^{-5} excess lifetime cancer risk for individual contaminants (or groups of contaminants, e.g., Total PCBs)

e) **TDEC Rule 0400-40-03-.05(4)** specifies discharge requirements in permits for discharge to surface water designated as recreational use are based on 30-day minimum five-year recurrence interval stream flow. (This may be estimated by USGS StreamStats.)

f) **TDEC Rule 0400-40-03-.05(6)** All discharges of sewage, industrial waste, and other waste shall receive the degree of treatment or effluent reduction necessary to comply with water quality standards.

g) **TDEC Rule 400-40-03-.03(4)(l)** Fish Consumption Advisories - A public fishing advisory will be considered when the calculated risk of additional cancers exceeds 10-4 for typical consumers or 10-5 for atypical consumers

h) **TDEC Rule 0400-40-03-.05(2)** … Mixing zones shall not apply to the discharge of bioaccumulative pollutants to waters of the state where the risk-based factors in Rule 0400-40-03-.03(4)(l) are exceeded for the pollutant group.

i) **Rule 0400-40-03-.03 (3) The criteria for the use of Fish and Aquatic Life**

(d) Turbidity, Total Suspended Solids, or Color - There shall be no turbidity, total suspended solids, or color in such amounts or of such character that will materially affect fish and aquatic life. In wadeable

streams, suspended solid levels over time should not be substantially different than conditions found in reference streams.

(g) Toxic Substances - The waters shall not contain substances or a combination of substances including disease - causing agents which, by way of either direct exposure or indirect exposure through food chains, may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), physical deformations, or restrict or impair growth in fish or aquatic life or their offspring.

(m) Biological Integrity - The waters shall not be modified through the addition of pollutants or through physical alteration to the extent that the diversity and/or productivity of aquatic biota within the receiving waters are substantially decreased or, in the case of wadeable streams, substantially different from conditions in reference streams in the same ecoregion. The parameters associated with this criterion are the aquatic biota measured. These are response variables.

j) **Rule 0400-40-05-.10 WATER QUALITY-BASED PERMITTING**.

(1) Effluent limitations on toxic substances will be required in accordance with the General Water Quality Criteria, Chapter 0400-40-03, using the LC50 and/or IC25 criteria and appropriate application factor for each toxic parameter.

(2) Appropriate limitations on organic related and other oxygen demanding parameters will be required in any permit to insure adequate dissolved oxygen in the state's waters in accordance with the General Water Quality Criteria, Chapter 0400-40-03.

(3) When a treatment process greater than BAT or conventional unit treatment processes is required by application of these rules, a set of effluent limitations will be required in any permit which will completely describe expected results of such treatment process.

(4) Effluent limitations may be required in any permits to insure compliance with the Antidegradation Statement, Rule 0400-40-03-.06.

Response: See response to comment in Additional Comment 54, Part 3 Comment #7. [Note – the introduction is different for each of the two comments and the quote from the Dispute Decision letter is not included in Part 4 Comment #12 (this comment), otherwise they are identical.]

[i] *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) APPENDIX E. Mercury Concentration in Environmental Management Disposal Facility Leachate includes: *"Untreated soils and debris that pass TCLP will be disposed of in the landfill. Although mercury has naturally high Kds, the amount of mercury-contaminated waste soil and debris expected to be disposed is large enough to result in significant "as-disposed" soil mercury concentrations that may result in measurable mercury concentrations in the leachate (see Fig. E.3). "As-generated" soil/debris mercury concentrations must be adjusted to account for the addition of soil fill, necessary for landfill stability, and the inclusion of other wastes in the landfill resulting in an "as-disposed" mercury concentration. The assumed volume of mercury-contaminated debris and soil to be disposed that will not require treatment to meet LDRs is approximately 300,000 CY. This material will be disposed along with the mercury containing debris and soil within the first three cells resulting in a final as-disposed volume of approximately 1.25M CY. Consequently, the as-generated mercury concentrations would be reduced by a factor of about four. Assuming the resulting, as-disposed concentration is in the range of 0.03 to 0.25 mg/kg (equivalent to an as-generated waste mercury concentrations corresponding to 0.1 to ~1 mg/kg), leachate concentrations could exceed the 51 ppt ambient water quality criteria (AWQC) for mercury depending on the Kd exhibited (see Fig. E.3). As noted in the Alpha-5 characterization results, mercury concentrations are highly variable, and 95% of debris samples exhibiting mercury concentrations up to 151 mg/kg may pass TCLP. Taking this as an upper bound of the as-generated mercury concentration and assuming the Kds for contaminated debris would be the same as soil, a leachate mercury concentration in the range of 10,000 (highest Kd) to 90,000 ppt (lowest Kd) might be possible. With the uncertainty in volumes of soil/debris to be disposed, and the variability in as-generated mercury concentrations, predictions are highly uncertain. It is expected that leachate concentrations will vary widely for reasons such as variability in rainfall, sequencing of waste volumes, operations procedures, etc."*

[ii] *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee (*DOE/OR/01-2664&D1) (DOE/OR/01-2664&D2) and (DOE/OR/01-2664&D3)

[iii] The 95% Upper Confidence Level of the sum of PCB-1254 and PCB-1260 in fish collected from Bear Creek for the 5-year interval of Calendar Year (CY) 2017 through CY2021 is 0.782 mg/kg. Using the EPA Regional Screening Level Calculator at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search with 17500 mg/day fish ingestion rate, 365 days per year, for 26 years consistent with assumptions in EMDF PRG Development, an existing excess lifetime cancer risk (ELCR) of 1.27E-04 from ingestion of fish collected from Bear Creek is calculated.

[iv] TDEC Rule 0400-40-03-.06(2)(a) *In waters with unavailable parameters, new or increased discharges that would cause measurable degradation of the parameter that is unavailable shall not be authorized. Nor will discharges be authorized in such waters if they cause additional loadings of unavailable parameters that are bioaccumulative or that have criteria below current method detection levels.*

[v] OREIS data of mercury in surface water at Bear Creek sampling stations BCK 9.2 and BCK 07.87 with mercury analysis performed by EPA method 1631 or 1631E from 2009 through 2020 were evaluated using ProUCL 5.1. This evaluation yielded a mercury concentration 95% UCL of 5.17 ng/L (ppt) and a median mercury concentration of 3.3 ng/L (ppt).
[vi] *Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee (*DOE/OR/01-2664&D1) (DOE/OR/01-2664&D2) and (DOE/OR/01-2664&D3)
[vii] Derived from USGS StreamStats

Additional Comment 58: Comment from Sid Jones

Part 1 (from May 17, 2022 public meeting).

I'm Sid Jones. I want to lodge a specific complaint [INAUDIBLE] WAC. As people have said, nobody is given much information on the WAC, but I had the privilege of reading all five RI/FS and PA and CA, and 10 years ago, I told DOE at meetings, you need to develop a WAC for uranium as a metal. It's probably, with the possible exception of mercury, the primary risk driver you're going to have. Given your inventory, [INAUDIBLE]. Looks to me like they still haven't done it. And the WAC I see and the D1 they're on gives for the uranium 238, uh, four times—well, 40,000 [INAUDIBLE] per gram. So, I may have forgotten the specific activity, but I think that's 10% by weight, and we're talking about 2.2 cubic million-yard facility. So, I may not be able—'cause I'm older now, I may not be able to do math in my head like I used to could do. But I think that's about 3 million kilograms total. So, we're talking about—no, 3 billion kilograms total. So, we're talking about maybe 300 million more kilograms of total uranium that the WAC have got in the D1 [INAUDIBLE] would allow. When there's 20 million or so kilograms out there in [INAUDIBLE] ground right now, it creates a problem, you know. People are having to catch the leachate and treat it because there's too much uranium going to the creek, so let's put in 10 times more and, you know, wait till things fail, and then you're going to have a 10 times-bigger problem. So, I mean, I don't want to belabor any of this stuff about WAC. I could go on and on about the issue because I was involved in, you know, in fussing with DOE way back in the '90s prior to DOE starting to send all their newly generated radioactive waste out west. But yeah, I did just want to make that one complaint that after 10 years, they still don't seem to have cared to develop a waste-acceptance criteria for uranium as a metal. And that may give you all some insight as to kind of why this project has gone on as long as it has.

Additional comment from Sid Jones (from May 17, 2022 public meeting): [INAUDIBLE]. That's all I need to say. Just depends on how much [INAUDIBLE].

> **Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The waste lot concentration limits based on the human intrusion scenario that are provided in the Record of Decision (ROD) do not represent the expected facility total inventory. A realistic expected total uranium inventory is on the order of 1 million kg. The final set of Environmental Management Disposal Facility (EMDF) inventory limits for uranium as a metal and radionuclides will be informed by the supplemental analysis in the Waste Acceptance Criteria (WAC) Compliance Plan. The final inventory of radionuclide contaminants will be protective of human health and the environment. These WAC limits will be implemented through the post-ROD, Federal Facility Agreement (FFA) parties-approved primary document, the WAC Compliance Plan.**

Part 2. Comments submitted to the U.S. Department of Energy (DOE), U.S. Environmental Protection Agency (EPA), and Tennessee Department of Environment and Conservation (TDEC) concerning the proposal to authorize construction and operation of an onsite disposal facility (the Environmental Management Disposal Facility or EMDF) in Bear Creek Valley, Oak Ridge, Tennessee.

I commend the DOE, EPA, and TDEC for offering the public another opportunity to provide input on the EMDF. When the Proposed Plan which selected the EMDF as the preferred alternative for disposal of CERCLA generated waste in Oak Ridge was issued in 2019, there was very little information available to

the public on how the three parties might demonstrate the protectiveness of the facility. There were also a number of ongoing disagreements between DOE and the regulatory agencies, including a formal disputes over wastewater treatment.

Response: DOE thanks you for your participation in the public comment process.

It remains unclear how the three parties given responsibility for remediation of the Oak Ridge Reservation under authority of the Federal Facilities Act (FFA) might meet or waive all regulatory requirements of the Clean Water Act and other rules that are applicable or relevant and appropriate to EMDF. It also appears that only administrative waste acceptance criteria derived primarily from prohibitions on waste in commercial radioactive, hazardous, and toxic landfills will be codified in the Record of Decision, leaving many unanswered questions regarding the potential long-term impacts of the facility. However, the fact sheets and supporting documents provide significantly more information than was available at the time of the Proposed Plan. Public comments should now be better informed, and consequently, they should be added to the Responsiveness Survey in the final draft of the EMDF Record of Decision (ROD).

Response: As noted, WAC are contained in this D2 ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as applicable or relevant and appropriate requirements (ARARs) (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. In addition, mercury in the elemental liquid form and hazardous mercury waste (D009) are prohibited from disposal. Inventory limits are provided in this ROD for the most mobile radionuclides with the highest potential to impact human health and the environment. As noted above, results of the supplemental analysis will inform development of the WAC Compliance Plan, by performing additional sensitivity/uncertainty analysis and informing the landfill design.

Comments received during the additional public engagement period and DOE's responses are included in the Responsiveness Summary of the D2 ROD.

Comment on the Groundwater Site Characterization Factsheet

If the site for the proposed landfill were on relatively flat terrain away from groundwater discharge areas and was underlain by rocks that had not undergone structural deformation, the ongoing groundwater monitoring at the site and the field demonstration described in the factsheet would almost certainly provide adequate data to properly design the facility. Unfortunately, no such site exists on the Oak Ridge Reservation. In addition to the knoll mentioned in the factsheet, the landfill is built on the side of Pine Ridge. The field demonstration described in the factsheet can only test the effect of cutting off recharge directly above the knoll. While this is important information, many uncertainties remain. Note there are no monitoring wells upslope of the facility nearer the crest of Pine Ridge that would better constrain hydraulic conditions at the upgradient boundary.

There are also likely to be effects due to landfill construction that may raise the water table in some areas. While blockage of recharge should depress the water table, perhaps quite significantly, in the knoll area, the water table may rise in other locations under the proposed landfill footprint due to placement of fill in areas where groundwater currently discharges, such as in the southeast corner of the facility. Loading of the landfill with waste may decrease the post-consolidation hydraulic conductivity of fractured media substantially, resulting in subsequent water table rise in upgradient locations. The effects of these hydraulic changes could be inconsequential but based on experience at a similar facility, the Environmental

Management Waste Management Facility (EMWMF), in a very similar hydrogeologic setting, they should be anticipated.

Groundwater intrusion at EMWMF was discussed in comments submitted previously that can be found in the Responsiveness Summary of the draft Record of Decision (ROD), provided as supporting information for the factsheets. On page 3-173 of the Responsiveness Summary, DOE responds to a critique of the EMWMF, which is the current on-site disposal facility for CERCLA generated radioactive, hazardous, and toxic waste in Oak Ridge. In this comment that describes various problems at EMWMF, specific issues relevant to site characterization were listed. Per the comment, DOE failed to:

(1) collect sufficient data on site geology and hydrology to permit optimum design of the landfill,

(2) build a facility that could meet the regulatory siting requirements in the Record of Decision that authorized its construction, and

(3) collect sufficient usable background water quality data to develop an adequate groundwater monitoring program.

The response from DOE does not refute these claims directly, but states "Results of the independent reviews have identified no immediate concerns with the performance of the facility and have confirmed that operations are being conducted following all ARARs."

The comment as originally submitted to DOE offered information in an attachment as support of the claims. The FFA parties chose not to include this attachment in the Response Summary. Perhaps they felt that performance of EMWMF was not relevant to EMDF, but as noted above, EMDF is a replacement facility for EMWMF and the preferred site for the facility is located in a similar hydrogeologic environment in the same valley. The denial that problems existed at EMWMF does not inspire confidence that the FFA parties will be able to avoid similar problems at the replacement facility. I offer the following evidence, some of it extracted from the previously submitted attachment, to support the statements in the comment.

Claims (1) and (2) are both supported by the need to build a drain under the facility in the area previously occupied by a tributary and its riparian zone. This area was a pre-construction groundwater discharge area. Had a better understanding of groundwater occurrence and flow 3 paths been developed prior to design of the facility, this area might have been excluded from the facility footprint.

The drain has sustained continuous flow since it was built nearly two decades ago and provides a direct connection to surface water from underneath the site. As it still discharges despite the fact that recharge above has been cut off by the landfill, the facility clearly remains out of compliance with the relevant and appropriate siting requirement listed on page 2-74 of the EMWMF Record of Decision (ROD):

The hydrogeologic unit used for disposal shall not discharge ground water to the surface within the disposal site.

No amendment to the EMWMF ROD (EPA/ROD/R04-00/028 2000) has requested a waiver for this ARAR, so a reasonable conclusion would be that the FFA parties are not greatly troubled by ROD violations at EMWMF and may not be troubled by future ROD violations at EMDF.

This figure from the Engineering Feasibility Plan for the Elevated Groundwater Levels in the Vicinity of PP-01, EMWMF, Oak Ridge, Tennessee, UCOR 4517, shows the water table predicted by a groundwater model calibrated to monitoring well data before the underdrain was installed. The pink area is where the water table may have intruded into the facility liner.

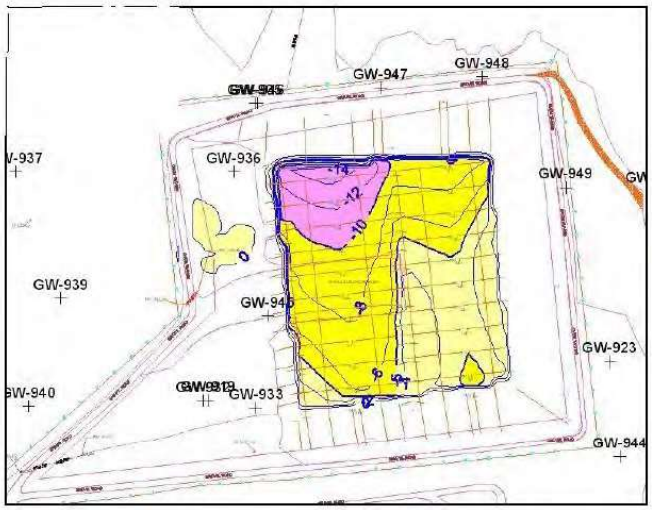


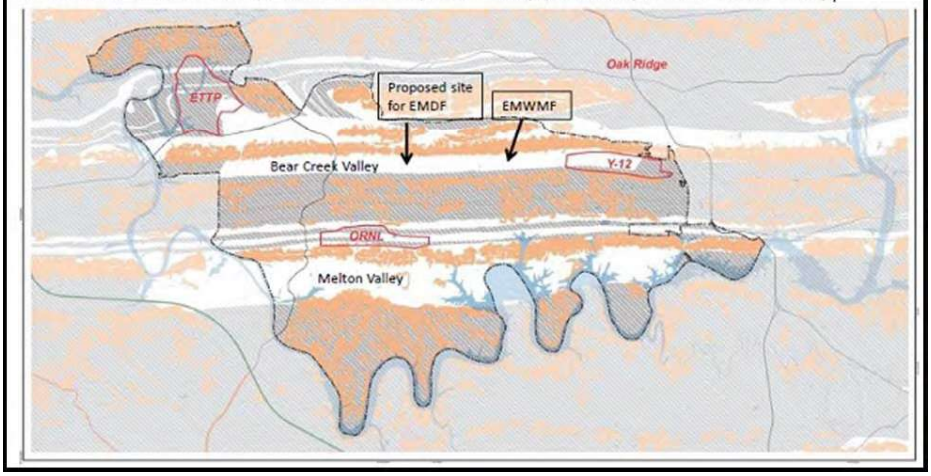
Fig. 9. Modeled hydrogeologic conditions prior to placement of the underdrain.

Consequently, the facility footprint should avoid groundwater discharge areas requiring fill to the extent possible, even if the landfill capacity is diminished. The justification given in the factsheet and supporting documents for waiving siting criteria that prohibit construction of a facility over groundwater discharges are based on the attenuation of potential releases from the facility. The significant uncertainty introduced into the prediction of post-construction groundwater elevations is not considered in the evaluation of equivalent protectiveness between engineered features and the waived siting requirements. Should groundwater flow paths be lengthened significantly by placement of fill, the FFA parties authorizing the EMDF may find it necessary to install drains adjacent to, if not directly under, the overlying waste to prevent unacceptable groundwater intrusion. Even if such drains were designed in a manner that did not compromise the stability of the landfill, they would provide contaminant migration pathways. The presence of preferential paths for contaminant migration near the waste would undercut the rationale given for waiving siting requirements in the Site Characterization Factsheet.

The factsheet discusses the considerations that went into site selection in the first few paragraphs. While DOE has done extensive work to determine the least problematic sites still available on the Oak Ridge Reservation (ORR) for land disposal of additional wastes, they have not clearly informed the public that no available ORR site could meet regulatory siting requirements for a radioactive, hazardous, and toxic waste landfill of the proposed size. The FFA parties have apparently focused their efforts on building legal justifications for waiving regulatory siting requirements rather than exploring waste minimization and volume reduction techniques that might have made it possible shrink the landfill footprint and use more favorable sites. The unpublished attachment to comments referenced above included the following graphic that showed areas that were unsuitable for waste disposal due to geologic conditions like karst development or steep slopes.

The factsheet describes only a study of water levels at the site but does not provide information to answer other questions about site suitability that were raised in several public comments. On page 3-171 in the Responsiveness Summary of the draft ROD, the comment discusses the requirements imposed on a disposal site by TDEC Rule TDEC 0400-20-11-.17(1). These requirements are listed as relevant and appropriate in Table A.3 (on page A-18) of the draft ROD for EMDF. The comment goes on to argue that several of these requirements may not be met at the Central Bear Creek Valley site. DOE does not debate these claims in the response, discussing only the justification of waivers.

ORNL studies as far back as the 1980s identified areas with steep slopes (orange) and areas of carbonate rocks that can develop caves and other karst features (hatched in gray) as poor candidates for radioactive waste disposal. Even the areas that are less problematic for waste disposal (shown in white) have high water tables, many small streams, and are close to roads and property boundaries. Large quantities of radioactive waste were buried in some areas. Wastes disposed in Melton Valley contain millions of Curies of radioactivity. Millions of pounds of uranium are buried near the current disposal facility (EMWMF) in Bear Creek Valley.



In particular, the FFA parties should establish prior to ROD approval that TDEC 0400-20-11-.17[1](b), which requires that the site be capable of being characterized, modeled, analyzed, and monitored, can be met. Alternatively, the FFA parties should establish prior to approving the ROD that corrective action is technically feasible at the site, as required by TDEC 0400-12-02- .03(2)(e)(1)(i)(III), also listed as a relevant and appropriate requirement in Table A.3 (page A-19) of the draft ROD. DOE has argued that groundwater restoration was technically impracticable at some locations on the ORR.

It should be noted that while it may be possible to model the site in some sense, DOE has failed to adequately predict either water levels or contaminant migration rates in Bear Creek Valley, information key to ensuring the protectiveness of a disposal facility. The unrealistically long travel times modeled for contaminants migrating in groundwater in the Performance Assessment (PA) for the Environmental Management Disposal Facility at the Y-12 National Security Complex, Oak Ridge, Tennessee (UCOR 5094/R2) and the Composite Analysis (CA) for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee (UCOR-5095/R2) are discussed in a review by, Neptune and Company, Inc. for prepared for TDEC (A Review of the Performance 6 Assessment and Composite Analysis for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee, Oak Ridge, Tennessee 12 October 2020). The PA and CA were provided by DOE as supporting information for the factsheets. Neptune's review is not among the supporting documents, but is available to the public at this time through a TDEC website (https://www.tn.gov/environment/program-areas/rem-remediation/rem-oak-ridge-reservation-clean-up/emdf/emdfdocuments.html)

On pages 24-25 of the review, Neptune and Company, Inc. states:

"However, the modeling described in Appendix G predicts that, starting between 20,000 and 25,000 years after closure, uranium will contaminate groundwater above the MCL for at least the next 75,000 years (Figures G.15 and G.16). The advective travel time from the edge of waste to the point of assessment (POA) calculated using the inputs to RESRAD-OFFSITE given in Tables G.10 and G.15 is over 7000 years. Experience with uranium transport from disposal sites in groundwater in Bear Creek Valley and Melton Valley indicates that uranium can certainly migrate through groundwater from sources at the rate of at least

one meter per decade, giving a lower bound of 1000 years for the advective travel time to the POA (see also Section 2.1.4). It should be noted that much faster transport is likely, depending on the hydrogeology of the particular site and the chemical form of uranium."

In fact, uranium began migrating through groundwater to seeps along tributaries to Bear Creek soon after it was disposed in Bear Creek Burial Grounds. While the distance from waste to these seeps was only on the order of a few meters, monitoring data from Bear Creek Valley show that the modeled travel times for advective transport of uranium in the geologic formations that underlie the EMWMF and EMDF sites in the PA and CA would be about one thousand times longer than the actual travel times.

DOE replies in their response to the Neptune review with the same dismissive tone sometimes used in their replies to public comments:

"DOE does not agree that evidence of uranium migration from other contaminated areas in BCV is indicative of how uranium will migrate from within the RCRA-compliant designed and constructed EMDF. Notably, the EMDF will be constructed as a robust, double-lined disposal facility where only solid wastes may be disposed. Uranium migration from legacy contamination sites in BCV is highly dependent on the form of the contaminated material, the presence or absence of barriers, location relative to the water table, etc."

The point DOE makes, while arguably true, is not relevant. DOE implies that Neptune is comparing apples to oranges. But the DOE response is comparing apples to oranges, not Neptune. Neptune was considering only the modeled travel time of uranium after reaching groundwater, which should be similar at the two sites since they are underlain by the same geologic formations and are nearly adjacent to each other in the same valley. Neptune was not comparing the time of release from burial trenches to that from the proposed facility or the travel time through the unsaturated (vadose) zone to the water table, neither of which would be expected to be comparable.

In fact, those familiar with DOE modeling of contaminant migration in groundwater to meet either DOE requirements such as the PA and CA or for risk assessment for regulatory purposes can attest that those models have never been calibrated to the abundant information available from relevant ORR tracer studies or monitoring data. Page 19 of Neptune's review presents a summary table of tracing results in the geologic formations that underlie the proposed EMDF site. This table is reproduced below and demonstrates that solute travel time through groundwater over relevant distances (about 100 meters) will occur in months or years, not centuries or millennia. DOE has a long way to go to establish that critical phenomena like transport of contaminants in groundwater can be modeled anywhere on the ORR or that, in particular, the EMWMF and EMDF sites can meet TDEC Rule 0400-20-11-.17[1](b).

Table 2. Summary of Tracer Testing in Maryville and Nolichuky Formations

tracer test site	geology	reference for geology	tracer	distance (m)	1st arrival (days)	peak arrival (days)	reference for trace
Waste Pit area, Melton Valley	Maryville	Lomenick et al., 1964	tritiated water	3	1	20	Blanco and Parker, 1964
Engineered Test Facility Site, Melton Valley	Nolichucky	Webster, 1996	chlorofluoro-carbons	9	6	60	Vaughan et al., 1982
Engineered Test Facility Site, Melton Valley	Nolichucky	Webster, 1996	tritiated water	9	120	480	Webster, 199(
West Bear Creek Valley CIIDF site	Maryville	Lee et al., 1992	He and Ne gas	35	20	200	McKay et al., 2000
SWSA 5, Melton Valley	Maryville	Jardine et al., 1999	bromide	16.8	3	180	Jardine et al., 1999
SWSA 5, Melton Valley	Maryville	Jardine et al., 1999	He and Ne gas	23	15	180	Sanford et al., 1996
SWSA 5, Melton Valley	Maryville	Jardine et al., 2002	bromide	9	8	100	Jardine et al., 2002
West Bear Creek Valley Well 462 area	Nolichucky	Moline et al., 1998	He gas	15	9	365	Moline and Schreiber, 1996
West Bear Creek Valley Well 462 area	Nolichucky	Moline and Schreiber, 1996	bromide	15	65		Moline and Schreiber, 1996

The third claim made in comments on page 3-173 involves the monitorability of EMWMF. While this comment was primarily informed by my experience working on the project team attempting to resolve issues with a proposed Sampling and Analysis Plan for EMWMF, the comment is supported by monitoring results published in various EMWMF monitoring reports and associated regulatory comments. In particular, some extreme outlier values of man-made radionuclides discussed in the 2002 Baseline Groundwater Monitoring Report for the Environmental Management Waste Management Facility Oak Ridge, Tennessee (DOE/OR/Ol-202l&D3) complicated the choice of threshold values for these radionuclides and created ambiguity concerning the integrity of the facility liner. The FFA parties should not begin active disposal operations at EMDF prior to establishing background levels and laboratory quantification limits sufficient to provide a sound basis for a detection monitoring program at the facility.

Response: As noted and as in the *Site Groundwater Characterization fact sheet*, the EMDF site has been extensively characterized to determine the geology and hydrogeology (figure on page 3 of the fact sheet). The investigation locations span the site to provide a complete picture of site conditions, including the lack of massive limestone and resulting karst features. There is a 300-ft separation between the disposal cells and the Maynardville Formation, the formation with karst features in Bear Creek Valley. The EMDF site was selected because there are no Northern Tributaries to Bear Creek present under the landfill waste. Other, smaller drainages are present, but not on the scale as the Northern Tributaries. Drainage north of the cell will be re-routed around the cell to the other Northern Tributaries.

In addition, a robust groundwater field demonstration (GWFD) is planned prior to construction of the EMDF to determine post construction groundwater elevation across the EMDF site. The EMDF site is separated from Pine Ridge by a saddle with drainage away from the EMDF site. This separation from Pine Ridge was key in selecting the EMDF site. As part of both the GWFD and landfill construction, this saddle will be enhanced to provide additional groundwater and surface water drainage away from the EMDF.

The attachment was inadvertently left out of the Responsiveness Summary included with the D1 ROD but has been included in the D2 ROD Responsiveness Summary.

DOE agrees that the release mechanism for the Bear Creek Burial Grounds is significantly different from the robustly designed and constructed EMDF. However, the relatively quick appearance of uranium in surface water from the Bear Creek Burial Grounds is almost entirely a result of the unique conditions at some locations at the Bear Creek Burial Grounds which allows rapid transport from the disposed waste to surface water.

Lessons learned from the Environmental Management Waste Management Facility (EMWMF) have been incorporated into the EMDF siting and preliminary design. These will continue to be incorporated into the final design and operations.

Threshold values are planned to be established at least 1 year prior to the start of EMDF operations. These should be straightforward because the EMDF is not located in an area of legacy contamination.

Comment on the Water Quality Factsheet

This factsheet presents a general overview of plans to protect water quality in Bear Creek. A supporting document (Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee, UCOR-5550) lists concentrations of 21 radionuclides and their progeny in surface water and fish tissue deemed protective of the recreational user. With the exception of a proposed 51 part per trillion limit on mercury concentrations, limits on wastewater discharges at either EMWMF or EMDF are not described.

Response: In accordance with the Clean Water Act and other ARARs, non-radiological discharge limits for the key EMDF contaminants of concern will be developed in post-ROD documents to meet the most restrictive of the applicable Tennessee Department of Environment and Conservation (TDEC) water quality criteria (TDEC 0400-40-03-.03, General Water Quality Criteria, "Criteria for Water Uses") and will include antidegradation requirements (TDEC 0400-40-03-.06, General Water Quality Criteria, "Antidegradation Statement").

Enforceable limits on radionuclide concentrations, as well as limits derived from Clean Water Act regulations, should be implemented at the point of discharge. Otherwise, significant contamination of the streambed and biota might occur prior to the identification of elevated concentrations found in surface water and fish tissue. It is especially important to establish discharge limits for radionuclides having in-stream preliminary remediation goals (PRGs) that may be too low to for analytical methods to quantify unambiguously. These would certainly include the plutonium isotopes, cesium-137, carbon-14, and radium-226, all of which have surface water PRGs less than 1 picocurie per liter.

For some isotopes, limits imposed on radionuclide concentrations in the discharge required to maintain concentration below in-stream PRGs might also be below the quantification limits of the analytical methods. Rather than wait until levels of these radionuclides in fish tissue approach the PRGs as stated in the factsheet, disposal of waste streams bearing these contaminants should be restricted over the entire operational life of the facility.

Response: As is common with ambient water quality criteria for chemicals with higher risk, preliminary remediation goals were sometimes set at concentrations that are not possible to detect using current laboratory methods. Over time, analytical methods are expected to improve to allow detection at these very low levels. For these analytes, the lowest practical detection limits will be selected.

Consider a scenario similar to that used in the Performance Assessment (PA) for the Environmental Management Disposal Facility at the Y-12 National Security Complex, Oak Ridge, Tennessee (UCOR-5094/R2) to estimate losses of carbon-14 over an assumed 25 year operational history. The PA, which was provided as a supporting document for the factsheets, estimates that 7.43 Curies of Carbon-14 (see Table B.6) will be disposed in EMDF and calculates a loss of nearly 6 Curies to wastewater during the operational lifetime of the facility (Section 3.2.2.5). Per USGS regression models for streamflow, the median flow in the lower reaches of Bear Creek is about 5 cubic feet per second. Over an assumed 25 year operational life of the facility, this is a total of 112 billion liters. Corresponding in-stream concentrations based on dilution with the median flow in lower Bear Creek over the operational history of EMDF would be about 53 picocuries per liter. To attain the surface water PRG of 0.0753 picocuries per liter published in UCOR-5550, wastewater treatment and in-stream processes would need to achieve almost 99.9% removal of carbon-14. Removal efficiency would need to be yet higher should in-stream concentrations be based on the harmonic mean of the discharge rather than the median flow, as recommended in EPA guidance, or if they were based on the 30 day duration, 5 year return flow, as specified in TDEC permitting rules. Given the solubility of some forms of inorganic carbon (carbonate/bicarbonate ions), such a high removal efficiency seems unlikely.

Response: The approximate dilution calculation using a median flow value does not provide an accurate estimate of Bear Creek carbon-14 concentrations expected to result from the discharge of treated EMDF landfill wastewaters. Regardless of treatment system efficiency, most of the carbon-14 flux in landfill wastewater will necessarily occur during wet seasons and wet-weather periods when Bear Creek flows are higher than the median value. In addition, the release model used to estimate operational period losses of carbon-14 and other highly soluble radionuclides is conservative in the context of estimating wastewater concentrations because it assumes zero chemical retardation of carbon-14 and takes no credit for treated waste forms or waste packaging that would reduce the release of carbon-14 inventory during operations.

The approach to calculating the EMDF treatment system annual discharge limits for carbon-14 and other radionuclides will be developed in cooperation with the FFA parties as the final treatment system location and other design elements are finalized to ensure that surface water protection goals are met consistent with the Remedial Action Objectives in the EMDF ROD.

The factsheet explains a process to establish water quality goals and limits for the protection of Bear Creek. The factsheet does not discuss other issues associated with wastewater management. For example, neither the factsheet or the ROD discusses any plans or practices to minimize the generation of contaminated wastewaters during landfill operations. Public comments in the Responsiveness Summary stressed the difficulties that arose due to inadequate wastewater handling and treatment capacity at EMWMF and warned of the potential for such problems at EMWMF. On page 3-168 of the Responsiveness Summary, the comment states:

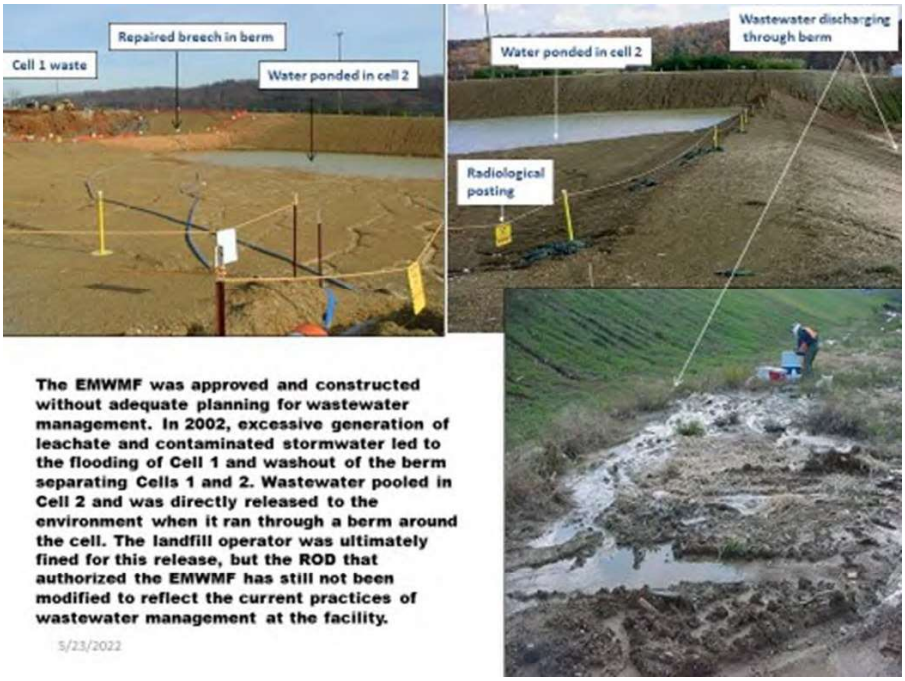
“DOE’s operation at EMWMF has been plagued by excessive generation of wastewater. To facilitate ease of operation and rapid disposal of large quantities of demolition debris, DOE has sometimes allowed the working face of the landfill to fill one or more of the cells. Best management practices to separate “clean” stormwater that had no contact with the waste from leachate and contaminated stormwater were implemented only after a decade of operations. In general, DOE prioritized rapid disposal and ignored waste management rules and guidance that direct waste management operations to minimize wastewater generation. In 2002, the facility actually flooded, with wastewater washing over a berm and entering Bear Creek. During the 2005 time frame, concentrations of strontium 90 discharged from EMWMF to Bear Creek, a stream which loses flow directly to groundwater, were two orders of magnitude higher than the maximum contaminant level for strontium 90 stipulated by EPA. While wastewater management at EMWMF has significantly improved over the past decade, this is almost certainly due to regulatory pressure

rather than a renewed DOE commitment to honor the spirit of the antidegradation statements in the Clean Water Act. DOE should make more effort to minimize wastewater generation at a future facility."

The DOE response was as follows:

"As described in this ROD, Phase I construction on the EMDF will include numerous engineering features to manage surface water and wastewater and will consider all lessons learned from 16 years operation at EMWMF (such as aggressively deploying rain shed covers on completed portions of the landfill)."

This response refers to water management measures to be taken during construction and on portions of the landfill that have been filled, not during operations. Temporary berms, daily cover, and other means to reduce run on reaching the working face of the landfill should be used at EMDF. Note that the comment previously discussed on page 3-173 of the Responsiveness Summary includes a reminder that the FFA parties failed to anticipate wastewater management needs at EMWMF. The attachment referred to in this comment but not included in the Responsiveness Summary provided evidence to support this need for caution. The following photo-documentation of flooding and uncontrolled release of radioactive leachate and contaminated stormwater at EMWMF in 2002 was extracted from the attachment submitted in 2018 with the Proposed Plan comments. Photos were taken by H. L. Crabtree, who prepared an internal report for the Tennessee Department of Environment and Conservation on the washout of the berm.



Note that the fine levied (see pages 26-27 of EPA-350-R-07-002, May 2007 for details) was for an intentional release from holding ponds containing landfill wastewaters to permit more water to be pumped from the flooded landfill cells, not for the uncontrolled release through the berm shown here.

As the following picture taken over a decade later by another TDEC employee shows, water management continued to be a problem through much of the operational history of EMWMF. The EMWMF ROD did not include applicable or relevant and appropriate requirements (ARARs) for discharge of wastewater, as discharges to Bear Creek were not anticipated at the time of the ROD. Subsequent modifications to the ROD have not incorporated rules for wastewater discharges. The final draft of the Focused Feasibility Study (FFS) for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation,

Oak Ridge, Tennessee, (DOE/OR/01-2664) will not be issued until after the comment period ends. Consequently, it is still not clear how wastewater discharges at EMWMF will be regulated after two decades of operations, nor how wastewater discharges would be regulated at EMDF.

Response: Water management practices for the EMDF were not provided as part of the public involvement information. However, as described in the initial response to this comment, "…Phase I construction on the EMDF will include numerous engineering features to manage surface water and wastewater and will consider all lessons learned from 20 years of operation at EMWMF (such as aggressively deploying rain shed covers on completed portions of the landfill)." To provide additional detail, landfill water will be controlled by plans and procedures to minimize water generation, such as is performed for the EMWMF.

The EMDF will deploy impermeable covers during operations to shed clean stormwater out of the disposal cells, similar to current operations at EMWMF. As a result of this approach, landfill wastewater generation is reduced. However, wastewater generation tends to be greatest during major storm events, such as during the stalled remnants of a hurricane as occurred in 2002 after the landfill was first opened and no impermeable covers were in place and as shown in the commenter's photos. Therefore, the existing EMWMF plans and procedures and future EMDF plans and procedures are specific to monitoring weather forecasts, maintaining equipment and personnel at the ready to respond to such events, employing additional best management practices, and thereby effectively managing these rare but significant events.

As clarification: the final photo shows the grouted waste containers used as a best management practice to minimize landfill wastewater accumulating in the disposal cell catchments from infiltrating into bulk disposed waste as the catchments are being pumped into the contact water ponds and tanks.

Comments on the Waste Acceptance Criteria (WAC) Factsheet

The administrative WAC is derived primarily from ARARs and is described in some detail in the factsheet. For details on the "analytic WAC", the reader is referred to the D1 Record of Decision (ROD) for a list of radionuclide concentration limits in waste lots or individual containers. WAC derived from the intruder scenario analyzed in the PA referenced in above comments are given in Table 2.6 of the draft ROD and are generally less than NRC Class C limits. The factsheet indicates that these limits are to be applied to individual waste lots, while the draft ROD states, "Concentration limits given in Table 2.6 could allow a much greater inventory than is projected; however, these concentrations limits are meant to be applied on a small scale, to individual generators (e.g., by waste lot/package), in order to efficiently utilize the facility capacity."

It should be noted that if the WAC derived from the intruder scenario are applied at the waste lot scale, significant hot spots within the landfill having concentrations of radionuclides exceeding Class C limits would not necessarily be prohibited. Some EMWMF waste lots had a total volume on the order of 100,000 cubic yards (c.f. waste lot 401.01, K-33 building debris) while the Class C limit would typically be applied to individual waste packages like a B-25 box with a capacity of about 3 cubic yards. Consequently, if waste such as hot cells were mixed with large quantities of other waste derived from building demolition in the same waste lot, the intruder scenario based WAC would need to be four orders of magnitude below the Class C limits to ensure an equivalent restriction on hot spots in the disposal facility. Intruder based limits should be applied at the waste package or waste shipment scale, not to entire waste lots. Furthermore, because NRC siting criteria will not be met for EMDF and very low concentrations of some radionuclides in discharges to surface water will be necessary to ensure protection of health and environment, NRC Class A limits rather than Class C limits should be used in the EMDF WAC.

> **Response: As described on page 2 of the *Waste Acceptance Criteria fact sheet*, waste classified as greater than U.S. Nuclear Regulatory Commission (NRC) Class C is prohibited. Usually waste that reaches Class C limits is associated with process equipment that ends up going offsite or it has to be packaged due to removable contamination, so this waste type is not common in the EMWMF and not expected in significant quantities in the EMDF inventory. The EMWMF WAC Project Execution Plan contains the following language, which is expected to also be used at the EMDF:**
>
> > ***Waste classification in the state of Tennessee is applied on a container-by-container basis. In instances where Class C waste is expected to be generated, profiles will be required to discuss which portions of the waste lot are expected to be Class C waste, and ADPs [Anomaly Detection Plans] will be required to discuss the specific methods that will be used to ensure no individual containers are greater than Class C wastes.***

The waste acceptance criteria factsheet does not discuss limiting disposal of mercury contaminated waste explicitly. However, the waste quality factsheet states that to prevent mercury from exceeding 51 parts per trillion (ppt) in wastewater discharges, one approach will be:

"Minimize mercury content of waste to minimize mercury content in landfill wastewater. The proposed EMDF waste acceptance criteria limits the acceptance of mercury-containing waste. DOE will send elemental mercury offsite and mercury containing waste receipts will be restricted to below Resource Conservation and Recovery Act hazardous mercury concentrations."

The efficacy of sending elemental mercury offsite for disposal will be dependent on the ability to characterize waste at the level of detail needed and to handle waste so that elemental mercury can be isolated and contained. It should be noted that such detailed characterization or meticulous handling of waste has

not been required to meet WAC at EMWMF. A quick calculation to see how much elemental mercury would be required to potentially contaminate wastewater to a level of 51 ppt over the operating life of the facility should serve as a reality check.

The FFS for wastewater management assumed 30 gallons per minute as the average discharge from EMDF for design purposes. This equates to about 1.5 billion liters of wastewater discharged over a facility operational life of 25 years. The amount of elemental mercury required to achieve 51 ppt in 1.5 billion liters of water is only 76 grams, or 5.6 milliliters of mercury. This is just slightly more than a single teaspoon of mercury.

Building debris most likely to contain elemental mercury will come from the Alpha 4 and Alpha 5 buildings in the west end mercury area of the Y-12 plant. The estimated volume of building debris resulting from demolition of these buildings given in Table B.2 of the PA is 177708 cubic yards. This is approximately 10000 dump truck loads of waste in which to lose a teaspoon of elemental mercury.

While DOE states that waste with mercury concentrations exceeding the Resource Recovery and Conservation Act (RCRA) standard will not be accepted at EMDF, just 16.6 liters of elemental mercury would need to be disposed inadvertently over 25 years of operations to potentially elevate mercury levels in landfill wastewater above the RCRA standard for hazardous wastewaters (0.15 milligram mercury per liter). This would require disposal of only about ¼ teaspoon of mercury per truckload of waste generated by Alpha 4 and Alpha 5 demolitions.

To date, no information has been made available that would allow the public to evaluate the feasibility of DOE's strategy to limit disposal of mercury at EMDF. The scheme proposed by DOE to regulators in Appendix C of the third draft of the Remedial Investigation/Feasibility Study (RI/FS) was removed prior to final draft (available as a supporting document for the factsheets) and was replaced with an empty Appendix C as a placeholder. The preferred method described in the D3 was containment of mercury post-disposal by the use of macroencapsulation in large concrete vaults. The viability of using macroencapsulation at this scale has not been demonstrated. The FFA parties have failed to give the public sufficient information to evaluate the possible threat that mercury disposal at EMDF may pose to human health and the environment through either wastewater discharges or through future releases after the facility is closed.

Response: The combination of prohibiting elemental mercury and restricting mercury containing waste to below Resource Conservation and Recovery Act of 1976 (RCRA) hazardous mercury concentrations, even if treated, will ensure that that most mercury will be disposed offsite. The EMDF approach has progressed since the Remedial Investigation/Feasibility Study (RI/FS), and macroencapsulation is no longer a part of the remedy, nor is disposal of waste with RCRA hazardous concentrations of mercury , even if treated by any method.

All EMDF wastewater will be treated to ensure the mercury discharge limit of 51 ppt is met. As a good point of reference, although the EMWMF has not received as much waste from the Y-12 National Security Complex as is anticipated for EMDF, landfill wastewater discharges on average are less than 51 ppt since the time that this detection limit was instituted, indicating that the approach stated in the ROD will be protective.

Neptune's review of the PA and CA discusses non-radiological risks posed by EMDF, noting that both mercury and uranium could contribute significantly. On pages 50-51, Neptune states:

"In addition to the need for assessing the impacts of non-radiological hazardous constituents, it is also important to recognize that the nephrotoxic effects of uranium are much more sensitive than radiological

dose. As shown in a Technical Memorandum (Neptune, March 2019), water concentrations of uranium associated with adverse nephrotoxic effects are approximately 50 times (natural U) to 100 times (depleted U) lower than concentrations associated with a 25 mrem/yr dose. Consequently, applying a threshold radiological dose as the health-based standard for uranium exposure is not protective of human health for either natural or depleted uranium."

To date, DOE has offered no information on how total uranium would be limited in EMDF. At EMWMF, regulators negotiated a limit on total uranium in the facility using bounds based on experience with uranium buried in the Bear Creek Burial Grounds (BCBG) and equity arguments. At the Burial Grounds, which lie between EMWMF and the proposed site for EMDF, roughly 18 million kilograms of uranium are estimated to have been buried, primarily in shallow disposal trenches. Currently, water contaminated by contact with waste at the burial grounds is collected and treated to mitigate the impacts of the Burial Grounds on water quality in the Bear Creek watershed.

To prevent disposal of sufficient uranium to create a future environmental threat comparable to BCBG, limits for total uranium in the EMWMF were set at 1000 part per million. The ROD authorized a disposal facility with capacity up to 1.7 million cubic yards. Assuming waste densities slightly less than one metric ton per cubic meter, this limited total uranium in EMWMF to slightly over 2 million kilograms, an order of magnitude less than the amount of uranium in BCBG. These limits seemed reasonable at the time. They were not revised when the EMWMF expanded beyond the anticipated 1.7 million cubic yard capacity as the total projected uranium inventory at facility closure has remained below 2 million kilograms.

Based on the estimated inventory of uranium isotopes at closure given Table B.1 of the CA, about 1 million kilograms of uranium will have been disposed in EMWMF, adding to the inventory already in Bear Creek Valley. Given the many uncertainties in modeling future risk due to releases from EMDF, limits based on modeling could vary from as low as natural background levels in soils to no limits at all. Since naturally occurring uranium levels (on the order of 10 picocuries per gram) provide a reasonable lower bound and experience from BCBG should provide an upper bound, common sense based on experience and equity considerations should help guide the choice of a waste acceptance limits for uranium.

The only limits placed on uranium at EMDF currently arise from the intruder scenario discussed in the factsheet. Converting to a mass basis, the limits for U-238 and U-235 isotopes would only prohibit disposal of waste lots that were more than 14% by weight uranium. Assuming the waste density of 1900 kilograms per cubic meter used in the PA and CA, the corresponding facility limit for the total mass of uranium in a 2.2 million cubic yard EMDF would be 450 million kilograms, far more than is currently buried in BCBG. Need I point out that this is ridiculous? To remain consistent with the intent of the administrative WAC for uranium at EMWMF, no more than another 1 million kilograms total uranium should be disposed of in EMDF. In EMDF, that would correspond to a total facility concentration limit of about 100 picocuries per gram.

Response: As described, the EMWMF uranium inventory is much lower than allowed, approximately 50 percent of the allowed volume.

The waste lot concentration limits based on the human intrusion scenario that are provided in the ROD do not represent the expected facility total inventory. A realistic expected total uranium inventory is on the order of 1 million kg. The final set of EMDF inventory limits for radionuclides and uranium will be informed by the supplemental analysis in the WAC Compliance Plan. The technical basis for all analytic inventory limits will be documented in the EMDF WAC Compliance Plan, which will be developed in consultation with the U.S. Environmental Protection Agency (EPA) and TDEC, and then submitted to EPA and TDEC for review and approval.

The factsheet states that the administrative WAC will be determined sometime after public comments are made but prior to approval of the ROD. As pointed out in comments on the Proposed Plan, the FFA parties have seemingly decided that a 2.2 million cubic yard facility is necessary before they have evaluated how much waste will need to be sent off site because of elevated levels of mercury or uranium in the waste. The following comment was excerpted from page 3-141 of the Responsiveness Survey:

"I note that the TDEC text expressing non-acceptance of the plan deals mostly with siting issues and applicable, relevant and appropriate regulations (ARARs). TDEC does not adequately question the suspect cost analysis, nor do they question DOE's discussion of the waste inventory or capacity demand. All of these defects remain in the plan and its justification.

The large footprint is, like the desire for a quite generous Waste Acceptance Criteria (WAC), apparently driven by contractor assertions. The footprint size is not supported by any actual analysis of the anticipated volume of CERCLA waste generation that is appropriate for on-site disposal. Reduction of the footprint by 30 to 50 percent would make evaluating and delineating a more adequate site, with lower risks from the karst and groundwater challenges significantly easier."

DOE responds: "RI/FSs for disposal facilities sometimes contain placeholder waste acceptance criteria (WAC), as was done for the Environmental Management Disposal Facility (EMDF). The Proposed Plan then includes general information on the components of the WAC. This was the case for EMDF in which the Proposed Plan generally described the WAC and the process for obtaining final approval. WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as applicable or relevant and appropriate requirements (ARARs). The developed WAC are anticipated to require nearly 90 percent of the radiological content in the low volume/highly contaminated waste streams to be sent offsite for disposal while the lower contaminated/high volume waste streams remain onsite."

DOE's response does not address the comment. There are few hazardous waste disposal sites operating under CERCLA authority, so it is uncommon for limits on waste acceptance to be presented in (or to be absent from) a CERCLA document such as a RI/FS. As discussed above, credible limits on mercury and total uranium are much more likely to control the amount of waste that can be disposed at EMDF than the radiological content. The public has simply not been given information to discern if an on-site facility of this size is the better alternative. TDEC and EPA have apparently not looked into the issues arising from uncertainty in capacity demand and waste inventory seriously and will rely on DOE's claim concerning capacity demand.

> **Response: The EMDF is designed to be constructed in phases. While the total approved capacity is 2.2 million cubic yards, the phased approach allows for construction of only the volume needed by the waste receipts.**
>
> **Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) process, the WAC are often contained in a post-ROD document. The ROD contains the high-level approach for the remedy while the post-ROD documents approved by EPA and TDEC contain the specifics on how the remedy will be implemented. In the case of the EMDF, WAC requirements are included in the *Waste Acceptance Criteria fact sheet* and the D2 ROD to address FFA parties and stakeholder concerns.**

These DOE talking points are repeated several times throughout the Responsive Summary to answer various comments or questions concerning waste acceptance at the proposed facility, for example, to a comment on page 3-162 that states:

"The administrative record shows that DOE efforts to develop waste acceptance criteria through site specific risk assessments, based primarily on a scenario of a future resident using water resources in Bear Creek Valley, were not successful. The limiting concentrations of contaminants in waste that were derived from the analysis varied significantly from one version of the RI/FS to the next. The effort to derive WAC is presumably ongoing, as DOE states on page 12, that:

The final WAC will be attached to the ROD prior to signature and will be one of many factors used by DOE to assure protection of human health and the environment.

Response: Please note that the EMDF planning approach has changed as expected through the RI/FS, Proposed Plan, and ROD phases as expected as part of the CERCLA process, to take into consideration input from stakeholders, including EPA and TDEC.

The current WAC are provided as part of the *Waste Acceptance Criteria fact sheet* and the D2 ROD. Additional inventory limits are being evaluated as part of the supplemental analysis in the WAC Compliance Plan. Results of this evaluation will be provided in the WAC Compliance Plan that will be developed in consultation with EPA and TDEC, and then submitted to EPA and TDEC for review and approval.

Prior to selection of a preferred alternative, defensible preliminary WAC should have been developed and the projected waste inventory for the proposed landfill screened against those WAC to better estimate the airspace required to dispose of those waste that were suitable for on-site disposal. DOE is apparently assuming that the volume that cannot meet WAC will be negligible, but given the levels contamination from mercury, uranium, and fission products in some of the waste streams listed in the RI/FS, this assumption needs justification."

Note here that the Proposed Plan promised that final WAC will be attached to the ROD prior to signature, but the waste acceptance factsheet promises finalization of only the administrative WAC. This difference is not addressed in the response.

The factsheet states:

"DOE will develop a WAC Compliance Plan in consultation and with the approval of EPA and TDEC to explain the basis for WAC use and describe implementation. DOE will also complete an analysis for the landfill inventory throughout operations and at closure, limiting the overall radionuclide inventory that can be placed in the EMDF.

The WAC Compliance Plan will specify how these analyses are completed. DOE will also develop and include details regarding implementation of the WAC, roles and responsibilities of the waste generator versus the disposal facility, and how multiple isotopes in a single waste lot are summed and how landfill inventory limits will be tracked."

Since little additional information on WAC compliance is given in the factsheets or supporting documents, the following comments on WAC compliance reiterate themes of previous comments. I note that the current Oak Ridge Reservation Cleanup Contract continues to yield responsibility for WAC compliance to the contractor. On page 43-44 of the request for proposals (solicitation number 89303319REM000047) responsibilities of the contractor for EMDF operations are listed and include:

"Assisting waste generators with preparation of waste lot profiles and review and approval of WAC compliance for all waste-generating projects."

This does not preclude the FFA parties from creating an independent group representing all three parties to have the final approval authority for disposal of waste lots but seems to indicate that the FFA parties will accept the status quo.

Response: DOE disagrees with this comment. The *Waste Acceptance Criteria fact sheet* page 2 includes the following listing of prohibited or limited waste for the EMDF that effectively limits the waste that can be disposed at the EMDF:

- **Waste generated outside CERCLA-related cleanup activities on DOE's Oak Ridge Reservation**
- **Transuranic waste, high-level waste, spent nuclear fuel, wastes produced by the extraction or concentration of uranium, and waste classified as greater than NRC Class C**
- **RCRA listed hazardous wastes**
- **Elemental and RCRA mercury characteristic hazardous waste**
- **RCRA hazardous waste that does not meet land disposal restriction treatment requirements or alternative treatment standards for hazardous debris or soil**
- **Infectious/pathogenic wastes and pyrophoric/detonatable/explosive wastes**
- **Free liquids, including RCRA and Toxic Substances Control Act of 1976 waste packages**
- **Bulk or non-containerized liquid hazardous waste or hazardous waste containing free liquids (whether or not sorbents are added)**
- **Bulk liquids exceeding 500 ppm polychlorinated biphenyls (PCBs) – bulk liquids containing PCBs at or below 500 ppm must be treated so they no longer contains free liquids**

In addition, analytical WAC have been set for the radionuclides with the potential to exceed the CERCLA risk range after closure, therefore ensuring the remedy remains within the risk range and is therefore consistent with CERCLA threshold criteria.

Broad language included in a procurement scope of work does not replace the regulatory agreements in place for reviewing and approval of waste lot profiles and determining WAC compliance.

A number of public comments addressed the potential mismanagement of EMWMF and suggested that problems may have occurred due to a potential conflict of interest created by having the same entity responsible for both waste generation and waste acceptance. One comment even suggests (see page 3-88 of the Responsiveness Summary) a plausible direct conflict of interest due to tipping fees.

Response: DOE strongly disagrees with this comment. There is a robust organization structure and assessment/oversight by both DOE and regulatory agencies to ensure there is separation between waste generation and waste acceptance. In addition, the EMWMF does not charge or assess tipping fees. Likewise, the EMDF operations does not plan to charge or assess tipping fees.

On page 3-159 on the Responsiveness Survey, another comment states:

"In practice, either the contractors generating the waste or entities that subcontract from the waste generator have been in charge of final approval of individual waste lots at EMWMF, setting up a potential conflict of interest. In certain cases where wastes were inappropriately disposed of in EMWMF (see Attachment B [Attachment 2]), it seems probable that the waste acceptance process, in addition to a confusing set of waste

acceptance criteria, contributed to the root causes of the inappropriate disposal. At any future disposal facility operating under CERCLA authority, the waste acceptance methodology employed at EMWMF should not be replicated, but replaced with a protocol that requires final approval of waste lots for disposal by representatives employed directly by the three FFA parties, DOE, EPA, and TDEC."

Predictably, the response denies any problems:

"DOE disagrees with the comment regarding inappropriate disposal of waste in the Environmental Management Waste Management Facility (EMWMF). DOE has a mature and robust process for the characterization of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste generated from remedial actions at the Oak Ridge National Priorities List (NPL) Site. Plans for remedial actions including waste disposal are subject to approval by the regulatory agencies prior to the implementation of work at the Oak Ridge NPL Site. The potential for waste material to be inappropriately disposed of onsite is minimal."

Note that the response states that the regulatory agencies approve plans for remedial actions. While true, this misses the point of the comment. It is the approval of waste profiles that include the a description of the waste and waste characterization data, not plans approved prior to characterization, that is at issue. I almost certainly reviewed more EMWMF waste handling plans and almost certainly audited more EMWMF waste profiles than the author(s) of the response, and I do agree that much of the waste disposed at EMWMF met WAC. However, there were some important exceptions.

The attachment to comments referred to in the comment above provided evidence for the disposal of a few containers of greater than Class C or TRU waste at EMWMF. Such disposals would have been prohibited by Tennessee's interpretation of the administrative WAC. This attachment was not included in the Responsiveness Survey. The attachment was a copy of correspondence concerning an audit performed by myself and others at TDEC on the profile for waste lot 84.4. This waste lot contained waste excavated from an area contaminated by releases of radionuclides from an inactive tank farm in Bethel Valley. The important point is that the characterization of waste lot 84.4 was found by TDEC to be inadequate to determine if the administrative WAC was met. To make clear that this was a determination made by the regulatory agency, not my personal opinion, I am including the copy of correspondence between the FFA parties below as Exhibit 1.

Exhibit 1. Correspondence from John Owsley to Laura Wilkerson

April 3, 2012

Laura O. Wilkerson
Portfolio Federal Project Director
Oak Ridge National Laboratory Projects
U.S. Department of Energy
Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, TN 37831-8540

Final Determination of Waste Lot 84.4

Dear Ms. Wilkerson

References:
1.) Letter from John A. Owsley to Stephen H. McCracken, "Core Hole Eight Lot 84.4 Audit Findings," dated May 16, 2006.
2.) Letter from Stephen H. McCracken to Paul F. Clay, "Tennessee Department of Environment and Conservation Concerns about Environmental Management Waste Management Facility," dated May 19, 2006
3.) Letter from Stephen H. McCracken to John A. Owsley, "Response to the Tennessee Department of Environment and Conservation concerns related to Waste Lot 84.4," dated July 28, 2006.
4.) Letter from John A. Owsley to Laura O. Wilkerson, "Audit Waste lot 84.4 Findings and Required Actions," dated May 25, 2011.
5.) Letter from Laura O. Wilkerson to John A. Owsley, "Audit of Waste Lot 84.4: Findings and Required Actions," dated October 26, 2011.

The Tennessee Department of Environment and Conservation (TDEC) has received the Department of Energy (DOE) letter dated October 26, 2011. Based on as thorough review as possible given the available data, TDEC has made the following determinations:

1. TDEC does not contest the DOE assertion that the strategy used for characterization of Waste Lot 84.4 yields, on average, was a conservative assessment of the radionuclide inventories that contribute toward administrative waste acceptance limits at the Environmental Management Waste Management Facility (EMWMF). TDEC accepts DOE's position that a further recalculation of the sum-of-fractions is not necessary for Waste Lot 84.4.

2. In order to maintain an interpretation consistent with State of Tennessee (Rule 1200-02-11-.17-(6)), Nuclear Regulatory Commission (NRC) and DOE Order (DOE N 435.1) requirements,

radionuclide concentrations must be on a container basis for purposes of definition of wastes as TRU or GTCC. Containers should be sampled individually in cases such as Waste Lot 84.4, where much variability in TRU or GTCC radionuclide concentrations is indicated. In general, characterization should be adequate to assert with 95% confidence that no individual container will exceed TRU or GTCC limits. Since the audit of Waste Lot 84.4, the requirements of the administrative WAC for TRU and GTCC wastes have been interpreted on a container basis, and there has been increased diligence on the part of WAC attainment personnel to assure that no containers of potentially TRU or GTCC waste have been disposed. The incorporation of the following statement into EMWMF WAC Attainment Team Project Execution Plan will address this requirement. "Projects are admonished that the Tennessee waste classification is applied on a container-by-container basis. In instances where Class C waste is expected to be generated, profiles are required to discuss which portions of the waste lot are expected to be Class C waste, and the anomaly detection plan in Appendix A is required to discuss the specific methods that will be used to ensure no individual containers are greater than Class C wastes."

3. In the past, TDEC has expressed a desire to have the WAC attainment team contracted independently by DOE. In lieu of an independent WAC attainment team, TDEC will now require that the WAC Attainment Team participate in the DQO session(s) leading up to the creation of the Sampling and Analysis Plan (SAP) that becomes part of the WHP, as well as approve the DQOs that are developed for the SAP, and approve the subsequent SAP. These plans (in whole or in part) may be included in waste profiles as part of their CERCLA and other documentation. Regardless, waste profiles must provide sufficient information to independently evaluate any results generated or conclusions drawn regarding compliance with WAC attainment requirements. Although WHP sampling requirements should be viewed as necessary characterization requirements, these data may still be insufficient. Should data gaps be discovered either as a result of unexpected sample results or incomplete DQOs within the WHP (e.g., due to discovering new process knowledge), additional data will be required to meet the EMWMF DQOs.

The available evidence for evaluation to support these determinations includes:

- **1999 Soil Boring Data**
  The 1999 data from twelve IT soil borings that were distributed over the entire Tank W1-A excavation area. These data were submitted by letter to TDEC in 2002. They do not provide complete isotopic analysis and show some inconsistencies, but do reliably indicate that soils in the southern and eastern parts of the excavation area were not contaminated at levels approaching TRU or GTCC limits. They also provide evidence that the upper few feet of soil were generally much cleaner than soils 8-12 feet below ground surface. Soils from these cleaner regions of the excavation were primarily shipped off-site for disposal (~700 cubic yards) and as waste lot 84.3 (about 200 cubic yards), but some of these data may give an indication of the contents of some of the containers shipped as waste lot 84.4. Samples were taken from three borings that were within the excavated area but near the southern and eastern boundaries of the remaining material and Tank W1-A. Analytical data indicate that TRU limits were not reached at any depth in these borings, although some samples south of the tank had TRU constituents that exceeded 50 nCi/g.

- **1998 Soil Boring Data**
  Three samples from borings in 1998, including one composited from the top five feet of soil from two borings, another from five feet to refusal of these borings, and one from a discrete location about 12 feet below ground surface in the southernmost borehole. The discrete location was identified as having the highest surface radiological readings, but had lower analytical results for TRU constituents than the composite samples. The southernmost boring was also relatively close to the excavation boundary, and the data indicate the soil was neither TRU nor GTCC. These data were taken from the 1998 EECA for the Core Hole 8 Plume Source.

- **2006 Soil Boring Data**
  In 2006, 33 borings in the soils that remained after the excavation were collected. Of 53 total samples that were analyzed adequately to allow the TRU or GTCC contents to be assessed, 18 samples were taken from soils that lay between the tank and the surface of the excavation. The other samples were north and west of the tank. Analytical data indicated that four to six of the 18 samples (TW1A-SB23-A-01, TW1A-SB25-A-01, TW1A-SB35-A-01, TW1A-SB36-A-01, TW1A-SB44-A-01, and TW1A-SB46-B-01) should be classified as TRU, depending on whether alpha or gamma was used to quantify Americium 241. Likewise, 10 to 13 of the total 53 samples would exceed TRU limits. These data were provided by the Waste Acceptance Criteria (WAC) attainment team on request and locations were determined using the Oak Ridge Environmental Information System (OREIS) database. They were used by DOE to establish WAC attainment at Nevada National Security Site (NNSS) for the remaining soils at Tank W1-A, now being removed. Similarly, a ratio of Americium to total TRU constituents was used provide evidence of conservatism in the Waste Lot 84.4 estimate of the TRU and GTCC contents of nine shielded boxes that were disposed in EMWMF. The correlation between either Cesium 137 or Americium 241 and the plutonium isotopes in this data set is too poor, however, to provide much confidence that no box contained TRU or GTCC material. In addition, many of these samples came from north and west of the tank, some distance from the presumed source of soils that were disposed in EMWMF. While this is by far the largest usable data set available from the Tank W1-A area, it is probably not an ideal set with which to evaluate soils in lot 84.4.

- **2002 Grab Sample Data**
  In 2002, grab samples were obtained during excavation of "soils near the tank". While the precise location of these samples is not available in any documents TDCE has reviewed, the 2002 Removal Action Report states they came from Quadrant 1 of the excavation area, and the samples are likely to have been taken near the final boundary of the pit. Results from gamma spectroscopy on 31 samples and alpha spectroscopy on 9 samples were included in the waste profile for Waste Lot 84.4. Eight of the nine samples exceeded TRU limits. Containers of soil that yielded these samples were not sent to EMWMF, but other B12 boxes that exhibited less surface radiation were shipped in Waste Lot 84.4. Attempts were made to use scaling factors to estimate the radionuclide inventory of individual containers based on Cesium 137 results. Only Americium 241 and Cesium 137 results were available for soils representative of individual boxes that were shipped in the waste lot. Unfortunately, Cesium 137 correlated negatively with plutonium isotopes, the main contributors, with Americium 241, to TRU or GTCC in all samples. Using just these data and establishing a very weak linear correlation between plutonium isotopes and Americium 241, TDEC would infer that soils representative of Box BR-03S were TRU. Due to the spatial variability of Plutonium, and to a lesser degree, Americium, TDEC does not, however, propose that this set of soil samples is an adequate surrogate data set for soils actually shipped in Waste Lot 84.4. Nor does TDEC claim any validity for a statistical approach based on

these data that might be applied to predicting the contents of a given waste container in Waste Lot 84.4 such as BR-03S.

TDEC has attempted some statistical analyses of these data sets, individually and in combinations, and can only conclude that TRU concentrations in samples near the source area for Waste Lot 84.4 are highly variable. Looking at the approximately 30 samples (18 from 2006 soil borings, 1 from the older data set, and 12 from the 1999 borings) taken near the excavation boundary for which there are sufficient data to infer TRU content, it would appear that a composite of these samples would be neither TRU nor GTCC. There, are however, several analyses that indicate TRU and GTCC adjacent to excavated soils, and DOE has yet to present convincing evidence that the contents of every container in Waste Lot 84.4 was indeed low-level waste.

TDEC accepts that there may be other mitigating factors which reduce the chances that a TRU or GTCC container was disposed. In all probability, many of the B12 boxes that may have contained TRU soils were placed in storage and never shipped to EMWMF. Few samples showed TRU content greater than 200 nCi/g. If the contents of one or more containers were TRU, then if the gross weight of the container (including shielding in some cases) is used this might reduce the overall concentration of a waste package below TRU or GTCC limits. In addition, blending of cleaner soils from the top of the soil column with more contaminated soils below was used for dose reduction during excavation, and reduced the chances of the average concentration in a container exceeding the TRU or GTCC limits. One caveat to add, however, is that the efficacy of these factors depends on the spatial correlation of concentrations of radionuclides that comprise the TRU or GTCC lists with radionuclides responsible for dose as measured in the field. As stated before, these appear to be positively but weakly correlated due to variability in the data.

If you have any questions, please feel free to contact me at (865) 481-0995.

Sincerely

John A. Owsley

John Owsley
DOE Oversight

cc Arthur Collins, EPA
Jeff Crane, EPA
Dave Adler, DOE

jao1047a

In another audit, initiated by an anomalously high reading at the EMWMF portal monitor, TDEC found that the waste handling plan had not been followed. Correspondence between the FFA parties concerning this waste lot is reproduced as Exhibit 2. Inappropriate disposal of waste at EMWMF was not common, but the potential was not minimal, nor is it likely to be minimal at EMDF because some ORR CERCLA waste has unique characteristics that may pose new challenges for waste characterization. The regulatory agencies should recognize that approval of this ROD including DOE's responses in the Responsiveness Survey as written amounts to tacit agreement that past audit findings by TDEC were in error.

Exhibit 2. Letter from John Owsley to Stephen McCracken

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DOE OVERSIGHT DIVISION
761 EMORY VALLEY ROAD
OAK RIDGE, TENNESSEE 37830-7072

May 9, 2007

Stephen H. McCracken, Assistant Manager
for Environmental Management Programs
U.S. Department of Energy
Oak Ridge Operations Office
Oak Ridge, TN 37831

Dear Mr. McCracken:

Homogenous Reactor Experiment (HRE) Evaporator Waste Lot 149.4 Audit, responses to findings. Tennessee Department of Environment and Conservation, DOE Oversight Division

References

1. March 12, 2007, letter from S.H. McCracken, DOE, to J.A. Owsley, TDEC, *entitled "Response to the Tennessee Department of Environment and Conservation Audit Findings on Homogenous Reactor Experiment Waste Lot 149.4"*
2. January 16, 2007, letter from J.A. Owsley, TDEC, to S.H. McCracken, DOE, entitled *"Homogenous Reactor Experiment (HRE) Evaporator Waste Lot 149.4 Audit Findings, Tennessee Department of Environment and Conservation, DOE Oversight Division"*
3. *"Waste Acceptance Criteria Attainment Team Project Execution Plan, Environmental Management Waste Management Facility Oak Ridge Reservation, Tennessee, BJC/OR-1091, April 2002"*
4. *"Attainment Plan for Risk/Toxicity-Based Waste Acceptance Criteria at the Oak Ridge Reservation, DOE/OR/01-1909&D1, Oak Ridge, Tennessee, October 2001."*
5. *"Waste Handling Plan for the Homogeneous Reactor Experiment Ancillary Facilities Decontamination and Decommissioning at the Oak Ridge National Laboratory, Oak Ridge, Tennessee, DOE/OR/01-2126&D1April, 2004"*

On January 16, 2007, the State of Tennessee, DOE Oversight Division, provided DOE with its comments from the audit of the waste profile for the Homogenous Reactor Experiment (HRE) Evaporator Waste Lot 149.4. The state's review resulted in three (3) general conclusions:

1. Waste Lot 149.4 was not adequately characterized, resulting in possible omission of site-related contaminants;
2. the Waste Handling Plan (WHP), which required collection of 14 samples to be analyzed for radiological constituents, was not followed; and
3. the sum of fractions (SOF) values generated by the Waste Acceptance Criteria Forecasting Analysis Capability System (WACFACS) can not be validated for this waste lot.

Specific findings and concerns were presented with additional questions intended to give DOE an opportunity to provide detailed explanations in support of general statements in the waste profile that the auditing team felt needed further substantiation. The state has received DOE's response of March 12, 2007, and found insufficient information in the response to alter the original conclusions stated above. The state reasserts that DOE and its contractors did not follow the waste characterization procedures outlined in "*Attainment Plan for Risk/Toxicity-Based Waste Acceptance Criteria at the Oak Ridge Reservation*" (Reference 4) or "*Waste Acceptance Criteria Attainment Team Project Execution Plan*" (Reference 3).

DOE states in their response that concerns about worker exposure to radiation resulted in departure from the approved methodology outlined in references 3 and 4. Estimates, based primarily on best professional judgment coupled with mass balances and dose modeling, were used to characterize the radionuclide inventory in Waste Lot 149.4 in lieu of following the DQO process as presented in the approved waste handling plan for the waste. The state concurs with DOE that credible bounding calculations or dose modeling may, in some cases, serve as an acceptable characterization alternative to the methodology outlined in the waste acceptance criteria (WAC) Attainment Plan. However, the state stipulates that such ad hoc changes in methodology must be agreed upon by all parties.

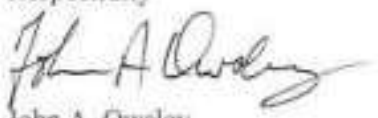
The state does not accept DOE's claim that the dose-to-curie modeling used here as an alternative to laboratory analysis of samples can be validated or verified simply by comparison to the original estimates of curie content made in the WHP. Furthermore, we do not concur that representative statistical distributions of Site Related Contaminants (SRCs)can be based on the analytical results from a single smear sample and a few dose readings, which measure, at best, only the variability of the primary gamma emitter, cesium 137. As cesium 137 does not contribute to the sum of fractions for the EMWMF analytical WAC, we have little confidence in either the SOF or the volume-weighted sum of fractions (VWSOF) generated for this waste lot. Waste characterization based on non-destructive assay used in conjunction with dose models must be carried out with properly calibrated equipment and independently confirmed with analytical data from representative samples of the waste.

As mentioned in the DOE response, a reasonable upper bound for the curie content of many SRCs might be determined in the case of this volumetrically small waste lot. We agree, at least in the case of fission products. However, bounding computations must demonstrate

conservatism at each step, and all assumptions, calculations, and documentation used must be appended to or referenced in the waste profile in a manner that allows independent verification of the results. In general, propagating uncertainty must be carried all the way forward and represented in the upper 95% confidence limit. In this case, conservative estimates of the waste lot radionuclide inventory from operational records and mass balances should be entered into the VWSF directly as upper bounds and not evaluated statistically, as there is no way to represent such limits as probability distributions.

In conclusion, the state audit team found little in either the waste profile or in the DOE response to our initial findings that would allow us to independently check the radionuclide inventory estimates, some of which were apparently based on best professional judgment of contractor personnel. Furthermore, DOE has not documented that the waste lot meets the administrative, ASA-derived, and analytic WAC. Consequently, the state requests that the approval memorandum for the HRE Evaporator Waste Lot 149.4 be rescinded and that an independent party be engaged by DOE to review the waste lot's characterization and provide DOE, EPA and the state with the recalculated SOF and the resultant EMWMF VWSF. If you have questions please call me, Dale Rector, Sid Jones, or Kristof Czartoryski at 865-481-0995.

Respectfully



John A. Owsley
Director

cc Franklin Hill, EPA
Harold Taylor, EPA

jao849.99

Response: DOE disagrees that only remedial action plans are approved by EPA and TDEC. For waste generating projects, a Waste Handling Plan (WHP) is developed that requires regulatory approval by the FFA parties (TDEC, EPA, and DOE). As part of the WHP, a Sampling and Analysis Plan (SAP) is developed to support waste characterization. The SAP, through the data quality objective/data quality assessment (DQO/DQA) process, defines the specific contaminates to be investigated. The DQO/DQA process is performed with regulatory parties including TDEC, EPA, DOE, and EMWMF Waste Acceptance. One of the objectives of the DQO process is to obtain representative data for a waste stream in accordance with the DQO Step 7. Once all parties are in agreement, the WAC Attainment Team evaluates and determines if the waste lot data

meets the form and format required by the EMWMF WAC Attainment Plan and also verifies the existing waste lot characterization data shared in the DQA is sufficient.

As noted in the responses above, there is a robust organization structure and assessment/oversight by both internal to DOE and regulatory agencies to ensure there is separation between waste generation and waste acceptance.

In addition, implementation of lessons learned, including concerns raised by TDEC in the past on the 2004 waste lot 84.4, the characterization of potentially Class C waste has been strengthened. As noted above:

The EMWMF WAC Project Execution Plan contains the following language, which is expected to also be used at the EMDF:

> ***Waste classification in the state of Tennessee is applied on a container-by-container basis. In instances where Class C waste is expected to be generated, profiles will be required to discuss which portions of the waste lot are expected to be Class C waste, and ADPs [Anomaly Detection Plans] will be required to discuss the specific methods that will be used to ensure no individual containers are greater than Class C wastes.***

Other comments point out that EMWMF capacity may have been wasted by failing to segregate relatively clean material that could be disposed in permitted on-site sanitary and demolition landfills and by failing to use volume reduction methods. A comment on page 3-67 of the Responsiveness Survey is typical:

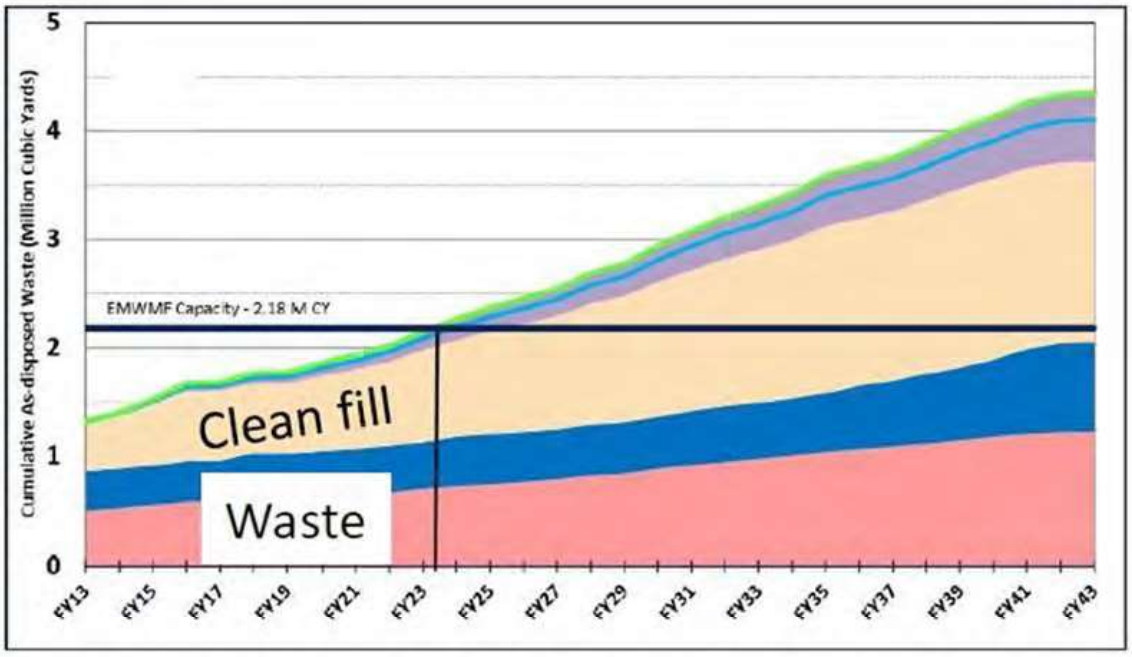
"We believe that DOE would not be seeking a new landfill, at least not this soon, if the space in the existing EMWMF had been managed properly. In particular, if waste had been characterized before disposal to determine the best disposal path, much less waste would have been placed there."

The response is a predictable denial:

"All waste was characterized before disposal. The waste that could be disposed in the construction debris or industrial landfills went there. The waste that did not meet the waste acceptance criteria (WAC) was sent offsite. DOE believes the space in EMWMF was managed appropriately."

It should be noted that a 2013 audit of EMWMF by the DOE Inspector General (DOE/IG-0883) identified the use of EMWMF for minimally contaminated waste as problematic. It seems certain that more detailed waste characterization and more aggressive efforts to segregate contaminated material from uncontaminated material could have led to disposal of more waste at the landfills. Projects generating waste are concerned with schedule and cost of characterization and will not be incentivized to undertake waste minimization efforts if they believe that there are no limits to the amount of material that can be disposed in CERCLA landfills.

Some historical problems with waste acceptance criteria and protocols were discussed in the attachment referenced in comments on page 3-173. As stated previously, this attachment, like the correspondence discussed above, was not published in the Responsiveness Survey. It included the graph below excerpted from the EMDF RI/FS that shows clean fill occupied a large part of the landfill volume at the time the RI/FS was submitted. This supports claims that excessive clean fill was used at EMWMF rather than sequencing waste generation to optimize the use of contaminated soil as fill. As the fill/waste ratio stays high until 2043, DOE is apparently not planning to put efforts into minimizing the reliance on clean fill to reduce void space in EMDF.



The attachment also discussed the risk assessment published in the EMWMF RI/FS (Remedial Investigation/Feasibility Study for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act of 1980 Waste, DOE/OR/02-1637 &D2) and RI/FS addendum (DOE/OR/02-1637&D2/Al) which required the restriction of concentrations of only 12 radionuclides in EMWMF waste lots, five of which were uranium isotopes. The intruder based concentration limits developed for EMDF discussed in the factsheet and presented in the draft ROD, if applied to waste packages or individual shipments of waste, would provide more defensible WAC for more radionuclides and could be welcomed as a substantial improvement over the current WAC at EMWMF.

Response: The previous response still stands: "All waste was characterized before disposal. The waste that could be disposed in the construction debris or industrial landfills went there. The waste that did not meet the waste acceptance criteria (WAC) was sent offsite. DOE believes the space in EMWMF was managed appropriately."

The RI/FS information is not current, as expected. The EMWMF has not used clean fill for void space mitigation in several years due to the amount of soil requiring disposal generated by the Heritage Center cleanup projects. Some clean fill is still used for access roads and ramps, the enhanced operational cover used to shed clean stormwater out of the disposal cells, and daily cover when mandated by regulatory agreement (e.g., to daily cover for the higher sum of fractions technetium-99 waste). Use of clean fill is minimized by repurposing suitable waste streams, such as using pallets of transite in lieu of clean riprap to armor catchments.

Additional Comment 59: Comment from Southern Environmental Law Center

Part 1: The Southern Environmental Law Center, Advocates for the Oak Ridge Reservation, Tennessee Chapter of the Sierra Club, and Tennessee Citizens for Wilderness Planning (Community Groups) write to request that the U.S. Department of Energy (DOE) provide completed information which the Department has committed to make available for public comment regarding its plans to construct and operate the proposed Environmental Management Disposal Facility (EMDF) on the Oak Ridge Reservation (ORR) in Oak Ridge, Tennessee. Community Groups additionally write to request that DOE expeditiously work with

the U.S. Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC) to provide a period of formal public comment on DOE's entire proposed action to construct and operate the EMDF as required under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

First, Conservation Groups were recently made aware of a website published by UCOR, a private contracting company involved in activities at the ORR, which includes three new "fact sheets" published by DOE to provide information regarding the proposed EMDF remedial action.[1] These fact sheets purport to provide new information about the proposed project's site groundwater characterization, waste acceptance criteria, and water quality protection for Bear Creek which was not available during a 2018 public comment period on DOE's Proposed Plan concerning the EMDF. The fact sheets state that DOE will accept comments from the public regarding this information from May 9 to June 7, 2022.[2]

Review of DOE's fact sheets reveals that seemingly-available information cited in these documents is currently missing or unavailable at the listed web addresses. For example, the *Waste Acceptance Criteria* fact sheet includes a hyperlink to the "DOE Information Center" which does not work.[3] Similarly, the *Water Quality Protection for Bear Creek* fact sheet states that measured radionuclide values will be compared to regulatory limits and newly-developed fish tissue and surface water values. The fact sheet then provides "For more information on these values, and how they are calculated visit ucor.com/EMDF."[4] However, a search for ucor.com/EMDF produces a "Page not found" webpage.[5]

Prior to the opening of a public comment period on these fact sheets, DOE must ensure that the public has access to all referenced information and that all of the hyperlinks and websites referenced in the factsheets are in working order. Because this missing information has prevented the public from having adequate time to comprehensively review these fact sheets prior to the start of the public comment period, DOE should additionally extend the time period in which the public can provide comments to the Department regarding these documents.

Second, Conservation Groups note that these newly-published fact sheets and DOE's solicitation of comments on them neither fulfills nor negates the public comment requirements of CERCLA regarding the proposed EMDF. As such—and given the large amount of new and unanticipated information which post-dates the 2018 public comment period on DOE's Proposed Plan for the EMDF—a new public comment period on the entire proposed remedial action is necessary. As you are aware, DOE issued its Proposed Plan on the EMDF for public comment approximately four years ago, at a time when several portions of the administrative record were incomplete. Specifically, DOE had yet to finalize a Remedial Investigation/Feasibility Study (RI/FS), wastewater focused feasibility study (FFS), waste acceptance criteria (WAC), list of complete applicable or relevant and appropriate requirements (ARARs), or to present the public with sufficient information regarding the geology and hydrology of the selected site.

CERCLA requires that proposed remedial plans and their accompanying notice and analysis "shall include sufficient information" to provide the public with "a reasonable explanation" of the proposed remedy as well as the other alternatives which were considered. 42 U.S.C. § 9617(a). DOE's initial proposed remedial plan for the EMDF fell far short of this statutory mandate. As EPA correctly noted in its comments on the draft Record of Decision (ROD) for the EMDF, "[u]nder the [National Oil and Hazardous Substances Pollution Contingency Plan], new information should be made available for public review and comment consistent with 40 CFR 300.430(f)(3)" before issuance of a final ROD.[6]

Importantly, CERCLA regulations also specify that such information must be presented holistically as part of an entire updated proposed remedial action, and the regulations further specify that the public must have an opportunity to comment on this information in a comprehensive format. Specifically, the regulations mandate that an agency "shall" issue "a revised proposed plan" when new, unanticipated information is

made available to the public after a previous proposed plan is put forth but before a ROD is finalized. 40 CFR 300.430(f)(3). The revised proposed plan should include "appropriate supporting material that provides the necessary engineering, cost, and risk information" absent from the first proposed plan and its supporting analysis, and should further discuss how the updated selected alternative "compares to the other alternatives with respect to the nine evaluation criteria [in 40 CFR 300.430(e)(9)]." U.S. Env't Prot. Agency, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Decision Documents*, 4-4 (July 1999).7 The agency must then provide "opportunity for public comment on this updated plan and its supporting analysis. 40 CFR 300.430(f)(3).

By requiring substantial new and unanticipated information to be compiled into a revised proposed plan and analyzed anew, CERCLA ensures that agencies substantively reevaluate selected remedies in response to new and significant information, and that both the information and analysis are presented in a consolidated way for the public to review. Given the amount of new information that must be compiled, analyzed, and reviewed prior to finalizing a ROD in this case, DOE must issue such a revised proposed plan and reopen a period of public comment for that entire suite of information. DOE's compilation of fact sheets regarding the EMDF and UCOR's publication of them on their website for public comment cannot replace the public participation requirements of CERCLA.

Finally, Community Groups note that these fact sheets continue to lack basic information about the suitability of the proposed EMDF site, what materials will go into the landfill, and how much pollution will be allowed to discharge from the landfill. The information in these fact sheets does not enable the community to evaluate whether DOE's proposal satisfies CERCLA's requirements to provide a remedy that is protective of public health and the environment.

[1] *See* EMDF Information, UCOR (last visited May 6, 2022), https://ucor.com/additional-emdf-information/.
[2] *See, e.g.*, *Environmental Management Disposal Facility Site Groundwater Characterization*, U.S. DOE, 4 (last visited May 6, 2022), http://ucor.com/wp-content/uploads/2022/05/EMDF-Site-Characterization-factsheet-r05-02-2022.pdf ("DOE will accept written comments on the EMDF fact sheets any time from May 9 to June 7, 2022.").
[3] *Environmental Management Disposal Facility Waste Acceptance Criteria*, U.S. DOE, 3 (last visited May 6, 2022), http://ucor.com/wp-content/uploads/2022/05/EMDF-WAC-factsheet-r05-02-2022.pdf.
[4] *Environmental Management Disposal Facility Water Quality Protection for Bear Creek*, U.S. DOE, 1 (last visited May 6, 2022), http://ucor.com/wp-content/uploads/2022/05/EMDF-Water-Quality-factsheet-r05-02-2022.pdf.
[5] Several supplemental documents are included on UCOR's website containing the DOE fact sheets which may include the resources cited therein. However, this is not clear from either the website or the fact sheets and must be updated. *See* https://ucor.com/additional-emdf-information/.
[6] U.S. ENV'T PROT. AGENCY, EPA Comments on the Record of Decision for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee, (DOE/OR?01-2794&D1), 18 (Oct. 6, 2021), https://www.tn.gov/content/dam/tn/environment/remediation/documents/oakridgereservation/emdf-documents/rem_73212_EMDF_ROD_D1_EPA_10_06_2021.pdf (EPA Comments).
[7] *Available at* https://www.epa.gov/sites/default/files/2015-02/documents/rod_guidance.pdf.

Part 2: The Southern Environmental Law Center, on behalf of the Advocates for the Oak Ridge Reservation, Tennessee Chapter of the Sierra Club, and Tennessee Citizens for Wilderness Planning (Community Groups), submits these comments on the three fact sheets ("EMDF fact sheets" or "fact sheets") which the U.S. Department of Energy (DOE) has made available for public comment regarding the planned Environmental Management Disposal Facility (EMDF) which DOE has proposed as a remedial action pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). All comment letters by Community Groups that are included as attachments to this comment letter—including those sent to DOE as well as the U.S. Environmental Protection Agency (EPA)—are incorporated by reference into these comments.

Community Groups previously submitted comments on the EMDF fact sheets which alerted the Department to missing and incomplete information within the sheets themselves as well as the inadequacy of these documents to fulfill the public participation requirements of CERCLA.[1] Community Groups submit these additional comments to highlight the arbitrary and capricious process by which DOE has attempted to force

its preferred remedial alternative—construction and operation of the EMDF—through the CERCLA selection process. This ham-handed and multi-year exercise has and continues to violate the statutory and regulatory requirements of CERCLA, including its public participation requirements, and has resulted in DOE's attempted selection of a final remedy that still lacks basic details including what types and amounts of waste will be disposed in the landfill and how wastewater will be treated when discharged into local recreational waterways.

Response: The public comment period began on May 9, 2022, and the U.S. Department of Energy (DOE) updated the referenced link on the fact sheet on May 11, 2022. The amount of time where the link did not work properly, combined with the fact that the document that the link connected to was also provided on the DOE-Oak Ridge Environmental Management public page, was not significant enough to justify an extension of the public comment period.

DOE's recent actions with respect to the CERCLA remediation process have resulted in the Department publishing a Draft 1 (D1) Record of Decision (ROD) which is demonstrably not protective of human health and the environment. The three fact sheets recently issued by DOE neither adequately address missing and incomplete information in the D1 ROD nor provide the public with the opportunity to comprehensively evaluate and comment on DOE's preferred remedial alternative as required under CERCLA. Rather than attempt to issue a Draft 2 (D2) ROD, as DOE has indicated it intends to do later this summer, DOE must instead issue a revised proposed plan for public comment which contains all necessary, outstanding information regarding its proposed remedy.

As it currently stands, DOE is attempting to force the community of Oak Ridge to coexist alongside its hazardous and radioactive waste for perpetuity without allowing the public the opportunity to comprehensively evaluate and comment on its plans. Community Groups maintain that the Oak Ridge Reservation must and can be cleaned of its waste in a way that protects both the environment and surrounding communities while complying with the law. In accordance with federal law, DOE should reverse course, issue an updated and revised proposed plan, reopen a period of public comment, and demonstrate that it has adhered to CERCLA's requirements of selecting a remedial action that is protective of human health and the environment and complies with all identified and non-waived applicable or relevant and appropriate requirements (ARARs).

Response: The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) process requires that DOE issue a Proposed Plan to summarize the evaluation of alternatives contained in the detailed Remedial Investigation/Feasibility Study (RI/FS) and to identify DOE's preferred alternative for implementation of the selected remedy. Detailed information on the alternatives evaluated, including the sites evaluated for the onsite alternative, is contained in the RI/FS. Detailed information on any aspect of the alternatives evaluated is included in the RI/FS.

Although the RI/FS was not formally approved by the U.S. Environmental Protection Agency (EPA) or the Tennessee Department of Environment and Conservation (TDEC), the three Federal Facility Agreement (FFA) parties (DOE, EPA, and TDEC) agreed to move forward with the Proposed Plan. On December 7, 2017, a formal dispute agreement was entered into by the FFA parties, which addressed the issues of siting, applicable or relevant and appropriate requirements (ARARs), and waste acceptance criteria (WAC), and concurred on submitting a Proposed Plan that would identify the Central Bear Creek Valley as the preferred location for an onsite disposal facility.

The Environmental Management Disposal Facility (EMDF) Proposed Plan was issued for a public review and comment period from September 10 to October 26, 2018. A public meeting was

held November 7, 2018, to present the preferred alternative described in the Proposed Plan and solicit public input. Two requests to extend the public comment period were granted, and the end date was revised to January 9, 2019. Comments were received from 194 commenters.

DOE disagrees that the Proposed Plan requires additional revision and public review. Relatedly, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) provides that the potential need for additional public comment on the Proposed Plan only arises when, after publication of the Proposed Plan "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…" 40 *Code of Federal Regulations* 300.430(f)(3). Here, the lead Agency has determined that the basic features of the remedy have not changed significantly as a result of information that was made available after the Proposed Plan's initial comment period. The proposed remedy remains an engineered landfill with 2.2 million cubic yards capacity that only accepts CERCLA waste from the Oak Ridge Reservation (ORR). The preliminary design features are unchanged, including the geologic buffer, liner system, and final closure cap. The proposed plan describes wastewater treatment options (both onsite and offsite) and WAC that were under development. While additional details of these features were made available to the public after the issuance of the Proposed Plan, the additional information did not significantly alter the basic features of the remedy with respect to scope, performance or cost.

Following issuance of the Proposed Plan for public comment, and as part of the Record of Decision (ROD) development, the FFA parties agreed to a final list of ARARs, and a final approach for both WAC and discharge limits. These elements of the remedy were identified in the Proposed Plan as topics to be finalized. The new information clarifies that the landfill will have a wastewater treatment facility, all wastewater will be treated prior to discharge, and defines the process for determining discharge limits for radionuclides. In addition, the ROD specifies that post-ROD characterization will be performed to determine groundwater elevations for the final engineering design. These final elements did not change the basic features of the disposal facility design nor significantly change the scope, performance, or cost evaluation criteria. Therefore, no additional public comment on the proposed plan is required.

The FFA parties also considered EPA's published *Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (EPA 540-R-98-031, OSWER 9200.1-23P, PB98-963241, July 1999), which provides guidance as to what can constitute a significant change and whether a significant change could be reasonably anticipated by the public.

However, following development of the D1 ROD (issued July 2021), the FFA parties recommended additional public notice and comment on the additional information related to WAC, water quality protection for Bear Creek, and site groundwater characterization.

DOE then developed fact sheets to describe updated information made available after the close of the public comment period for the Proposed Plan. Those fact sheets included WAC, Site Groundwater Characterization, and Water Quality Protection for Bear Creek. DOE made those fact sheets available for public review and comment from May 9 to June 7, 2022. These fact sheets were provided for public comment, and DOE also provided for public review of detailed characterization data (e.g., Technical Memoranda 1 and 2 with the EMDF site monitoring results) and the detailed information on development of the preliminary remediation goals for fish tissue and instream water concentrations. In addition, extensive information is available in the EMDF RI/FS on WAC development and Bear Creek Valley/site characterization data. This

large amount of information was provided both at a higher, summary level in the fact sheets, and at a very detailed level to address these topics of public interest.

In addition to making the fact sheets available for public comment, DOE also held a public meeting on May 17, 2022, to present the information and solicit public input. Comments were received from 68 commenters.

The public comments received during both the Proposed Plan comment period and the additional comment period, and the responses to those comments, are included in the D2 ROD Part 3 Responsiveness Summary.

I. DOE Cannot Select a Final Remedy Under CERCLA Without Providing the Public with Basic, Essential Information About Its Preferred Alternative in a Revised Proposed Plan and Reopening a Period of Formal Public Comment

a. DOE has failed to follow the remedial selection process outlined in CERCLA for the proposed EMDF.

DOE has issued three "fact sheets" purportedly to provide the public with new information on its preferred remedial action at the Oak Ridge Reservation. However, and as discussed in detail below, these fact sheets lack necessary information and detail to allow the public to meaningfully evaluate DOE's proposed action as required by CERCLA. DOE has specified in each of the fact sheets that it is allowing the public to comment "on the EMDF fact sheets" through June 7, 2022.[2] DOE's explicit limitation of public review to only these fact sheets exemplifies the arbitrary and capricious manner in which DOE has conducted this entire remedial process.

CERCLA and its implementing regulations clearly lay out the sequence of steps an agency should undertake when developing and implementing a remedial action. The process should begin with a thorough assessment of the remedial action site and alternative remedial options. This is done through preparation of a remedial investigation and feasibility study (RI/FS) "to assess site conditions and evaluate alternatives."[3] The remedial investigation allows an agency to "collect data necessary to adequately characterize the site,"[4] including its physical characteristics such as the geology and hydrogeology of the location.[5] The agency should then compile a feasibility study "to ensure that appropriate remedial alternatives are developed and evaluated."[6]

Only after the RI/FS process has been completed should an agency begin the remedy selection process by issuing a proposed plan which "identif[ies] the alternative that best meets the requirements" for a protective remedy as detailed in CERCLA.[7] At this point in the process—after a proposed plan is issued based on a completed RI/FS—the public should be invited to provide formal comments. The sequencing of these events is meant to allow the public to have the benefit of viewing the agency's preferred remedial alternative against the backdrop of the information gathered and alternatives analyzed in the RI/FS process. As the CERCLA regulations note, "[t]he purpose of the proposed plan is to *supplement* the RI/FS and provide the public with a reasonable opportunity to comment on the preferred alternative for remedial action, as well as alternative plans under consideration, and to participate in the selection of remedial action at a site."[8]

CERCLA regulations also outline when additional public outreach and participation is required, and the mechanism for satisfying that requirement. Specifically, "[a]fter 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* . . . seek additional public comment *on a revised proposed plan*" when these changes could not have been "reasonably anticipated" by the public."[9] As Community Groups

have previously noted, "[b]y requiring substantial new and unanticipated information to be compiled into a revised proposed plan and analyzed anew, CERCLA ensures that agencies substantively reevaluate selected remedies in response to new and significant information, and that both the information and analysis are presented in a consolidated way for the public to review."[10]

DOE has flouted CERCLA's prescribed process with respect to the EMDF. To begin, DOE issued a D1 of its RI/FS on September 15, 2012. Nearly ten years later, that document has *still* not been finalized. Neither has the Focused Feasibility Study (FFS) for water management, which is properly considered an element of the RI/FS intended to establish preliminary remediation goals for the site. Instead, DOE issued a proposed plan for public comment in September of 2018 when, as DOE acknowledged, there were significant gaps in the information presented to the public, including but not limited to an unfinished characterization of the proposed landfill location and proposed waivers from ARARs under federal and state law.[11] Although some of that information has since been made publicly available, still other information remains missing, and even more information has come to light which calls into question the assertions and analyses DOE relied on in its Proposed Plan to select onsite disposal in the EMDF as its preferred remedy. Community Groups note that in the latest draft RI/FS, DOE performed analysis demonstrating that other viable and implementable remedial actions exist for this CERCLA action, including offsite disposal, which have not been revisited even as the challenges of constructing the EMDF have been made clear.[12]

DOE has continued to charge ahead with its attempts to finalize its remedy selection by issuing a D1 ROD and these EMDF fact sheets in anticipation of issuing a D2 ROD this summer. It bears repeating that the D1 ROD and the EMDF fact sheets have been issued before the RI/FS and FFS have been finalized. To make matters worse, these "fact sheets" make clear that crucial information related to site characterization, the waste acceptance criteria (WAC), and surface water releases will not be available until after the ROD is finalized.[13] In other words, DOE has again put the cart before the horse by trying to select a final remedy before it has even completed its analysis of the site and feasible alternatives or fully disclosed the contours of its proposed action, upending the entire CERCLA process along the way.

It is also worth noting that, if DOE's proposed discharges from the EMDF were subject to the National Pollutant Discharge Elimination System (NPDES) permitting process under the Clean Water Act (CWA), the Department would need to provide the relevant permitting authority with basic information such as what it is planning to discharge prior to the opening of public comment period on the draft permit and issuance of a final permit.[14] No equivalent process is occurring under CERCLA here, as DOE is attempting to finalize a ROD without disclosing this information.

As discussed in further detail below, these actions by the Department have occurred despite repeated requests from the local community for an opportunity to comprehensively evaluate and comment on the changes that have been made to DOE's proposed remedy in the roughly four years since the Proposed Plan was issued. DOE's response is the publication of three fact sheets for public comment, which total twelve pages of generalized, high-level information, provide little of the necessary missing information, and do not place the information the context of a revised proposed plan.[15] DOE has not explained how this process fulfills CERCLA's public participation requirements, nor can it.

> As Community Groups have previously noted:
>
> By issuing a Record of Decision now without reopening a public comment period, DOE is essentially trying to shift the cost of its decision to issue a premature Proposed Plan onto the public. DOE's strategy to forge ahead with issuing an incomplete Proposed Plan meant that new information would be generated after the public comment period closed, and much of that new information has significantly changed the basic features of the proposed remedy. Although TDEC and EPA agreed to allow DOE to

issue the Proposed Plan prior to a finalized RI/FS, the public never agreed to forego their rights under CERCLA to provide public comment on new significant and unanticipated information that was revealed thereafter.[16]

Publication of EMDF fact sheets does not alter this reality. The fact sheets do not constitute a revised proposed plan; they do not consolidate, synthesize, and analyze all of the new information that has been made available on DOE's preferred alternative; and they still lack basic information which is essential to allow the public to participate in the remedial selection process in an informed manner. Instead, they represent an effort by DOE to arbitrarily silo the information that the public is allowed to comment on regarding the proposed EMDF and to present information in disjointed documents instead of in a CERCLA-prescribed revised proposed plan. This is contrary to the remedial process outlined in CERCLA and insufficient under federal law.

b. Community Groups have repeatedly requested that DOE provide the public with completed information as required under CERCLA so that the community can give informed comments on DOE's preferred remedial alternative.

Community Groups have repeatedly requested that DOE provide sufficient information on its proposed remedial action to fulfill CERCLA's public notice requirements and allow the community to provide informed comments on all relevant data, analyses, and proposals. These requests have been ignored. DOE has still not made all needed information available to the community, refused to reopen the public comment period on a revised proposed plan, and has acted arbitrarily and capriciously by issuing a D1 ROD based on incomplete information and insufficient review. Specifically,

- On December 10, 2018, Community Groups commented on DOE's Proposed Plan for the EMDF and noted that DOE "has not satisfied its obligation to provide for meaningful opportunity for public comment" due to the Department's failure to provide sufficient supporting analysis, data, and information regarding its preferred remedial alternative, including a completed characterization of the proposed landfill location and a finalized list of regulatory waivers.[17]
- On August 1, 2019, Community Groups wrote to DOE again requesting that a period of public comment be reopened on the Proposed Plan given that, in addition to the concerns outlined in their previous comments, the Proposed Plan did not include a finalized WAC, discuss the long-term effectiveness and permanence of the EMDF, disclose primary balancing criteria, account for the EMDF's long-term liability and costs, or include a completed site characterization and groundwater modeling.[18] Community Groups outlined seven categories of information that DOE should at a minimum provide prior to reopening a period of public comment, including: completed hydrological data, a finalized list of ARARs, the WAC, a completed composite analysis and comparative analysis of costs for onsite and offsite disposal alternatives, mercury remediation and disposal plans, landfill controls for radionuclides, and information regarding the performance failures of DOE's Environmental Waste Management Facility (EMWMF) landfill.[19]
- On October 1, 2019, Community Groups wrote to DOE stating that the Department must reopen public comment on the Proposed Plan as a result of alarming new groundwater and geologic information recently made available in Technical Memorandum 2 that "fundamentally changes the suitability" of the proposed EMDF's site to safely store hazardous and radioactive waste.[20]
- On May 10, 2022, Community Groups wrote to DOE alerting the Department that its publication of three EMDF fact sheets and request for comments on the same was insufficient to fulfill its public comment obligations.[21] Community Groups further noted that a new public comment period on the entire proposed remedial action was necessary under CERCLA.[22]

c. DOE must issue a revised Proposed Plan to allow the public to comment on new and still-outstanding information related to the proposed EMDF.

DOE has not met the public participation requirements of CERCLA for its proposed remedial action, and the publication of and request for community feedback to three fact sheets does not change that reality. As Community Groups have previously noted, "these newly-published fact sheets and DOE's solicitation of comments on them neither fulfills nor negates the public comment requirements of CERCLA regarding the proposed EMDF."[23] Community Groups have explained:

> When an agency publishes a proposed remedial plan, CERCLA requires that the plan and its accompanying notice and analysis "shall include sufficient information" to provide the public with "a reasonable explanation" of the proposed remedy as well as the other alternatives which were considered. 42 U.S.C. § 9617(a). DOE's initial proposed remedial plan for the EMDF fell far short of this statutory mandate. As EPA notes in its comments on the draft ROD, when DOE issued its Proposed Plan for public comment in 2018, several portions of the administrative record were incomplete. EPA Comments, 7. At that time, DOE had yet to finalize a Remedial Investigation/Feasibility Study (RI/FS), wastewater focused feasibility study (FFS), waste acceptance criteria (WAC), list of complete ARARs, or to present the public with sufficient information regarding the geology and hydrology of the selected site. In sum, the 2018 Proposed Plan was not the culmination of an effective fact-gathering and evaluative process but rather set forth a pre-selected remedy accompanied by overtures that the agency would later fill in the necessary informational and analytic gaps. . . .
>
> Given the extensive amount of information missing from the administrative record at the time the 2018 Proposed Plan was issued, CERCLA requires DOE to issue a revised proposed plan. As EPA correctly notes, "[u]nder the NCP, new information should be made available for public review and comment consistent with 40 CFR 300.430(f)(3)" before issuance of a final ROD. EPA Comments, 18. That regulation mandates that an agency "shall" issue "a revised proposed plan" when new, unanticipated information is made available to the public after a previous proposed plan is put forth but before a ROD is finalized. 40 CFR 300.430(f)(3). The revised proposed plan should include "appropriate supporting material that provides the necessary engineering, cost, and risk information" absent from the first proposed plan and its supporting analysis and should further discuss how the updated selected alternative "compares to the other alternatives with respect to the nine evaluation criteria [in 40 CFR 300.430(e)(9)]. U.S. Env't Prot. Agency, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Decision Documents*, 4-4 (July 1999).[24]
>
> By requiring substantial new and unanticipated information to be compiled into a revised proposed plan and analyzed anew, CERCLA ensures that agencies substantively reevaluate selected remedies in response to new and significant information, and that both the information and analysis are presented in a consolidated way for the public to review. Given the amount of new information that must be compiled, analyzed, and reviewed prior to finalizing a ROD in this case, DOE must issue a revised proposed plan.[25]

As discussed and as previously articulated in Community Groups' letters to DOE, the amount of new and significant information which has come to light since the 2018 public comment period as well as all of the outstanding information which must still be provided necessitate that a revised proposed plan be issued for this remedial action.[26] The fact sheets issued by DOE fail to provide this needed information and contain inappropriately segmented information which does not allow the public to holistically evaluate DOE's preferred remedy. Further, the fact sheets lack any analysis of how the proposed alternative measures against other alternatives given the new and unanticipated information developed since 2018.

Issuance of a revised Proposed Plan is also necessary in this instance because DOE has indicated that significant changes are still being made to its proposed remedy. At DOE's public meeting on the EMDF fact sheets, DOE employee Roger Petrie noted that the D1 ROD published by DOE "is very different" than the forthcoming D2 ROD which DOE expects to release this upcoming July.[27] Yet DOE is asking the public to comment on three fact sheets which reference the D1 ROD and which are supported by "Project Framework Documents," that include both the D1 ROD and DOE's Responsiveness Summary to the D1 ROD.[28] In other words, DOE is asking the public to comment on fact sheets that the agency has publicly admitted contain and rely on outdated information regarding its proposed remedy. This is insufficient under CERCLA, and DOE must include any updated information in a revised proposed plan available for public review and comment.

Response: See above response.

II. The EMDF Fact sheets Do Not Provide Sufficient Information for the Public to Make Informed Comments on DOE's Proposed CERCLA Remedy

The three fact sheets published by DOE describing its proposed remedial action do not supply the public with sufficient information or analysis to demonstrate that the EMDF will be protective of human health and the environment or meet all identified and non-waived ARARs as required by CERCLA.[29] The fact sheets additionally lack necessary detail to allow the public to meaningfully comment on DOE's preferred remedial alternative.

a. DOE's use of fact sheets to provide new information in lieu of a revised proposed plan is inappropriate.

CERCLA regulations and guidance make clear when publication of facts sheets is appropriate as part of a remedial action. This is not such a time. CERCLA regulations themselves only mention the potential use of fact sheets at one point in the remedial process: during the remedial design/remedial action (RD/RA) stage—which occurs after a ROD has been issued.[30] At that point, fact sheets can be used to update the public on the completion of the remedial design prior to initiation of the remedial action itself.[31] In the *Superfund Community Involvement Handbook* ("the Handbook"), EPA additionally opines that publication of fact sheets may be appropriate in limited circumstances, such as providing the public with general information on the Superfund remedial selection process or publishing preliminary findings from a site assessment.[32] Neither of those circumstances involves allowing an agency to use fact sheets to affirmatively replace publication of other necessary documents as outlined by the statute.

The Handbook also states that, during a remedial process, it may be appropriate to publish a fact sheet *in addition* to a proposed plan in order to "summarize[] the key findings and conclusions contained in the Proposed Plan."[33] Similarly, the Handbook states that fact sheets may be utilized *in tandem* with publication of a revised proposed plan to "explain[] significant changes and the process for a new public comment period."[34] These circumstances clearly demonstrate that fact sheets should be utilized in the CERCLA to summarize, explain, or update the public on a remedial action, not to affirmatively publish new information about a proposed remedy and certainly not to usurp CERCLA's clear regulatory requirements regarding when a revised proposed plan must be issued.[35] DOE's attempt to publish fact sheets in lieu of issuing a revised proposed plan is therefore inappropriate.

b. The structure of the fact sheets prevents the public from providing informed comments.

At their most basic level, the EMDF fact sheets do not allow the public to meaningfully engage with the new and additional information DOE purports to make available through publication of these documents. In particular, DOE fails to define the terms it utilizes, explain how these terms interact with each other, or

provide necessary details regarding its actions. Take, for example, the second paragraph of the *Water Quality Protection for Bear Creek* fact sheet. That paragraph states:

> DOE will **treat** all contaminated wastewater and leachate from EMDF prior to discharge into Bear Creek. The treatment will include, **at a minimum**, chemical flocculation/precipitation and sediment removal. DOE will conduct **secondary treatment** as necessary to ensure compliance with all **regulatory limits** and full protection of human health and environment. **Protective levels** have been set for radionuclides that may potentially be in the landfill wastewater. **Radionuclide levels** will be directly measured in contaminated wastewater and leachate, fish, and surface waters. These **measured values** will be compared to **regulatory limits** and newly developed **fish tissue and surface water values** (preliminary remediation goals [PRG]) that ensure **protection of public health**. (For more information on **these values**, and how they are calculated, see http://ucor.com/wp-content/uploads/2022/05/Rad-PRG-Explanation.pdf.)[36]

This paragraph is confusing at best and misleading at worst. To start, DOE fails to provide meaningful insight into its proposed treatment standards. The Department states that it will "treat" wastewater and leachate from the EMDF, lays out treatment methods which will be performed "at a minimum," and then states that "secondary treatment" may also occur. Yet the public is left in the dark about the actual contours of this treatment regime. Is DOE considering other basic treatments which will apply to all contaminated wastewater and leachate? Do these include control technologies as preferred by CERCLA, prioritized in the CWA, and which are ARARs for hazardous pollutants like PCBs and mercury?[37] When will secondary treatment occur? What will that entail? Neither this paragraph nor the remainder of the fact sheet provide any further details.

The paragraph also includes several terms that are undefined and unclearly applied. For instance, the paragraph at different times refers to "protective levels" that have been set for radionuclides and also "radionuclide levels." Are these terms interchangeable? Or do they mean different things? The paragraph also repeatedly refers to "regulatory limits" that will be complied with to protect human health and the environment. But there are no "regulatory limits' for radionuclides under Section 122 of the CWA because radionuclides are excluded from the statute's definition of pollutants.[38] And CERCLA is a remedial statute, not a regulatory statute, so radionuclide "regulatory limits" are likewise missing there. DOE fails to define or explain what "regulatory limits" it is referencing. DOE then discusses "measured values" and "fish and surface water values," before purporting to provide more information on "these values" without clarifying which values it is referencing. The Department also states that it will compare some combination of these "values" to "ensure protection of public health," which notably leaves out any reference to CERCLA's additional requirement that the remedial action also be protective of the environment and comply with all non-waived ARARs.[39]

In short, it is unclear to Community Groups how the public is supposed to provide meaningful input on the EMDF fact sheets when they are rife with undefined and intermixed terms as well as vague assertions with unclear implications. Apart from the informational gaps the fact sheets contain—which are discussed in more detail below—DOE's confused presentation of the information itself prohibits the public from engaging with the fact sheets in a meaningful way.

c. The fact sheets lack information necessary to allow the public to provide informed comments.

Review of the EMDF fact sheets makes clear that the documents provide more questions than answers. In particular, the *Site Groundwater Characterization* fact sheet does not adequately address or provide:

- Whether and how DOE's design of the EMDF landfill considers and incorporates the foreseeable increase in precipitation, storm events, and changed hydrologic conditions which will occur in East Tennessee due to climate change;
- Alternative remedial actions DOE will undertake if its upcoming field demonstration test at the EMDF does not result in predicted outcomes, including lowered groundwater levels at the proposed landfill site;
- Why "adjustments" may be made to observed groundwater elevations used to support EMDF design if there are "unusual amounts of rainfall" during the field demonstration project when, as mentioned, this area of East Tennessee is predicted to have a foreseeable increase in wet weather events[40];
- Whether the public will be afforded another period of public comment if current ARARs and ARAR waivers are "revisit[ed]" based on findings from the future field demonstration project analyzing groundwater elevations at the proposed EMDF site.

Response: The Groundwater Field Demonstration (GWFD) scope will be detailed and finalized in a post-ROD Remedial Design Work Plan, a primary document that requires approval by all three parties before implementation of the demonstration. This GWFD will provide additional characterization information, and while not itself a change to the remedy, has the potential to affect the final design of the facility. Results of the field study will be incorporated into the Remedial Design Report, which will present the final landfill design, and is also a primary document that requires approval by the FFA parties before landfill construction.

The landfill siting and design reduce concerns from climate change and provide resiliency to potential increase in rainfall and flood events through the following measures:

- **Located outside the 100-year floodplain and on Pine Ridge, away from and at a greater elevation than Bear Creek. Waste elevation is approximately 60 ft higher than Bear Creek elevation in this area.**
- **Landfill does not cross one of the northern tributaries. Tributary immediately west of the landfill will be armored and widened to improve run-off. Tributary immediately east of the landfill will be diverted into an adjacent tributary. Culverts beneath the existing Haul Road will be oversized to improve drainage from the area and eliminate ponding.**
- **Upgradient diversion ditch is considerably oversized—greater than 100-year storm event.**

Additional considerations will be part of the post-ROD final design.

The *Waste Acceptance Criteria* fact sheet does not adequately address or provide:

- Whether the public will be afforded an opportunity to provide public comments on a finalized WAC, including a completed analytical WAC;
- Explanation for how issuance of a ROD prior to determining what waste and waste amounts will be accepted in the landfill complies with CERCLA's requirement that RODs contain a determination that the remedial action is protective of human health and the environment and complies with all non-waived ARARs[41];
- Necessary details regarding the "supplemental modeling on additional post-closure scenarios to ensure inventory limits do not result in an unacceptable risk" which DOE plans to perform for the EMDF, or whether the public will be able to provide public comment on this modeling and analysis[42];

- Whether and in what ways the waste that will be accepted at the EMDF differs from the waste that has been disposed of at the EMWMF;
- Whether the performance assessment analysis to be undertaken by DOE will consider the decay chains and progeny of all disposed radionuclides;
- Community Groups also note that this fact sheet contains an assertion that the EMWMF "has operated safely for 20 years"[43] without any discussion or analysis of the landfill's contamination of local groundwater or the multiple, unauthorized discharges of thousands of gallons of untreated wastewater containing radionuclides and other hazardous pollutants which DOE and its contractors have allowed to enter local waterways.[44]

  Response: WAC are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the ORR indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils), and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

  The WAC Compliance Plan will be included in the EMDF Administrative Record, which is available to the Public.

Finally, the *Water Quality Protection for Bear Creek* fact sheet does not adequately address or provide:

- Whether DOE has completed or plans to undertake any fish consumption studies regarding local populations who may participate in recreational or subsistence fishing in and around the Oak Ridge Reservation, including on Bear Creek and its downstream waterways;[45]
- What criteria DOE will use to determine whether secondary treatment is necessary for contaminated wastewater and leachate being discharged from the EMDF to Bear Creek;[46]
- Finalized radiological discharge limits from the EMDF;[47]
- Finalized mercury discharge limits from the EMDF which include mass limitations;
- How DOE's fish ingestion exposure parameters, including exposure duration and fish ingestion rates, in Table A.2 of the *Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee* ("PRG Report"),[48] as referenced in the fact sheet, provide full protection of Bear Creek's designated use and will adequately protect human health and the environment given their inconsistencies with EPA guidance documents including but not limited to *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*[49];

- Whether required monitoring, detection, and reporting limits will enable sufficient quantification of radioactive and hazardous substance discharges from the EMDF to ensure protection of both human health and the environment;
- Whether required monitoring, detection, and reporting limits will enable effective evaluation of whether the discharges comply with promulgated water quality criteria for toxic substances in surface water designated for recreational use;
- Effluent discharge limits for hazardous pollutants which will allow attainment of ambient water quality criteria throughout Bear Creek;
- How discharges of PCBs and mercury from EMDF into Bear Creek, which is impaired by both substances, will not violate Tennessee's Antidegradation Statement, which is an ARAR for these hazardous pollutants.[50]

  Response: The specific remediation goals for landfill wastewater are specified in the ROD (Sect. 2.12.2.4). The approach was agreed upon among the FFA parties. The discharge limits will be developed in the future, based on the remediation goals, when the specifics of the EMDF landfill wastewater treatment systems are known, including the discharge location. The remediation goals and future discharge limits are within the CERCLA risk range and protective of human health and the environment.

More broadly, none of these fact sheets address or provide critical information which the public must have in order to be able to effectively evaluate the safety and effectiveness of this proposed remedial action. This includes:

- A finalized RI/FS;
- A finalized FFS;
- DOE's response to EPA and TDEC's comments on the latest draft RI/FS, draft FFS, and D1 ROD;
- Clear identification of which ARARs are being used in the proposed remedial action;
- An analysis of how climate change will impact the preferred remedy;
- An analysis of the impacts DOE's selected remedy will have on environmental justice communities; and
- Any changes which have been made to the EMDF design as a result of lessons learned from the unauthorized discharges and pollution to local groundwater and surface water from the EMWMF.

Community Groups also incorporate by reference the concerns outlined by former TDEC employees in comments submitted to DOE on the EMDF fact sheets.[51]

Both TDEC and EPA have previously identified many of these concerns and highlighted this missing information in their comments on the D1 ROD. For instance, EPA has previously noted that without finalized effluent limits and instream criteria, the D1 ROD "is not consistent with" the National Contingency Plan requirements at 40 C.F.R. § 300.430(f)(5)(iii).[52] Similarly, TDEC has stated that the D1 ROD "lacks the information needed to demonstrate protective landfill wastewater discharge limits and waste acceptance criteria."[53] And both parties have highlighted DOE's failure to analyze the potential impacts that climate change will have on the proposed EMDF facility.[54]

Apart from the information currently still missing from the ROD, EPA has highlighted the incomplete nature of other CERCLA remedial documents. In particular, in its comments on the D1 ROD, EPA asserted

that the FFS should be revised and approved by EPA and TDEC "prior to the issuance of the D2 EMDF ROD," and that these steps are necessary "to have an adequate Administrative Record supporting the final decision in the ROD."[55] Despite EPA and TDEC's efforts to highlight the still-missing and still-needed information to adequately analyze DOE's preferred remedial alternative prior to finalizing a ROD, neither DOE's responsiveness summary nor these new EMDF fact sheets sufficiently address or remedy these deficiencies.

Finally, DOE's solicitation of public comment on the EMDF fact sheets does not comport with the public engagement scenario apparently agreed upon by DOE, EPA, and TDEC. In its comments on the D1 ROD, EPA noted that "EPA and TDEC have determined, and DOE has agreed, that the EMDF ROD merits additional public involvement activities before finalization. Public involvement should include new information developed since the September 2018 Proposed Plan *specifically the WAC, limits for radionuclides and mercury in surface water, and groundwater elevation at the proposed site location.* Resulting public comments and responsiveness should be included in the final ROD."[56] The EMDF fact sheets do not provide the information identified by EPA, TDEC, and DOE as being necessarily released to the public prior to engaging the public for comments. Accordingly, this information must be made available and a period of public comment reopened.

III. DOE Should Not Issue Any Draft Record of Decisions Until EPA has Completed Its Review of the Radionuclide Pollution Decision

On June 9, 2021, EPA alerted Community Groups that it was in the process of reviewing a December 31, 2020 Radionuclide Pollution Decision[57] issued by former EPA Administrator Andrew Wheeler regarding proposed wastewater discharges to surface water from the EMDF facility.[58] Community Groups had previously alerted EPA to inconsistencies with the Radionuclide Pollution Decision and federal environmental law, including but not limited to discrepancies between the Radionuclide Pollution Decision and CERCLA's preference for technology-based effluent limitations (TBELs).[59] In response, EPA stated that, pursuant to Executive Order 13990 and in the context of Executive Orders 14008 and 13985, the agency was "in the process of reviewing the Decision."[60] To the best of our knowledge, that review is ongoing.

Despite EPA's current, active reconsideration of the Radionuclide Pollution Decision, DOE has published several documents which interpret and rely on the Radionuclide Pollution Decision to push forward the Department's haphazard effort to finalize its proposed CERCLA remedial action. This includes release of a D3 FFS on June 23, 2021, and a D1 ROD on July 12, 2021. DOE has now issued the EMDF fact sheets which appear to have been published in reliance on the Radionuclide Pollution Decision. For the same reason that publishing a D3 FFS and a D1 ROD were inappropriate, so too is it premature for DOE to issue these fact sheets for public comment. Namely, the information within them is predicated, at least in part, on a decision that is subject to ongoing review by EPA. DOE should delay issuing a D2 ROD until EPA culminates its review of the Radionuclide Pollution Decision, and a revised proposed plan should then be published for a period of public comment.

To the extent that the *Water Quality Protection for Bear Creek* fact sheet and the referenced PRG Report can be read as an implicit affirmation of the Radionuclide Pollution Decision by EPA, that Decision cannot be used to justify or override the clearly-stated preference in CERCLA for technology-based treatment.[61] Former Administrator Wheeler was not authorized to rewrite CERCLA in the Radionuclide Pollution Decision. There is no basis for eschewing technology-based treatment for radionuclides at EMDF or EMWMF, and indeed, there is strong basis in both law and fact for requiring it. In addition to the statutory requirements of CERCLA (and the technology-based treatment requirements of CWA as an ARAR), application of technology-based treatment would help ensure that *all* discharged radionuclides—including

those known to the public as well as those classified from public view—are treated so that the remedy is in fact protective of public health and the environment.

Community Groups additionally maintain that, for the same reasons that former Administrator Wheeler misapplied the eight-factor analysis in 40 C.F.R. § 300.400(g)(2) to find that TBELs were not ARARs for the discharge of radionuclides in this remedial action, he was also incorrect in finding that Tennessee's Antidegradation Statement was not an ARAR for radionuclide discharges. Namely, the CWA envisions a holistic water protection regime that begins with the premise that discharges should be treated with "the best practicable control technology" prior to discharge, and that more stringent limitations necessary to meet water quality standards then be applied as necessary.[62] In Tennessee, those water quality standards include the State's Antidegradation Statement.[63]

In the Radionuclide Pollution Decision, former Administrator Wheeler eschewed application of the first two lines of CWA defense—treating discharges and applying water quality standards which prevent the degradation of waters—to prioritize water quality based effluent limitations and designated use criteria as ARARs. The Radionuclide Pollution Decision is therefore properly viewed as an attempt to unlawfully preference weaker water quality standards in the CWA in contravention of the Act's plain purpose and intent.

Response: The proposed remedy for EMDF is being selected consistent with the "December 31, 2020 Radionuclide Pollution Decision issued by former EPA Administrator Andrew Wheeler." That decision is no longer under review. The approach for preliminary remediation goals and discharge limits was developed and agreed upon among the FFA parties, including significant input and review from EPA Headquarters.

IV. Conclusion

As EPA has so aptly noted, "there currently is no factual basis in the D1 ROD or the Administrative Record for this ROD" to justify DOE's assertion that the Department's preferred remedy at the ORR site "will meet [remedial action objectives], . . . will protect human and ecological receptors, and will prevent adverse impacts to surface water."[64] Specifically, EPA noted that any such statement was "premature" because "the draft ROD does not specify remediation goals[] and does not accurately apply ARARs [] related to compliance with certain CWA and TDEC water quality standards."[65] The EMDF fact sheets, among other shortcomings, do not supply this missing information or fail to demonstrate that it would sufficiently protect human health and the environment. And if EPA cannot effectively evaluate DOE's preferred remedial alternative given these deficiencies, neither can the public.

In order to rationally and lawfully select a remedial action under CERCLA, DOE must address the deficiencies outlined above before issuing a revised proposed plan for public comment. DOE should additionally issue this revised proposed plan only after EPA has made a determination on its review of the Radionuclide Pollution Decision. It is imperative that DOE takes these steps to comply with federal law and so that the legacy waste at the Oak Ridge Reservation is disposed of in a manner that actually ensures the health and safety of the local community and surrounding environment.

Attachments can be viewed at: https://southernenvironment.sharefile.com/
d-s1e4fa53bf7684edc958bfe5dd0b64e05

Response: DOE thanks you for your participation in the public comment process. EMDF will be a permanent CERCLA waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated

with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this ROD. The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the NCP for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to TDEC 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

[1] Att. 1, Letter from Amanda Garcia (SELC) et al. to Roger Petrie (DOE), Re: Request to Provide Completed Information for Public Discussion of the EMDF and an Additional Period of Public Comment as Required under CERCLA (May 10, 2022).
[2] *See* U.S. Dep't of Energy, *Environmental Management Disposal Facility Site Groundwater Characterization*, 4 (April 2022), http://ucor.com/wp-content/uploads/2022/05/EMDF-Site-Characterization-factsheet-r05-02-2022.pdf ("EMDF Groundwater fact sheet" or "Site Groundwater Characterization fact sheet"); U.S. Dep't of Energy, *Environmental Management Disposal Facility Water Quality Protection for Bear Creek*, 4 (April 2022), http://ucor.com/wp-content/uploads/2022/05/EMDF_Water_Quality_factsheet.pdf ("EMDF Bear Creek fact sheet" or "Water Quality Protection for Bear Creek fact sheet"); U.S. Dep't of Energy, *Environmental Management Disposal Facility Waste Acceptance Criteria*, 4 (April 2022), http://ucor.com/wp-content/uploads/2022/05/EMDF_WAC_factsheet.pdf ("EMDF WAC fact sheet" or "Waste Acceptance Criteria fact sheet").
[3] 40 C.F.R § 300.430(a)(2).
[4] *Id.* at § 300.430(d)(1).
[5] *Id.* at § 300.430(d)(2)(i).
[6] Id. at § 300.430(e)(1).
[7] Id. at § 300.430(f)(2).
[8] Id. (emphasis added).
[9] *Id.* at § 300.430(f)(3)(ii) (emphasis added).
[10] Att. 2, Letter from Amanda Garcia et al. (SELC) to Michael Regan (EPA), Re: Request for Update Regarding the U.S. Environmental Protection Agency's Review of the Radionuclide Pollution Decision and for a Revised Proposed Plan Regarding Environmental Management Disposal Facility at the Oak Ridge Reservation (Nov. 4, 2021).
[11] U.S. Dep't of Energy, DOE/OR/01-2695&D2/R1, *Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA Waste)*, 6, 18, 21 (2018), https://doeic.science.energy.gov/uploads/A.0100.030.2596.pdf.
[12] *See* U.S. Dep't of Energy, DOE/OR/01-2535&D5, *Draft Remedial Investigation/Feasibility Study for Comprehensive Environmental Response Compensation, and Liability Act Oak Ridge Reservation Waste Disposal Oak Ridge, Tennessee*, 7-40–7-48 (2017) (hereinafter "D5 RI/FS"), https://doeic.science.energy.gov/uploads/F.0615.029.0055.pdf.
13 *See e.g. EMDF Groundwater* fact sheet, *supra* note 2, at 3 (noting that a "field demonstration test" at the EMDF site analyzing the landfill's effect on local groundwater has yet to occur but could show that a new landfill design is needed); *EMDF WAC* fact sheet, *supra* note 2, at 1, 3 (acknowledging that "the final WAC have not been determined" and stating that supplemental modeling must be completed to develop the analytical WAC); *EMDF Bear Creek* fact sheet, *supra* note 2, at 4 (stating that a "comprehensive mercury strategy" will be developed to address mercury discharges into Bear Creek, a mercury-impaired waterway subject to Tennessee's Antidegradation Statement.).
[14] *See* 40 C.F.R. § 122.21.
[15] The United Cleanup Oak Ridge LLC (UCOR) website containing DOE's published fact sheets contains certain "project framework documents" and "additional resources"; however, this information does not provide all necessary information, nor is it compiled in a revised proposed plan. *See EMDF Information*, United Cleanup Oak Ridge LLC, https://ucor.com/additional-emdf-information/ (last visited June 6, 2022).
[16] Att. 3, Letter from Amanda Garcia (SELC) et al. to Michael Regan (EPA), Re: Concerns Regarding the U.S. Department of Energy's Recent Actions During the U.S. Environmental Protection Agency's Review of the December 31, 2020 Radionuclide Pollution Decision for the Oak Ridge Reservation Facility in Oak Ridge, Tennessee (Aug. 2, 2021).
[17] Att. 4, Letter from Christina Reichert (SELC) et al. to John Japp (DOE), Re: Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste (Dec. 10, 2018).
[18] Att. 5, Letter from Nate Watson (SELC) et al. to John Japp (DOE), Re: Continuing lack of meaningful public comment on Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste (September 2018) (Aug. 1, 2019).
[19] Id. at 3–4.
[20] Att. 6, Letter from Christina Reichert (SELC) et al. to John Japp (DOE), Re: New information regarding the proposed landfill site for Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste. (Oct. 1, 2019).
[21] Letter from Amanda Garcia, *supra* note 1, at 1–2.
[22] Id. at 3.
[23] Id. at 2.
[24] Available at https://www.epa.gov/sites/default/files/2015-02/documents/rod_guidance.pdf.

[25] Letter from Amanda Garcia, supra note 10.
As they did previously, Community Groups incorporate by reference the concerns outlined in a letter and accompanying attachment sent to EPA by several former Tennessee Department of Environment and Conservation (TDEC) employees. The letter and attachment provide context on the history and operation of the EMWMF and the proposed EMDF, highlight inconsistencies in the D1 ROD which must be addressed in a revised proposed plan, and shows how the current administrative record does not support a finding that the threshold criteria of protectiveness of public health and the environment and compliance with non-waived ARARs will be met. *See* Att. 7, Letter from Steve Goins et al. to Michael Regan (EPA), Re: Misinformation concerning the Department of Energy (DOE) Oak Ridge Reservation (ORR) Environmental Management Waste Management Facility (EMWMF) and the proposed Environmental Management Disposal Facility (EMDF) that affects the EMDF Record of Decision (ROD), Oak Ridge, Tennessee (Nov. 4, 2021).
[26] *See* Letter from Christina Reichert, *supra* note 17; Letter from Nate Watson, *supra* note 18; Letter from Christina Reichert, *supra* note 20; Letter from Amanda Garcia, *supra* note 1.
[27] U.S. Dep't of Energy, *EMDF Public Meeting – May 17, 2022* at 7:46 (May 19, 2022), https://www.youtube.com/watch?v=_0lhQsTE-_I.
[28] *See* United Cleanup Oak Ridge LLC, *EMDF Information* (last visited June 3, 2022), https://ucor.com/additional-emdf-information/.
[29] *See* 40 C.F.R. § 300.430(f)(1)(i)(A).
[30] *See* 40 C.F.R. § 300.435(c)(3).
[31] Id.
[32] U.S. Env't Prot. Agency, *Superfund Community Involvement Handbook*, 28–29, 38 (2016), https://semspub.epa.gov/work/HQ/100000070.pdf.
[33] Id. at 40.
[34] Id. at 44–45.
[35] *See* 40 C.F.R. § 300.430(f)(3)(ii).
[36] *EMDF Bear Creek* fact sheet, *supra* note 2 at 1 (emphases added).
[37] *See* 42 U.S.C. § 9621(b)(1); 33 U.S.C. § 1311(b)(1).
[38] *See* 40 C.F.R. § 122.2
[39] *See* 40 C.F.R. § 300.430 (f)(ii).
[40] *See EMDF Groundwater* fact sheet, *supra* note 2, at 3.
[41] *See* 40 C.F.R. § 300.430 (f)(1)(ii)(A)–(B).
[42] *See EMDF WAC* fact sheet at 3.
[43] Id. at 2.
[44] *See, e.g.*, Att. 8, Plea Agreement, *United States v. Duratek Federal Services*, No. 3:06-cr-00172-CCS, 1 (E.D. Tenn. Dec. 14, 2006); Att. 9, Factual Basis, *United States v. Duratek Federal Services*, No. 3:06-cr-00172-CCS, 2–3 (E.D. Tenn. Dec. 14, 2006).
[45] Community Groups have previously raised concerns regarding EMDF given the fishing practices of local communities. *See* Att. 10, Letter from Amanda Garcia et al. (SELC) to Carlton Waterhouse (EPA), Re: Additional Information Regarding Communities Potentially Affected by the U.S. Environmental Protection Agency's Oversight of Cleanup Decisions at the Oak Ridge Reservation and the Radionuclide Pollution Decision (Feb. 16, 2022).
[46] *See EMDF Bear Creek* fact sheet, *supra* note 2, at 1 ("DOE will conduct secondary treatment as necessary . . . .").
Community Groups highlight comments submitted by TDEC on the D1 ROD, which discuss the standard and currently-in-use practice by DOE at the ORR to treat radionuclide discharge with ion exchange, to support its use as treatment for contaminated wastewater and leachate. Specifically, EPA stated that "[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." Letter from Randy Young (TDEC) to Roger Petrie (DOE), Re: 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), 11–12 (Oct. 8, 2021) ("TDEC Comments on D1 ROD").
[47] EPA has previously identified the lack of finalized radiological discharge limits as impeding the Agency's "ability to evaluate whether the ROD is protective and complies with ARARs." U.S. Envt'l Prot. Agency, *EPA Comments on the Record of Decision for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee (DOE/OR/01-2794&D1)*, 1 (Oct. 6, 2021) ("EPA Comments on D1 ROD").
[48] *See* United Cleanup Oak Ridge LLC, UCOR-5550, *Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee*, A-10 (2022), http://ucor.com/wp-content/uploads/2022/05/Rad-PRG-Explanation.pdf.
[49] U.S. Env't Prot. Agency, EPA-822-B-00-004, *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000)* (2000), https://www.epa.gov/sites/default/files/2018-10/documents/methodology-wqc-protection-hh-2000.pdf.
[50] *See* Tenn. Comp. R. & Regs. 400-40-03-.06.
[51] Att. 11, Letter from Andy Binford to Roger Petrie (DOE), Re: Comments primarily related to the Site Groundwater Characterization fact sheet (June 7, 2022); Att. 12, Letter from Andy Binford et al. to Roger Petrie (DOE), Re: Comments primarily related to the Water Quality Protection of Bear Creek fact sheet, page 4 concerning mercury discharge limits, PCBs, and antidegradation and the TSCA ARAR exemption or waiver in the Site Groundwater Characterization fact sheet (June 7, 2022); Att. 13, Letter from Andy Binford to Roger Petrie (DOE), Re: Comments primarily related to the Water Quality Protection of Bear Creek fact sheet concerning discharge limits for radionuclides including values and how they are calculated referenced on page 1 of the fact sheet (June 7, 2022); Att. 14, Letter from Andy Binford to Roger Petrie (DOE), Re: Comments primarily related to the Waste Acceptance Criteria fact sheet (June 7, 2022).
[52] EPA Comments on D1 ROD, *supra* note 47, at 2.
[53] TDEC Comments on D1 ROD, *supra* note 46, at 2.
[54] *See* EPA Comments on D1 ROD, *supra* note 47, at 1 (stating that the Agency "expects the ROD to include a discussion of the potential impacts of climate change on the proposed remedy, including potential changes in rainfall, storm events and hydrologic condition, and climate resiliency measures to be addressed in the design and construction of the remedy."); TDEC Comments on D1 ROD, *supra* note 46, at 43 (noting that historically high average annual rainfall levels "are no longer extreme events, but rather the norm, and this must be taken into consideration for storage treatment and design.").
[55] EPA Comments on D1 ROD, *supra* note 47, at 1, 3.
[56] *Id.* at 2; s*ee also* TDEC Comments on D1 ROD at 24 ("[A]s 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.").
[57] Att. 15, Letter from Andrew Wheeler (EPA) to John Mullis (DOE) and David Salyers (TDEC) (Dec. 31, 2020).
[58] Att. 16, Letter from Lawrence Starfield (EPA) to Amanda Garcia et al. (SELC), Re: Request to Review December 31, 2020, Radionuclide Pollution Decision (Decision) Regarding Discharge of Radioactive Wastewaters at the Oak Ridge Reservation Facility in Oak Ridge, Tennessee (June 9, 2021).
[59] Att. 17, Letter from Amanda Garcia (SELC) et al. to Michael Regan (EPA), Re: Request to Review December 31, 2020 Radionuclide Pollution Decision Regarding Discharge of Radioactive Wastewaters at the Oak Ridge Reservation Facility in Oak Ridge, Tennessee (May 26, 2021).
[60] *See* Letter from Lawrence Starfield, *supra* note 58, at 1.
[61] *See* 42 U.S.C. § 9621(b)(1); *see also* Letter from Amanda Garcia, *supra* note 59, at 4; TDEC Comments on D1 ROD, *supra* note 46, at 7.
[62] 33 U.S.C. § 1311(b); s*ee* Att. 18, Letter from Acting Regional Administrator Mary S. Walker (EPA) to John A. Mullis II (DOE) and David W. Salyers (TDEC), 7 (Mar. 21, 2019) (stating that TBELs "constitute a minimum floor of controls" which must be implemented under the CWA regime).
[63] *See* Tenn. Comp. R. & Regs. 0400-40-03.06.
[64] EPA Comments on D1 ROD, *supra* note 47, at 27; s*ee also* TDEC Comments on D1 ROD, *supra* note 46, at 2 ("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.").
[65] EPA Comments on D1 ROD, *supra* note 47, at 4.

Additional Comment 60: Comment from Keith L. Kline

I encourage your office to (a) clarify or correct the website information regarding public comments, (b) clarify what exactly will be disposed of in the EMDF, and (c) extend the time period for comments.

A. Currently, the website https://www.energy.gov/orem/oak-ridge-office-environmental-management lists upcoming events and indicates in large print: "May 9 Public comments due for EMDF Project." This gives typical readers the impression that they have already missed their opportunity to submit comments. One must click on the link or see the finer print details to discover that the comment period is currently May 9-June 7.

B. To conduct proper analysis and provide comments on the EMDF proposal, we need to have more information regarding exactly what types of materials are to be accepted for this facility. Details on the Waste Acceptance Criteria must be shared with the public and other agencies in order for informed decisions to be made.

C. Given the lack of clarity and lack of communication regarding the potential materials to be handled and therefore, their toxicity, and given that most local communities and stakeholders are NOT aware of the specific proposal because details are not provided, please allow at least 30 days for public comments from a date that follows the public release of more details on the proposed types and characteristics of wastes to be accepted at EMDF.

Thank you for considering these comments.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human

health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Waste acceptance criteria (WAC) are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils), and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, Federal Facility Agreement (FFA) parties-approved primary document, the WAC Compliance Plan.

DOE has conducted additional work needed to support selecting a remedy in the ROD. DOE has worked with the other FFA parties to agree to a final list of applicable or relevant and appropriate requirements, and a final approach for WAC and discharge limits. As these final elements did not change the essence of the disposal facility design nor change any of the protectiveness, effectiveness, implementability, or cost evaluation criteria, no additional public comment is required. However, with submittal of the D1 ROD, the FFA parties recommended additional public engagement, which included the May 9 to June 7, 2022 public comment period. That effort allows for additional public comment that is addressed within the D2 ROD.

Additional Comment 61: Comment from Chuck Hope (from May 17, 2022 public meeting)

Hello, my name's Chuck Hope. C-H-U-C-K. H-O-P-E. First and foremost, I'm a citizen of Oak Ridge. I'm a long-time small business owner. I sit on city council, and I'm also the city council representative on the ECA, Energy Communities Alliance. We just got back from a tour of the [INAUDIBLE] project out in New Mexico. So, to say we know something about how the DOE facilities work and operate among themselves and how they interchange with each other is vitally important for the [INAUDIBLE] for our country. One of our biggest issues across the whole DOE complex is always going to be how do we clean it up, how do we take care of it and manage the waste. It's vitally important that we take care of that. We have to understand that. In that case, I'd like to thank Roger and his staff, the DOE, the folks at EPA and TDEC who continue to work on that. My question has always been about the WAC, waste acceptance criteria. We need to make sure that we clearly understand and define that because we're not just talking about building materials. That's predominantly what we're talking about in the disposal facilities. We've seen the success of what they've done with – and I'm an old-school guy. It's always going to be K-25, but

it's the East Tennessee Technology Park – and how the gaseous diffusion plants have come down. This is a big milestone for the Department of Energy. It's one of the biggest projects they've been [INAUDIBLE] to do to date, and it has a very high success rate. But as we move into the Y-12 valley and National Lab valley, the difference in the [INAUDIBLE] waste and the waste criteria that goes into this disposal facility does change. We need to make sure that we're aware of that, and we need to make sure that we understand that directly going forward. I think that's been the biggest stumbling block for us as citizens of Oak Ridge to make sure that we understand that. The engineering of the project, how we're going to manage the project, it's been done and been proved before. I can see that happening. I don't think we'll have any problem with the success of that. But, you know, this is something—Roger said it earlier. He made it in his opening statement. This is something we're going to have in our backyard into perpetuity. So, I mean, we're going to be there forever, and we're going to have to make sure we manage that. One of the questions I have is, as this moves from environment management into legacy management, how does that change? What changes? That's very important because we're not looking at things with decisions we're making today but 10, 20, 30 years from now or even longer. How does that change? So, that'd be a very important question that I'd like to have answered as well. So, in closing, I would just say that as long as we can continue to understand the waste criteria [INAUDIBLE], we need to understand that. We need to have a clear definition of that. My last statement I would make is as much as I appreciate EPA, TDEC, and DOE making the decisions, we're not at the table. The City of Oak Ridge, citizens of Oak Ridge are being represented by these three organizations. So, just remember, we'd like to be at the table as well when making these decisions about our backyard.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

WAC are contained in this ROD. Most of these waste acceptance criteria (WAC) result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation

indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils), and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, Federal Facility Agreement parties-approved primary document, the WAC Compliance Plan.

Additional Comment 62: Comment from Marion Burger

I am very uncomfortable about the limited amount of information that is included in your fact sheets, as was pointed out by several scientists and engineers at the recent DOE public hearing. I know the resumes and reputations of some of those professionals , and they are very well-qualified. They, and we who live in the Oak Ridge area, deserve to receive clear, forthright responses to their questions and concerns before any approvals for the landfill.

Thank you for the opportunity to comment.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Comment 63: Comment from Alfreda Cook

I am responding to the opportunity for comment on the public meeting hosted by the DOE on May 17, 2022, that provided an update on the Proposed Plan for construction of the new Environmental Management Disposal Facility (EMDF). The three fact sheets that were presented provided a high-level overview of planned actions but failed to address specific concerns as reported by TDEC and EPA – as Federal Facility

Agreement partners with DOE – and how resolution of those concerns has progressed to-date. Of course, documents with in-depth detail of those concerns are available for public access, but interpreting that information is time-consuming and often requires knowledge of environmental regulations that the average citizen does not possess. I had expected the DOE to offer pros and cons to the Proposed Plan such that the public could evaluate the supporting rationale. I left the meeting feeling that I had heard a "sales pitch" that promoted the needs of DOE.

Note that I reside in Country Club Estates, which is the residential area closest in proximity to the planned EMDF. I depend on TDEC and EPA to protect my best interests in regard to human health and the environment, and I expect DOE to prioritize those interests when developing budgets and project schedules for clean-up of the Oak Ridge Reservation. With those comments in mind, I offer the following suggestions:

- Schedule quarterly public meetings to report progress toward resolution of concerns as identified by FFA partners and other concerned community organizations
- Issue a revised Proposed Plan that addresses how current concerns will be alleviated
- Discuss specific "lessons learned" from 20-year operation of the existing Environmental Management Waste Management Facility (EMWMF) and how those lessons will be incorporated into design, construction, and management of the EMDF
- Discuss whether a wastewater treatment facility will be constructed at EMDF for immediate processing of contaminated leachate and surface water to prevent the need for collection basins that have potential to overflow during heavy rainfall and discharge hazardous liquids into nearby waterways
- Discuss the course of action if contaminants are found during building demolition at ORNL and Y-12 that exceed EMDF waste acceptance criteria
- Discuss whether waste from old burial sites in Bear Creek Valley are planned for future excavation or other remedial actions.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2

of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

DOE has conducted additional work needed to support selecting a remedy in the ROD. DOE has worked with the other Federal Facility Agreement (FFA) parties to agree to a final list of ARARs, and a final approach for the waste acceptance criteria and discharge limits. As these final elements did not change the essence of the disposal facility design nor change any of the protectiveness, effectiveness, implementability, or cost evaluation criteria, no additional public comment is required. However, with submittal of the D1 ROD, the FFA parties have recommended additional public engagement, which included the May 9 to June 7, 2022 public comment period. That effort allows for additional public comment that is addressed within the D2 ROD.

DOE works to continuously improve its efforts involving the cleanup mission at the Oak Ridge Reservation through lessons learned. DOE, along with their contractors, has implemented and follows a waste disposal hierarchy that prioritizes waste disposal in non-radiological onsite disposal facilities over the Environmental Management Waste Management Facility, provided characterization allows this path. The waste disposal hierarchy will also be applied for EMDF waste disposal. DOE has a mature and robust process for the characterization of CERCLA waste generated from remedial actions at the Oak Ridge NPL Site. Plans for remedial actions including waste disposal are subject to approval by the regulatory agencies prior to the implementation of work at the Oak Ridge NPL Site. The potential for waste material to be inappropriately disposed of onsite is minimal.

Additional Comment 64: Comment from Peter Scheffler

I understand the general features of the project, thanks to the fact sheets.

Specific concerns:

Groundwater at the site, even in the knoll, may not be totally due to rainfall but also "artesian" groundwater flowing from higher elevations surrounding the site through fractures in the bedrock and soil.

How has the effect of climate change on groundwater and surface water been factored into the design of the project?

The demonstration project should be completed before issuance of the Record of Decision, so that the project managers know whether it indicates the site is adequate and the EDMF properly designed.

There needs to be an opportunity for public comment on the Waste Acceptance Criteria before the ROD is issued. The criteria MUST NOT allow for "dilution" of contaminants by including waste material which is not contaminated. That in essence would result in filling the EDMF prematurely.

The WAC Compliance Plan should be developed and submitted for public comment before the ROD is issued.

What will be done with the residuals other than mercury from the treatment of EMDF wastewater and leachate?

Finally, Mr. Petrie mentioned in his introductory remarks at the public meeting that the ridge between the EMDF and the Scarboro community protects the community from the possibility of contaminated

groundwater. My comment above about possible "artesian" groundwater at the site also applies to the possibility of such groundwater at locations elsewhere with lower elevations than the EMDF site, regardless of intervening topography. (In this regard, I agree with Pastor Hammond and Martin McBride that DOE needs to put substantial effort and funding into redressing historical negative effects on Scarboro from environmental contamination, even if due only to unfounded negative perceptions of contamination.)

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex (Y-12) and Oak Ridge National Laboratory (ORNL) that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

The landfill siting and design reduce concerns from climate change and provide resiliency to potential increase in rainfall and flood events through the following measures:

- **Located outside the 100-year floodplain and on Pine Ridge, away from and at a greater elevation than Bear Creek. Waste elevation is approximately 60 ft higher than Bear Creek elevation in this area.**
- **Landfill does not cross one of the northern tributaries. Tributary immediately west of the landfill will be armored and widened to improve run-off. Tributary immediately east of the landfill will be diverted into an adjacent tributary. Culverts beneath the existing Haul Road will be oversized to improve drainage from the area and eliminate ponding.**
- **Upgradient diversion ditch is considerably oversized—greater than 100-year storm event.**

Additional considerations will be part of the post-ROD final design.

The Groundwater Field Demonstration (GWFD) scope will be detailed and finalized in a post-ROD Remedial Design Work Plan, a primary document that requires approval by all three parties before implementation of the demonstration. This GWFD will provide additional characterization information, and while not itself a change to the remedy, has the potential to affect the final design of the facility. Results of the field study will be incorporated into the Remedial Design Report, which will present the final landfill design, and is also a primary

document that requires approval by the Federal Facility Agreement (FFA) parties before landfill construction.

Waste acceptance criteria (WAC) are contained in this ROD. Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as ARARs (Administrative WAC). These WAC prohibit the higher radioactive waste from being disposed. For example, transuranic waste, greater than Class C (Nuclear Regulatory Commission) waste, and other wastes that contain radioactivity in excess of the limits specified in this ROD are prohibited from disposal. Experience with cleanup projects on the Oak Ridge Reservation indicates the volume of waste that exceeds WAC and requires offsite disposal is less than 10 percent by volume but contains greater than 90 percent of the radioactivity. Examples would include spent resins, some duct work, hot cell internals, and some equipment. Based on the projected inventory expected to be disposed in EMDF (consisting mainly of building demolition debris and soils), and in accordance with the WAC limits specified in Sect. 2.12.2.3 of this ROD, the final inventory of radionuclide contaminants will be protective of human health and the environment. In addition, the WAC are intended to limit the concentrations in landfill wastewater by limiting the concentrations of mobile contaminants in the waste, such as mercury. These WAC limits will be implemented through the post-ROD, FFA parties-approved primary document, the WAC Compliance Plan.

DOE has worked with the other FFA parties to agree to a final list of ARARs, and a final approach for WAC and discharge limits. As these final elements did not change the essence of the disposal facility design nor change any of the protectiveness, effectiveness, implementability, or cost evaluation criteria, no additional public comment is required. However, with submittal of the D1 ROD, the FFA parties recommended additional public engagement, which included the May 9 to June 7, 2022 public comment period. That effort allows for additional public comment that is addressed within the D2 ROD.

Existing and new data from hundreds of wells in Bear Creek Valley show groundwater flow from Pine Ridge towards Bear Creek and away from residential areas. Groundwater contamination is primarily located closer to Bear Creek in the upper part of the valley (as indicated in the 2021 Remediation Effectiveness Report). This data supports the conclusion that contamination in the valley cannot reach residential areas.

The comment expresses concern of a socioeconomic nature. Jobs associated with construction and operation of the facility, and the acceleration of cleanup enabled by onsite disposal and subsequent opportunities that it would present to Y-12 and ORNL, are expected to benefit both the economy and perception issues associated with environmental conditions in Oak Ridge. DOE points to the recent socioeconomic study supporting the landfill that is referenced and summarized in this ROD (see Sect. 2.10.11).

Additional Comment 65: Comment from Jessica Briggs

Please make sure any toxic waste removal and disposal does not contaminate the water ways and soils.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the

cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Additional Comment 66: Comment from Sandra Goss (from May 17, 2022 public meeting)

My name is Sandra. S-A-N-D-R-A. I didn't write that. I just tried to write "S." My last name is Goss. G-O-S-S. My thick Southern tongue gets that wrong, so let me say, G-O-Sam-Sam. I'm the executive director Tennessee Citizens for Wilderness Planning. We're an Oak Ridge-based environmental advocacy organization. We've been in action now since 1966, and we have a big interest in decent air to breathe, pure water to drink, and adequate habitat for all creatures. I appreciate all this big information that we've gotten today, and I know it's taken some effort to pull it together and to present it in ways that the public can understand. I look forward to delving into this information in more detail, and when I do that, I hope I find out how is the mercury hazardous waste going to be shipped and where? I hope so much – I guess more than anything – that we read about a climate change model selection, in other words, that when you've been working on this, that you've looked carefully at all these models of climate change weather, making the choice of the one that will be applied in this plan and then make plans accordingly. I'm a little uneasy with the idea that some of these arrangements are going to be decided more or less in process, and I want to urge the appropriate bodies to include the citizenry of our community here with information about how these experiments work out. I am very interested in this final layer of plastic that isn't going to let any rainwater through it. Very exciting. And I'd like to know the vendor on that, and maybe a little stock purchase might be necessary. That's the end of my comments, and thank you very much.

Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate

requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

Decisions on waste volume reduction or mercury treatment are the responsibility of the generating project and associated decision documents. The EMDF will have waste acceptance criteria (WAC) that specify what waste is allowed and in what form. The projects must comply with the WAC but for waste that does not meet the WAC, the projects can further treat the waste if in compliance with EMDF requirements or send the waste to an alternative disposal location. With regard to mercury hazardous waste (Resource Conservation and Recovery Act of 1976 [RCRA] D009 code), that waste is prohibited from disposal in EMDF.

DOE will meet all regulatory requirements pertaining to mercury treatment and onsite disposal of waste, including RCRA requirements that dictate WAC for mercury. The regulatory compliant design, operation, and closure of the onsite disposal facility, coupled with DOE's compliance with all regulatory requirements concerning mercury, will help to ensure that the new disposal facility is protective of human health and the environment over the long term. For West End Mercury Area remediation projects with EMDF-bound waste streams, DOE will take all practical measures to remove mercury before waste generation and send that mercury offsite to treatment/storage/disposal facilities.

The landfill siting and design reduce concerns from climate change and provide resiliency to potential increase in rainfall and flood events through the following measures:

- **Located outside the 100-year floodplain and on Pine Ridge, away from and at a greater elevation than Bear Creek. Waste elevation is approximately 60 ft higher than Bear Creek elevation in this area.**
- **Landfill does not cross one of the northern tributaries. Tributary immediately west of the landfill will be armored and widened to improve run-off. Tributary immediately east of the landfill will be diverted into an adjacent tributary. Culverts beneath the existing Haul Road will be oversized to improve drainage from the area and eliminate ponding.**
- **Upgradient diversion ditch is considerably oversized—greater than 100-year storm event.**

Additional considerations will be part of the post-ROD final design.

The Groundwater Field Demonstration (GWFD) scope will be detailed and finalized in a post-ROD Remedial Design Work Plan, a primary document that requires approval by all three parties before implementation of the demonstration. This GWFD will provide additional characterization information, and while not itself a change to the remedy, has the potential to affect the final design of the facility. Results of the field study will be incorporated into the Remedial Design Report, which will present the final landfill design, and is also a primary document that requires approval by the Federal facility Agreement parties before landfill construction.

Additional Comment 67: Comment from William A. Rose

Where will all the soil/dirt come from for this proposed project?

Response: The U.S. Department of Energy thanks you for your participation in the public comment process. Materials from excavation of the site will be used wherever possible, and if needed, borrow material for the Environmental Management Disposal Facility (EMDF) construction will be obtained from the knoll just east of the facility and other locations at the Oak Ridge Reservation, which will be developed during the Early Site Preparation phase of construction. Section 2.12.2.2 of this Record of Decision provides additional discussion of construction activities.

Additional Comment 68: Comment from Gareth Davies

This is somewhat of a dissertation, but there are some fundamental issues that apply directly to groundwater work that has been done by DOE and its contractors on the Oak Ridge Reservation and at the proposed EMDF site (and actually they would apply to anywhere where there are bedrock aquifers). The proposed EMDF site is located on Pine Ridge, in fractured clastic interbedded shale, sandstone, siltstone and carbonate rocks. The hydraulic conditions in such a setting means that it is not possible to average conditions because there are different lithologies with different hydraulic conductivities. It is common knowledge that there is and will be in all bedrock, preferential flow in fissures, channels and conduits (see also numerous other references for the conditions in several lithologies [Worthington et al., 2016]). However, the general conceptual model approach used by most hydrogeologists is to assume something called the *porous medium.* This approach is based upon flow in an ideal system that is assumed to be both homogeneous (consisting of parts all of the same kind) and isotropic (having physical properties which have the same value when measured in different directions). This approach originated from work done by Henry Darcy. Darcy (1856) was tasked with finding a water source for the City of Dijon in eastern France. The original report of the work is translated by Bobeck (2004). During this work he wrestled with water filtration and performed many experiments in sand and gravel columns. He realized that there would be a loss of hydraulic pressure and discharge with the flow through sand and gravel. He solved these problems and derived the mathematical relationships. However, these were conducted in columns of unconsolidated sands and gravels. Actually, Darcy in the report for Dijon (Darcy, 1856) discusses many other aspects of flow in bedrock and channels in the subsurface to springs and artesian wells, a subject where there is little or no discussion in much of the hydrological literature.

A summary by Worthington: *"The experiments by Darcy (1856) that led to the formulation of Darcy's law represented a major advance in hydrogeology (Fetter 2004). However, Darcy and other leading hydrogeologists like Dupuit, Chamberlin, Daubre´e, Meinzer, and Theis all recognized that many aquifers do not behave as porous media but instead as more complex media with preferential flow in fractures and channels."*

The source of water he found and used for Dijon is the Rosoir Spring about 12.5 km northwest of the city. He constructed an aqueduct to get the water to the city but found he would have to filter the water before its use. For this he constructed an apparatus to determine any hydraulic head loss that would happen during the filtration. He used sand and gravel for filtration a thus derived equations that described the results. This is known as the Darcy Equation. Bobeck (2004) has translated the entire Darcy (1856) report. The filtration work is in one short section (3 - 4 pages) of Appendix D of a report of 500 + pages plus plates.

It is worth mentioning that Darcy had early on established that the Rosoir Spring was flowing from "underground pipes" – (conduit) which was subsequently shown by cave divers exploring several kilometers of passages. This is discussed by Worthington and Gunn (2009).

The general position adopted by groundwater professionals early on up to and within the 1900's in the US and elsewhere was implicit assumption that most aquifers would be found in sand and gravels accumulated in valleys and that Darcy's Law could be used to describe flow in those settings. This use of sand as a type lithology and Darcy's Law to calculate the rate of groundwater movement is confirmed in Simmons (2007). However, it should be noted that a reading of the Dijon fountains report (Darcy, 1856) shows numerous statements and illustrations of his idea that there are conduits in the subsurface and some may be filled with sand.

The Darcy equation uses a hydraulic gradient , cross sectional area (of a flume) and a value for the permeability that is called the hydraulic conductivity. The hydraulic conductivity number is a value that has to be calculated (or estimated). Many academic texts have tables of hydraulic conductivity values for various settings and lithologies (Freeze and Cherry, 1979, p.29, Table 2.2).

Simmons (2007) additionally references Mead (1919) and Slichter (1905) relating that workers did not know how to apply hydraulic conductivity when using Darcy's Law and this led instead to direct measurements of groundwater velocity in aquifers rather than use Darcy's Law, this was similar to doing tracer tests (Simmons, 2007).

It should be pointed out that the mentality at this time still involved flow and velocity in sand and does not yet address bedrock issues and how to take some volume of bedrock with fissures and fractures and within that apply Darcy's Law. Darcy (1856) on page 80 discusses artesian wells and talks about flow in subsurface channels even using the term underground streams.

Hubbert (1940) in the *Theory of Ground-Water Motion* quickly assumes using Darcy's Law and flow through an *"isotopic medium."* Nothing much changed but subsequently USEPA Regulations were developed around implicit assumption of the porous medium, overall validity of Darcy's Law and the use of monitoring wells.

The original RCRA and CERCLA regulations implicitly use a porous medium approach, and only use well - based monitoring techniques. The aquifer testing techniques (slug tests and pumping tests) implicitly make the same assumptions of a porous medium. Another assumption in most regulations assume flat-bedded situations with an impermeable base. Although this can be the case in valleys filled with geologically younger unconsolidated sediments, it is rarely the case for bedrock and certainly not bedrock with any structure (bedding planes, joints, folds and faults).

During the late 1970's and 1980's the published literature started to include papers that pointed out that the USEPA regulations did not allow reliable monitoring in karst. Bradbury and Muldoon (1990) followed by discussing fractured rocks. Quinlan and Ewers (1986) initiated the conversation on karst. They implied that poor monitoring performance was caused by the inability of borings and wells to penetrate conduits, and particularly main conduits to which there would be convergent flow, so it was very important to monitor main conduits. However, the probability of intersecting these with borings and constructed wells was very low. There was much documentation that showed sites being inadequately monitored and in carbonates contamination being transport many kilometers and with velocities of more than 1 km/day.

Another problem was illustrated by Smart (1999). He suggests that many wells only intersect subsidiary (tributary) channels/conduits with regards to what they sample and interpreting the correct hydraulic head and contaminant data therein is difficult and may not be possible. Quinlan (1989) was the first USEPA initiative that addressed karst and tracer tests. This was followed by Well-Head and Spring-Head protection manual development for USEPA Region 4 (USEPA 1997). All of these documents say that tracing would be necessary in karst.

In 1996 the American Society for Testing and Materials formed a subcommittee and task group to develop a Standard Guide for the Design of Ground Water Monitoring Systems in Karst and Fractured-Rock Aquifers. This was the first consensus document (ASTM D5717-95 - later D5717-96) and in the introduction makes the point that such a setting should not be considered a porous medium. This "karst and fractured rock" implies all fractured rock lithologies, not just karst (for example, carbonates). The publication of D5717-96 initiated further discussions about non-carbonate fractured rocks and initiated a discussion about a definition of karst in terms of monitoring and the regulations.

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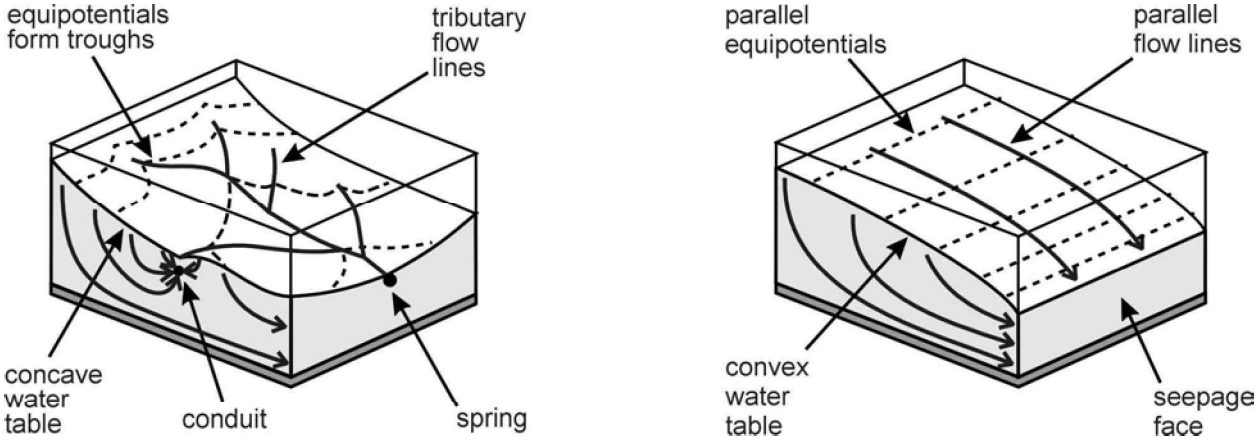
ASTM has recently formed a new subcommittee on karst (D18-27) and is meeting and writing several new documents that address important issues in karst. In addition the D5717-96 document has to be updated and that is also being done. The author of these comments was the vice-chairman of the task group for writing of D5717-96 and is the Task Group leader for doing the update.

Worthington (2001) made a comparison of an ideal porous medium (below, right) and a typical carbonate aquifer (below left). The parameters of the depicted ideal porous medium are based upon theory, the parameters of the carbonate aquifer are from physical evidence, empirical data and calculations. Note that the ideal porous medium has no sinking streams and no springs, so just the existence of those two features would effectively invalidate the existence of a porous medium at any site (they are present at the proposed EMDF site). It appears from subsequent work, especially having sinking streams, springs, tracing and hydraulic gradients that many fractured non-carbonate (clastic) rock sites behave more like a carbonate setting. A question for DOE and its



contractors would be: do they consider the site to be a porous medium? Do they consider it to have homogeneous and isotropic conditions? Do they choose to ignore the professional consensus?

So, in using only wells DOE and its contractors implicitly assume that the site does behave like a porous medium and they implicitly do not follow the professional consensus set by ASTM (1996) advised by

OMB A-119 and as advised and revised in all the regulations. Unfortunately they are ignoring the conceptual advances made over 40 years of work to improve monitoring and further protect the public and the environment in this type of terrain.

Many tracer tests have been done in carbonates, but in addition now in many other bedrock settings (Worthington et al., 2016). That work includes a database of traced velocities in the major types of bedrock more, and more recently Klein and Davies (2017) included tracer test velocities in clastic (non carbonate) rocks including several from the Oak Ridge Reservation, some done by DOE and its contractors. It is noted that some tracer tests have been done in the same lithology as the proposed EMDF, have those data been used, they may be the most representative.

Contaminants as tracers. Contaminants are typically excellent tracers, and in particular many radionuclides. Uranium in groundwater was established as a tracer by Osmond and Cowart (1976) - where in many cases it can be quantitative. The signatures created by, for example, depleted uranium in Bear Creek Valley are - let's say (understating) significant. Uranium, if used correctly (Osmond and Cowart, 1976 show how) can be used as a tracer that will not only delineate sources but also show discharge locations, and is quantitative with regards to the mass (plotted reciprocal of the concentration in micrograms/liter) of uranium in a given volume.

At this point it is important to discuss the mobility of uranium. Gascoyne (1993) fully discusses this and it is obvious that uranium will be soluble in open, oxidized waters particularly with the presence of bicarbonate and several other anions. DOE and its contractors most of the time state incorrectly that uranium is not mobile. They need to provide the geochemical evidence for this position. One common position is that the waters have to be in contact with carbonate rocks.

Natural Waters – Anion Geochemistry (from Hembrey et al., 1952, US Geol. Circ. 170)

Dissolved Substance	Granite Substrate	Limestone Substrate	Gypsum Substrate	Shale Substrate
HCO_3^-, CO_3^{2-}	15.9	86.3	101.8	163.6
Ca^{2+}	10.0	32.2	121.4	139.4
Mg^{2+}	0.9	17.1	40.0	76.8
H_4SiO_4	11.9	10.1	10.2	6.1
SO_4^{2-}	3.2	5.7	383.9	1212.0
$Na^+ + K^+$	0.5	1.9	55.3	410.1
$Cl^- + NO_3^-$	0.6	4.7	14.5	12.1
Total ppm	43.0	158.0	727.1	2020.1

The most dominant anions are always HCO_3^-, CO_3^{2-} (obviously except for gypsum, shale: Na^+, K^+, SO_4^{2-}) and their biggest source is the atmosphere, note the larger concentration in shales as compared to limestone substrates, granites could be an analogue for sandstones. The lack of carbonate rock obviously would not mean a lack of HCO_3^-, CO_3^{2-}. I have successfully used uranium isotopes as a natural tracer in geological settings from the Rocky Mountains to the coastal plain

The table above shows how incorrect this would be (from Blatt et al., 1972). If a porous medium approach is used then Darcy's equation for groundwater discharge is often used. Freeze and Cherry (1979) (page 73) state that Darcys Law is probably invalid because of turbulent flow in "*karst, dolomites and cavernous volcanics"* Subsequently Quinlan et al., (1996) describe this more rigorously using: the minimum traced velocity in conduits in carbonates (0.001 m/s), typical Reynolds numbers, the onset of turbulent flow could

happen in fissures of a width of a few millimeters. They described a conduit size this way. This would implicitly suggest that many fractured clastic rocks might yield generally the same results - their tracing results are often comparable. At this point it is important to discuss the mobility of uranium. Gascoyne (1993) fully discusses this and it is obvious that uranium will be soluble in open, oxidized waters particularly with the presence of bicarbonate and several other anions. DOE and its contractors most of the time state incorrectly that uranium is not mobile. They need to provide the geochemical evidence for this position. One common position is that the waters have to be in contact with carbonate rocks.

However, Worthington et al., (2016) show how in non-carbonates fissures increase in width as weathering or alteration progresses. In all bedrock aquifers a positive feed-back loop results as fissures widen and allow more recharge water to enter, thus allowing more alteration. The main difference between carbonates and clastic and non carbonate rocks is the dissolution. These authors suggest in carbonates dissolution is congruent in that all the solute is likely to be removed enlarging the porosity. In non-carbonates (e.g., silicates) there would still be some dissolution or really alteration converting feldspar and other silicate minerals to clays. These might reduce the porosity. However they show that in that many settings there appears to more extensive alteration with depth in silicates and such - because of the surface area that is being altered and the alteration rate is higher in the direction of the fissure (implied vertically).

It should be emphasized that the inadvertent discharge of contaminants or contaminated waters into Bear Creek would be very unfortunate. This is not because of the contamination of Bear Creek itself, but because of the fact that Bear Creek, at low stage sinks into its own bed. TDEC (2001) includes information about a tracer test that was done along Bear Creek and showed how that surface water sinks into its bed and thereafter does not simply rise again, but discharges from springs (SS-4, SS-5). The TDEC tracing shows velocities in the km/day range - totally normal for carbonates whether called karst or not. The tracer was added to the discharge of Bear Creek near the location of the EMWMF and sinks at various locations downstream of that. It should benoted that the tributaries of Bear Creek on the NW side also, in dry conditions, sink into their own beds - some (in dry conditions it be many) before they reach Bear Creek. This is normal for fractured rocks of any of the main lithologies.

The only way that it can be determined where these waters eventually discharge to is by doing additional tracing at the proposed site and beyond, and that includes the tributaries and Bear Creek itself, and continue the tracing to any offsite receptors. This can be done using multiple tracers.

It does not appear that the sinking surface or groundwater is returning to discharge at surface water downstream for several reasons. The first is that all the springs in Bear Creek Valley are overflow springs. These types of springs do not discharge all the time - so aquifer water must be discharging at lower elevation springs when the higher level springs (overflow springs) are not discharging. This vertical hierarchical nature of discharge is normal as it can observed in groundwater basins everywhere. The nature of this type of discharge was first explained by Worthington (1991) in karst. It was shown to be the normal case where extensive knowledge of groundwater basins was obtained by Quinlan and Ray, (1989).

The complication in Oak Ridge are the TVA structures on the rivers (Melton Lake Dam and Watts Bar Dam). If continuous monitoring at springs next to the Clinch River is done what should be seen is that the springs near the river banks do not operate as “normal karst springs” [of which a substantial amount is known] when the pond levels are high and the discharge of the springs are inundated. When the pond levels are lowered the springs behave as normal karst springs.

A uranium-series plot of sources and discharges (using methods as outlined by Osmond and Cowart, 1976) does not suggest a simple system where groundwater discharges to surface water (unpublished work). The existing data strongly suggest that this water sinks and feeds groundwater. This is simply supported by the shallow hydraulic heads being higher than the deeper heads. From the uranium-series data it would be

possible to use uranium-series as a powerful tracer in the whole system in surface water and groundwater, and would work as far as discharge to the oceans as shown in Osmond and Cowart, (1976).

The offsite pathways are likely very deep and long. During the past few decades, drilling for oil in the subsurface west of Nashville reaches fresh water at a depth of > 1,200 meters (~4,000 ft). This should not be a shock as this is penetrating the Knox Group and it is known that fresh water has also been encountered in the Knox Group at over 3,500 meters below the surface. Banner et al., (1989) show similar depth of circulation across the US mid-continent and the source of water feeding springs in central Missouri, where from the stable isotope data the recharging water must be recharging from over 3,000 m above sea level. This conceptual model began with some work done in the 1990's to explore the origin of Pb-Zn deposits across the US mid-continent (Garven et al., 1990). The whole concept suggests that there are very deep flow paths involved. This can be tested with natural stable isotope tracing or a combination of uranium-series and stable isotope data from groundwater around the Oak Ridge Reservation. Since so many of the contaminants in Oak Ridge are long lived (e.g., 238U with a live time of 5 - 7 half lives - would last something like 3 - 4 times the current estimate of the age of the universe. Remember uranium is highly mobile as previously stated. The immobility of uranium in the groundwater system as has been parroted by DOE and its contractors is demonstrable nonsense (see Gascoyne, 1993; Osmond and Cowart, 1976, 1993).

So, to the rivers and whether they are barriers to groundwater flow. The nature of the rivers in Appalachia are such that they are meandering. The way that rivers can meander is that the spend a lot of geological time flowing on a geologically old and stable plain.

The nature of east Tennessee and much of Appalachia is that the meandering rivers are now in gorges in the oldest geologically (deepest stratigraphically) Lower Paleozoic rocks. How did they get there? The simplest explanation is that they formed on a plain of sediments that were eroded away but remained here long enough to let the rivers form meanders.

Recent work at the Gray Fossil Site, Gray Tennessee, shows a 30 m (100 ft) sequence of sediments, which are 5.5 Ma (million years before the present) at the top and ~55 Ma at the bottom (Zaboaa et al., 2011). The upper part of this sequence (same age, ~5.5 - 6 Ma) (Anthony and Grainger, 2001) is present in a now dry cave passage in Big Bone Cave near Murfreesboro, Tennessee. Work by a colleague from the USGS (Daniel Doctor, personal communication) suggests that the same sediments (youngest - 5.5 - 6 Ma) maybe also be in place in a cave excavated into by a quarry in SW Virginia. These distal sites might be enough to describe and explain the nature of the sediment blanket and explain the meanders in the SE USA.

The sediment blanket is no longer present, all the sediments from 5.5 to 55 Ma have all been eroded away and the rivers are now flowing through channels cut in the remaining bedrock. There are explanations for this that geologically that begin with a massive removal of sediments from the area beginning ~ 17 Ma. This is more than adequately documented by drilling records from the floor of the Atlantic Ocean offshore of the Eastern Seaboard of the US and the floor of the Gulf of Mexico (also southeast of the US). Biswal and Hatcher (2019) document (using detrital zircons) that sediments along the US Gulf Coast originate in Appalachia. Poag and Sevon (1998) have written about the dump of sediments into the Atlantic beginning ~ 17 Ma. Other workers suggest some of these sediments remain trapped in small quantities in some high valleys in the Appalachian high country, but they were, except where trapped in caves and sinkholes eroded.

So, what this means is that the Garven et al., (1990) concept shows that a flow system deep in the mid-continent driven by meteoric recharge via the Appalachian began in mid-late Paleozoic. This is known from the Pb-Zinc mining information and has been confirmed to be the case in the more recent deep drilling records mentioned previously. Thus the rivers would not be related to the groundwater flow paths which would be deep and much older geologically. Whatever confusion maybe solely related to the effect of the

dams on the river, the use of only monitoring wells and the limited sampling of groundwater - regardless of what the regulations say should be done.

Unless a rigorous amount of additional work is done DOE and its contractors will not get a grasp of the system as a whole. This means that the risk to offsite users and potential future users is significant and probable. One wonders what will happen far into the future when the radionuclides are just as dangerous as now and daughter products that have comparable mobility and greater radioactivity will be produced.

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Response: The U.S. Department of Energy (DOE) thanks you for your participation in the public comment process. The Environmental Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility with a robust design that is protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste disposed in EMDF will primarily be soil and debris associated with the cleanup of the Y-12 National Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision (ROD). The efficient remediation of the Oak Ridge NPL Site will reduce the risks associated with contaminated soil and facilities in their current configuration to acceptable levels and will consolidate that waste into an engineered facility that can be monitored and maintained. The selected remedy is consistent with CERCLA Sect. 121 and the threshold criteria described in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for selecting a remedial action—overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). The selected remedy complies with federal and state ARARs as identified in the ROD, including ARARs from the Dispute Resolution Decision (EPA 2020). A Toxic Substances Control Act of 1976 (TSCA) waiver for siting requirements in TSCA 40 *Code of Federal Regulations* (*CFR)* 761.75(b)(3) and TSCA 40 *CFR* 761.75(b)(5) is invoked for the selected remedy under 40 *CFR* 761.75(c)(4). An exemption to Tennessee Department of Environment and Conservation (TDEC) 0400-20-11-.17(1)(h) is invoked for the selected remedy under TDEC 0400-20-04-.08. Bases for the TSCA waiver and state-allowed exemption are provided in Sect. 2.13.2 of this ROD. No statutory waivers under CERCLA 121(d)(4) or Sect. 300.430(f)(1)(ii)(C) of the NCP are requested.

However, to clarify, the location where the disposal cells will be located was specifically selected to avoid the karst features described in this comment.

This EMDF location was selected based on the conclusions in the Remedial Investigation/Feasibility Study (RI/FS), supported by the extensive data set available in

Bear Creek Valley (BCV). During preparation of the Proposed Plan, DOE began more site-specific characterization efforts. The additional site characterization evaluated geologic and hydrogeologic conditions specifically at the selected EMDF location and included the referenced eight well pairs (16 wells). These piezometers have been monitored since installation and the monitoring results were evaluated with results from other existing wells in BCV to supplement the general understanding of the site. These monitoring results were used to support identification of a preferred location in the Proposed Plan and the selection of the location in this ROD. Analysis of the data confirmed DOE's understanding of the site, including the conditions that support flow from Pine Ridge towards Bear Creek, with an additional component of flow towards the tributaries and along strike. These are consistent with flow in porous media.

As noted, the contaminant plumes present in BCV from legacy waste management sites demonstrate flow towards Bear Creek, then along Bear Creek as a result of the underlying karst features. As noted earlier, the EMDF was specifically located in an area without such features.

3.3 RESPONSIVENESS SUMMARY REFERENCES

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RESPONSIVENESS SUMMARY ATTACHMENT: ADDITIONAL INFORMATION INCLUDED AS PART OF PROPOSED PLAN COMMENT #168

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Attachment 1

What the public should know about on-site radioactive and hazardous waste disposal before the next landfill is built on the Department of Energy Oak Ridge Reservation

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What the public should know about on-site radioactive and hazardous waste disposal before the next landfill is built on the Department of Energy Oak Ridge Reservation

The Environmental Management Waste Management Facility (EMWMF), the active landfill for radioactive and hazardous waste disposal on the Oak Ridge Reservation

How and why did things go wrong at the EMWMF?

How can mistakes be avoided at a future radioactive and hazardous waste landfill on the Oak Ridge Reservation?

Historically, DOE disposed of waste in Oak Ridge under the authority of the Atomic Energy Act with minimal attention to environmental releases.

Waste dumped into trenches in Bear Creek Valley prior to DOE establishing requirements for disposal

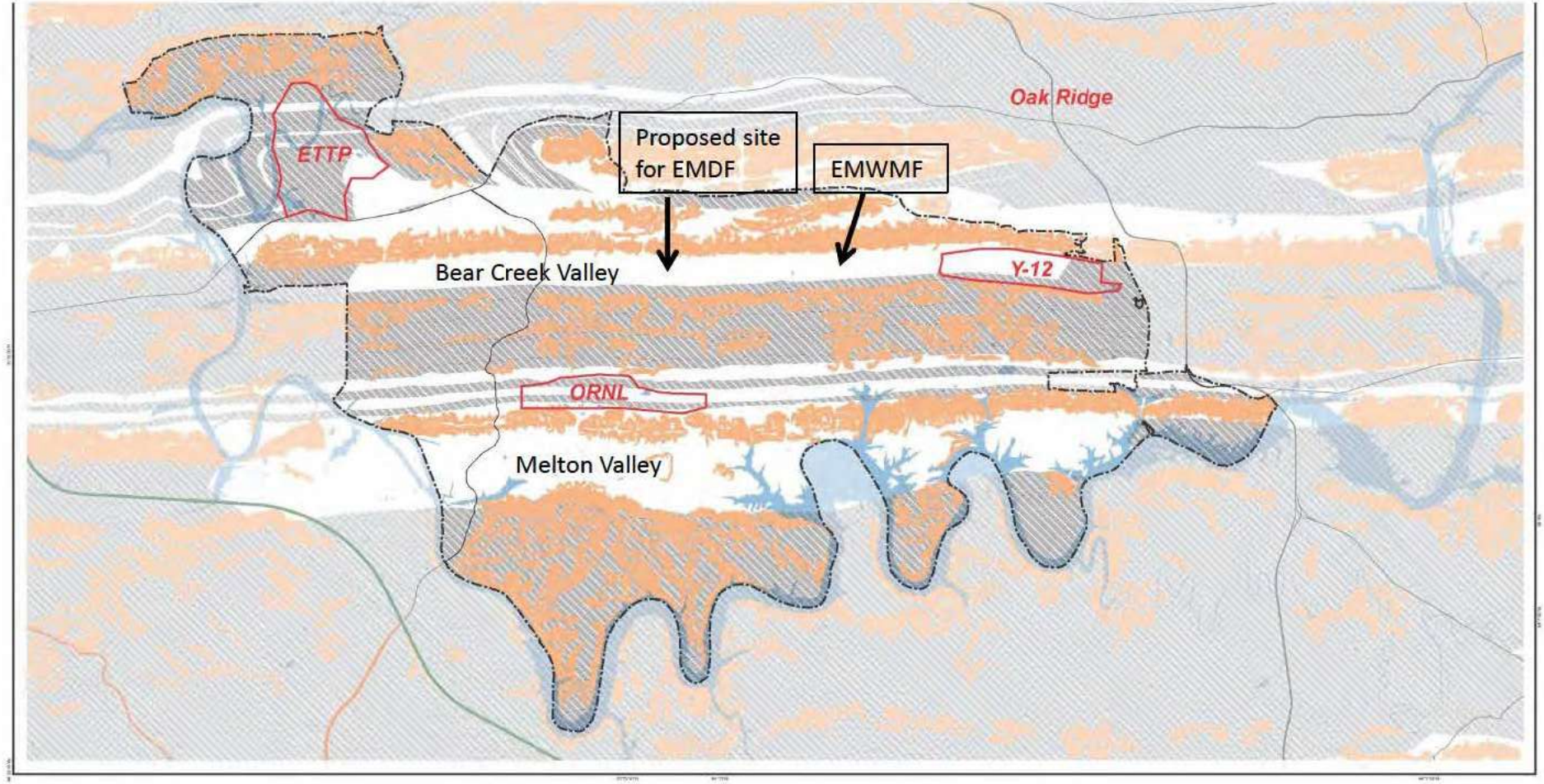
Radioactive waste generated from plant operations is now shipped off site for disposal, but large volumes of waste generated by cleanup activities in Oak Ridge have been buried on site. Disposal of radioactive and hazardous waste was authorized through an agreement between DOE, EPA, and the State of Tennessee.

Radioactive waste in vaults in the Interim Waste Management Facility in Melton Valley near highway 95 in the late 1990s

In the 1980s and 1990s, DOE Orders and guidance led to efforts to isolate waste from the environment, but resulted in increased disposal cost

Demolition and remediation waste landfilled in 2002 at the Environmental Management Waste Management Facility (EMWMF)

ORNL studies as far back as the 1980s identified areas with steep slopes (orange) and areas of carbonate rocks that can develop caves and other karst features (hatched in gray) as poor candidates for radioactive waste disposal. Even the areas that are less problematic for waste disposal (shown in white) have high water tables, many small streams, and are close to roads and property boundaries. Large quantities of radioactive waste were buried in some areas. Wastes disposed in Melton Valley contain millions of Curies of radioactivity. Millions of pounds of uranium are buried near the current disposal facility (EMWMF) in Bear Creek Valley.

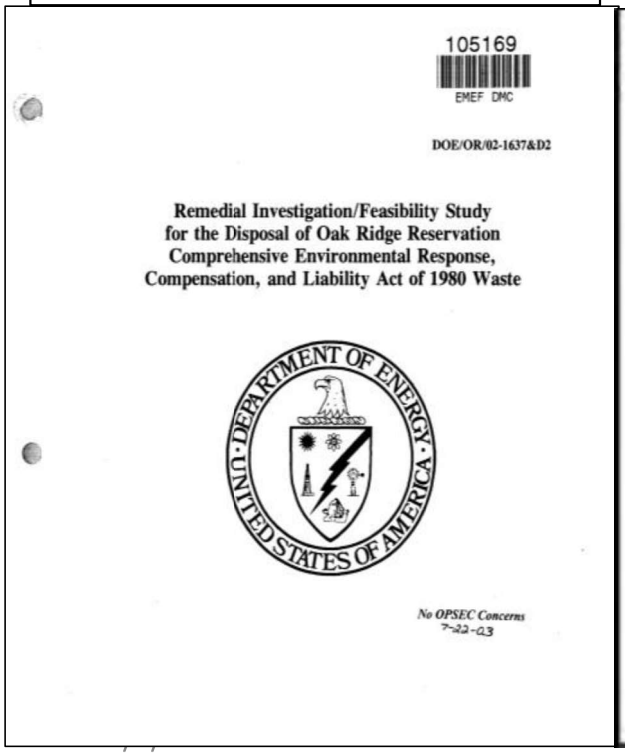


Preliminary Geologic Map of the Oak Ridge, Tennessee Area

Radioactive, hazardous, and toxic waste generated by demolition and remediation activities is currently disposed on site at the Environmental Management Waste Management Facility (EMWMF) in Bear Creek Valley. DOE sometimes refers to the EMWMF as a permitted landfill. This may be misleading. Although the EMWMF was authorized by agreement with regulatory agencies, it does not operate under a State or EPA permit for waste disposal. Instead, the authorization is implemented through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund, and associated laws and rules. These regulations deal with environmental cleanup rather than waste disposal. When the EMWMF was legally authorized, it was through a CERCLA Record of Decision (ROD) rather than a permit.

To obtain an actual permit for EMWMF, it would have been necessary to submit a permit application to a regulatory agency that could license the facility. The permit application would have provided information on the characteristics of the waste to be disposed, a detailed characterization of the site, and plans for facility design and closure. The CERCLA documents that should have provided most of the information normally in a permit application are the Remedial Investigation (typically used to report contaminant nature and extent and exposure pathways at a contaminated site) and the Feasibility Study (typically the basis for choosing a cleanup method).

Remedial Investigation Feasibility Study (RI/FS) - evaluates disposal options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EMEF DMC

DOE/OR/02-1637&D2

Remedial Investigation/Feasibility Study
for the Disposal of Oak Ridge Reservation
Comprehensive Environmental Response,
Compensation, and Liability Act of 1980 Waste

No OPSEC Concerns
7-22-03

Proposed Plan - summarizes the RI/FS information and identifies the preferred option

114297

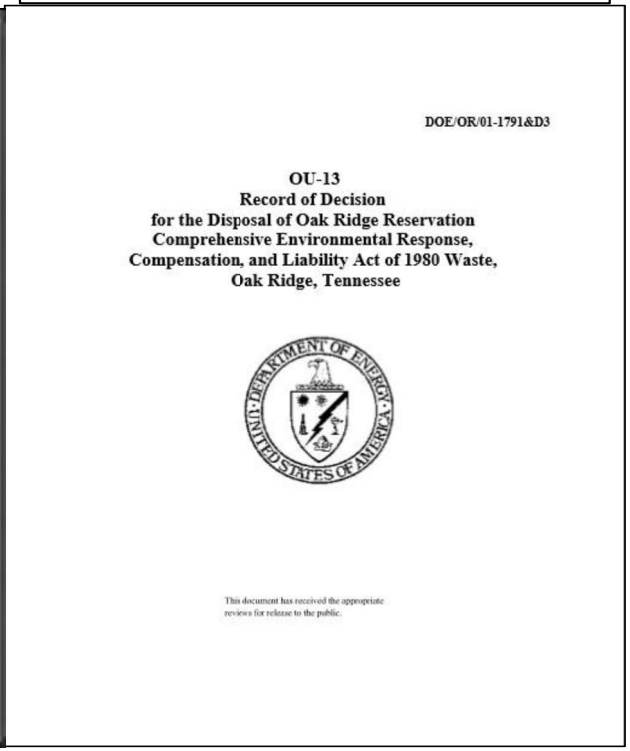
EMEF DMC

Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act of 1980 Waste

INTRODUCTION

EMEF DMC

Record of Decision - presents and describes the alternative chosen by DOE, EPA, and State


DOE/OR/01-1791&D3

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

This document has received the appropriate reviews for release to the public.

CERCLA provides a logical framework for evaluating environmental cleanup but must be adapted when used to authorize waste disposal. The EMWMF ROD was approved before some critical information was available, perhaps because the CERCLA process is not designed for approving a disposal facility. Because regulatory decisions were based on limited information, significant problems arose at EMWMF. Some of these problems have persisted. The most significant include:

- **Inadequate information was collected about site hydrogeology before deciding the landfill location, size, layout and design. This has led to groundwater intrusion into the facility buffer and liner.**

- **The need to treat large quantities of landfill wastewater was not anticipated, and requirements for wastewater treatment were not included in the ROD. Adequate facilities to manage wastewater were not built at EMWMF.**

- **EMWMF risks were evaluated assuming a restricted set of exposure pathways. Contaminant fate and transport modeling in the risk assessment was flawed. As a result, the landfill does not have reasonable limits on the inventory of some radionuclides.**

While Melton Valley and Bear Creek Valley have been considered to be the least problematic locations for radioactive waste disposal on the Oak Ridge Reservation, these areas have high water tables and areas of groundwater discharge that restrict their use for shallow disposal of radioactive waste. The EMWMF site was not studied enough to identify areas where groundwater is near the ground surface. The landfill was designed as if there was no shallow water table. As a result the facility footprint was moved uphill from its planned location, and a drain was built under the facility to suppress groundwater levels. Prior to construction of the EMWMF underdrain, modeling suggested that groundwater was in the clay liner beneath the disposal facility. Groundwater levels under some areas of the landfill remain uncertain, and some data indicate that the levels may remain in the buffer below the landfill liner.

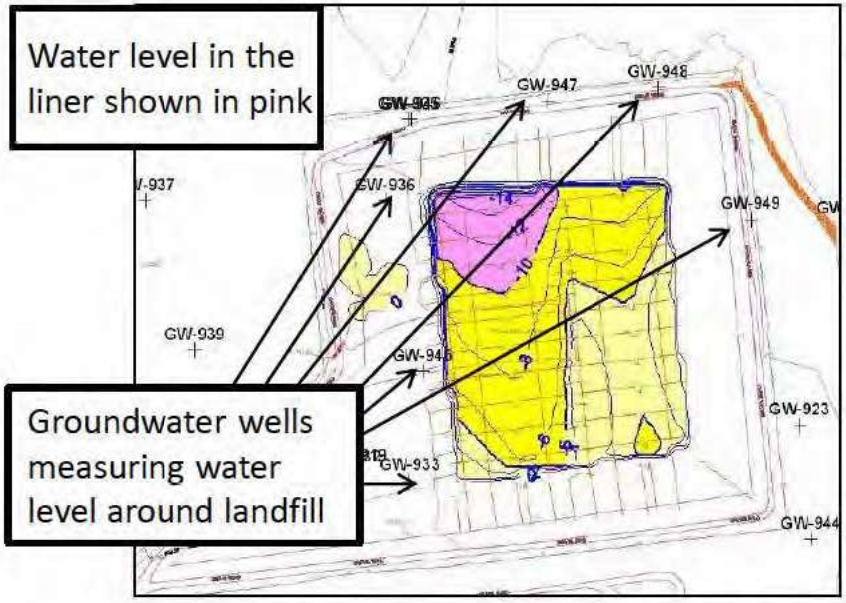


Fig. 9. Modeled hydrogeologic conditions prior to placement of the underdrain.

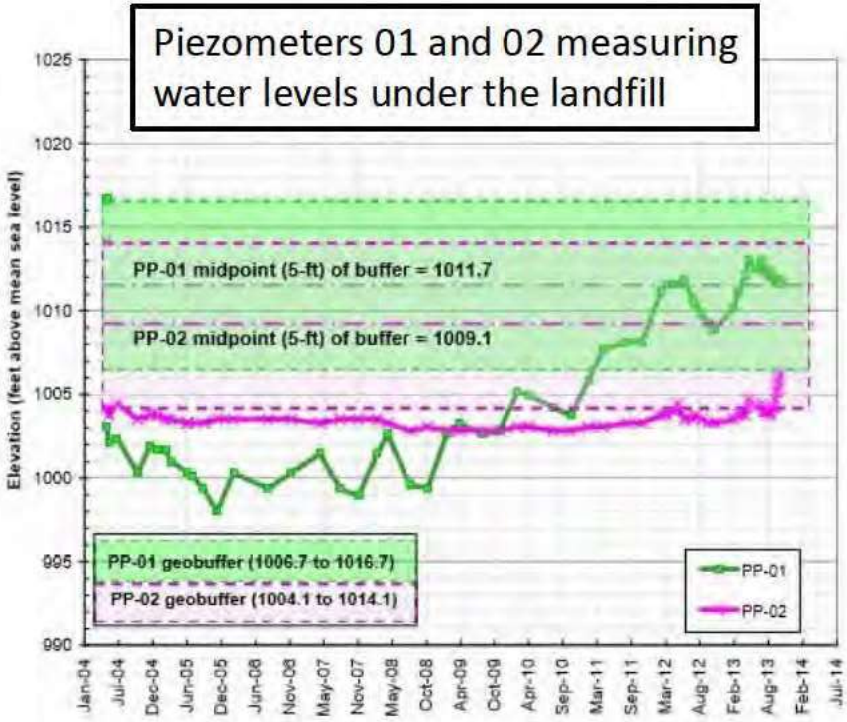
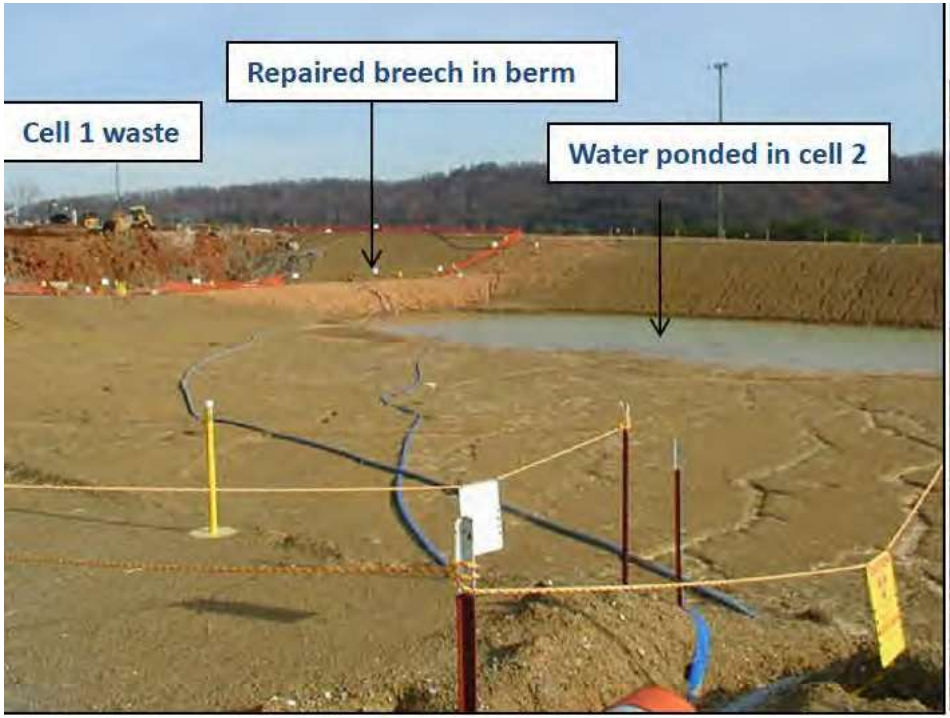
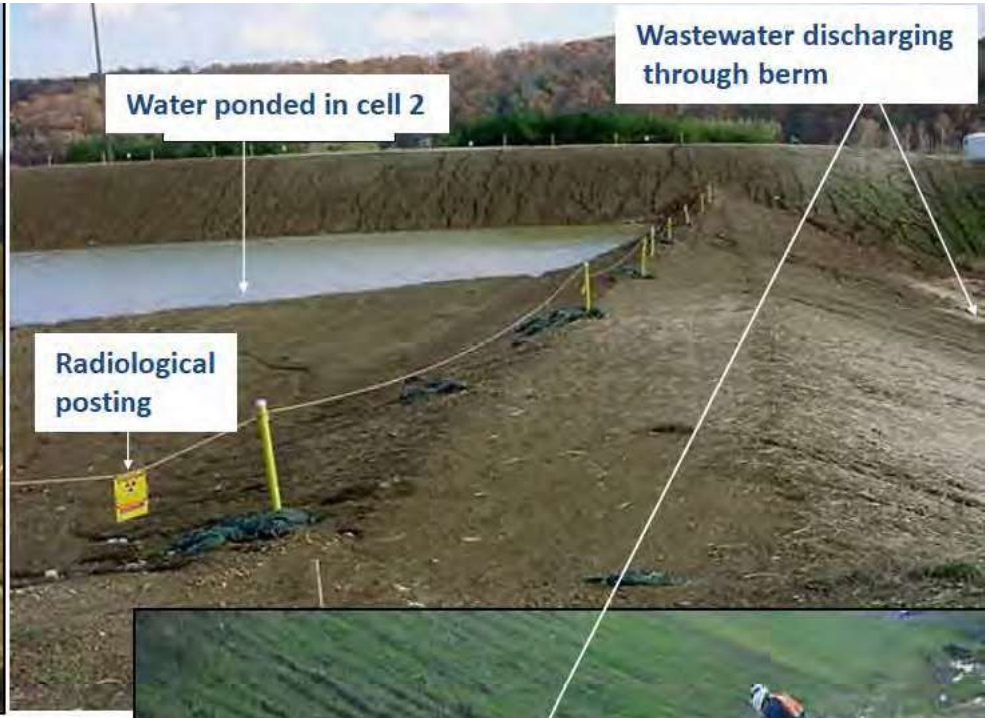


Fig. 6. Groundwater elevations over time for PP-01 and PP-02.

Figures from Engineering Feasibility Plan for the Elevated Groundwater Levels in the Vicinity of PP-01, EMWMF, Oak Ridge, Tennessee, UCOR 4517





The EMWMF was approved and constructed without adequate planning for wastewater management. In 2002, excessive generation of leachate and contaminated stormwater led to the flooding of Cell 1 and washout of the berm separating Cells 1 and 2. Wastewater pooled in Cell 2 and was directly released to the environment when it ran through a berm around the cell. The landfill operator was ultimately fined for this release, but the ROD that authorized the EMWMF has still not been modified to reflect the current practices of wastewater management at the facility.

The risk assessment for the EMWMF led to some absurd conclusions. Most hazardous chemicals and radionuclides present at Oak Ridge were alleged to never pose a significant risk, even if they were buried in the landfill without any limits on concentration or radioactivity. According to the risk analysis , waste acceptance limits were not necessary for waste contaminated with mercury, most fission products, and many transuranic radionuclides.

This analysis could not pass a reality check. DOE, EPA, and the State negotiated administrative limits. But even these limits allowed disposal of billions of Curies of fission products, comparable to the inventory of fission products proposed for the geologic repository for spent nuclear reactor fuel at Yucca Mountain. The administrative waste acceptance criteria (WAC) at EMWMF aren't based on a CERCLA site specific risk assessment and still don't make sense.

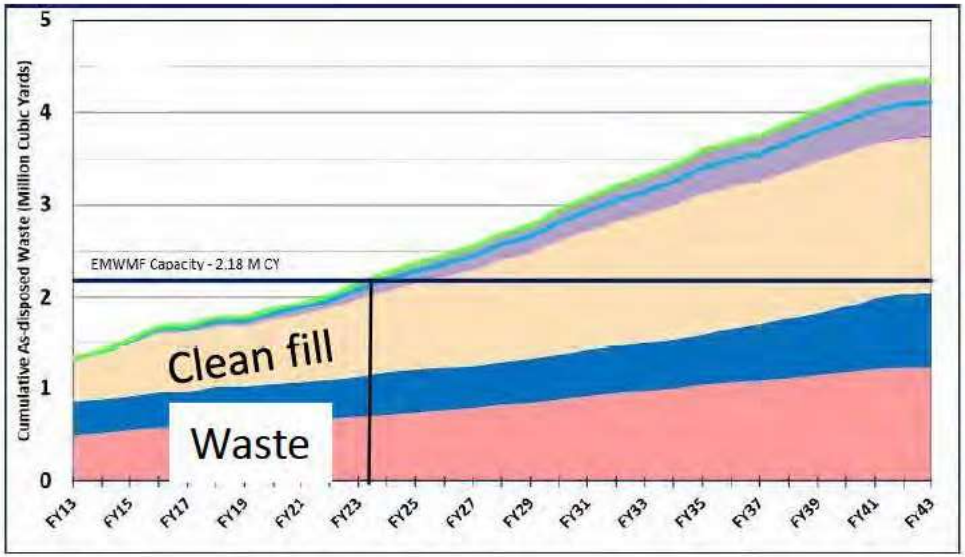
The failure to develop waste acceptance criteria (WAC) that would clearly protect human health and the environment and the failure to rigorously enforce the EMWMF WAC led to a number of problems, especially during the early years of operation. Examples include:

- **Liquid radioactive waste was not properly solidified and leaked onto a public highway during transport to EMWMF.**

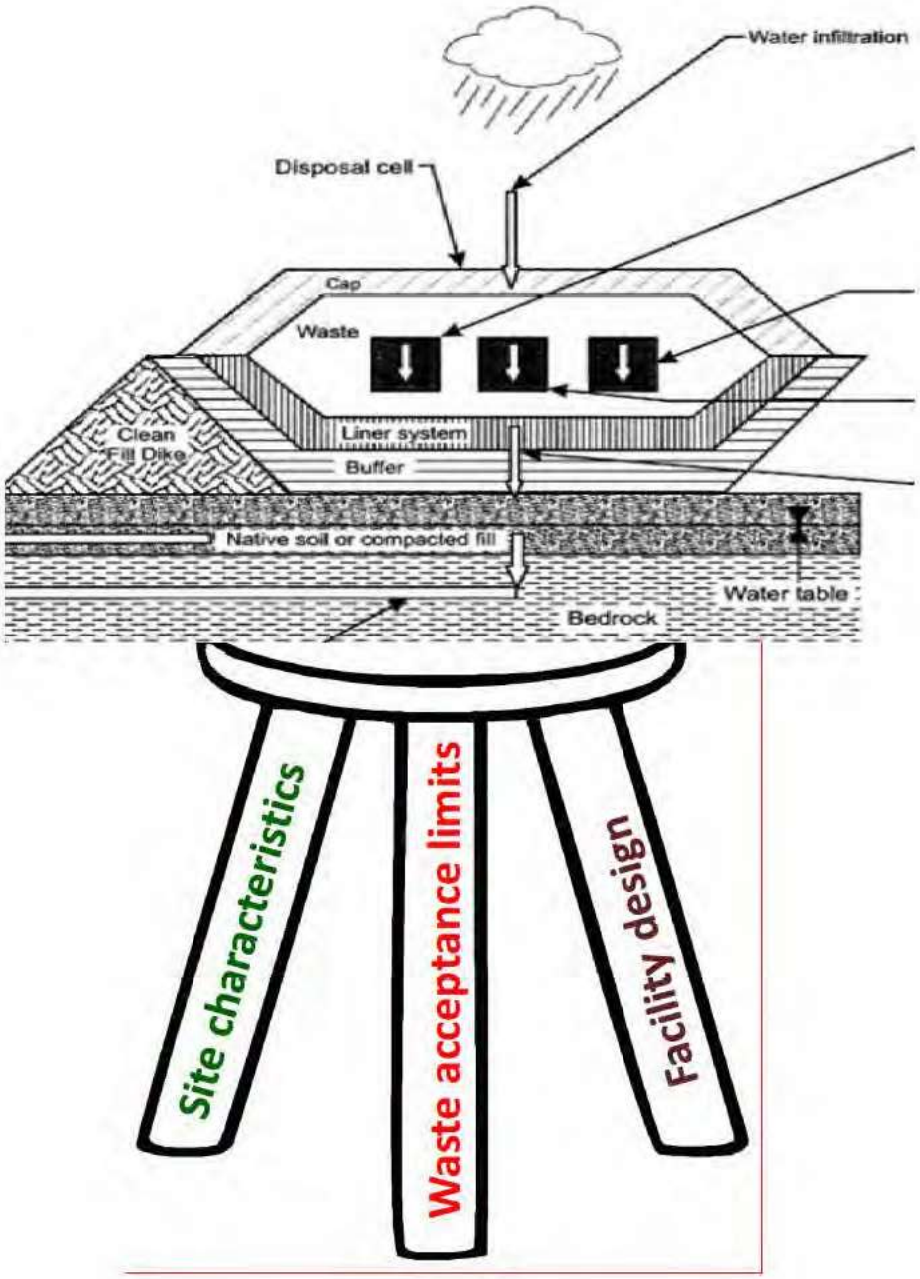
- **High activity waste was apparently buried in EMWMF in Waste Lot 84.4. This should have been disposed in a geologic repository like the one that was proposed at Yucca Mountain.**

- **Waivers of size requirements led to excessive use of clean soil to fill around large pieces of structural steel, wasting landfill capacity**

Radiation survey on Hwy. 95 after liquid waste leaked during transit (DOE/ORO-2183, Type B Accident Investigation Board Report).



Burial of large steel beams from the gaseous diffusion buildings such as K-33 without size reduction to meet the EMWMF physical WAC led to the need for excessive use of clean fill and loss of landfill capacity



Protection of human health and the environment from buried radioactive and hazardous waste depends primarily on:

- **Ability of the site to isolate contaminants from the environment**

  A site with desirable geologic and hydrologic characteristics can minimize the potential for a significant release indefinitely.

- **Waste limits**

  Limits on the amount of radioactive and hazardous material that can be disposed in the landfill will mitigate the effects of any release to the environment or any exposure of humans to contamination over both short and long timeframes.

- **Ability of engineered barriers to isolate contaminants from the environment**

  These barriers have proven to be quite effective for time scales of decades, but they may not be effective for longer periods.

The Oak Ridge Reservation does not provide good sites for radioactive waste disposal due to geologic, hydrologic, and demographic characteristics.

Protection of human health and the environment from wastes buried in Oak Ridge must rely on a robust facility design, adequate quality control during construction, careful operation of the landfill, and restrictions on the waste inventory.

At EMWMF, the facility design was compromised by inadequate site characterization. The facility was consequently built over, rather than around, areas with streams and shallow groundwater. Waste acceptance criteria were compromised due to limited evaluation of potential exposure pathways and inaccurate assumptions in the contaminant migration models that were fundamental to assessing the potential risks posed by the facility.

A CERCLA remedy selected to remediate contaminated sites is required to meet, at a minimum, two threshold criteria:

- **Protect human health and the environment**
- **Comply with applicable or relevant and appropriate regulations**

Did the "remedy" that became EMWMF meet the these criteria?

NO. For example, the landfill was built over an area of groundwater discharge, prohibited by rules for siting a radioactive waste disposal facility that are listed in the EMWMF Record of Decision.

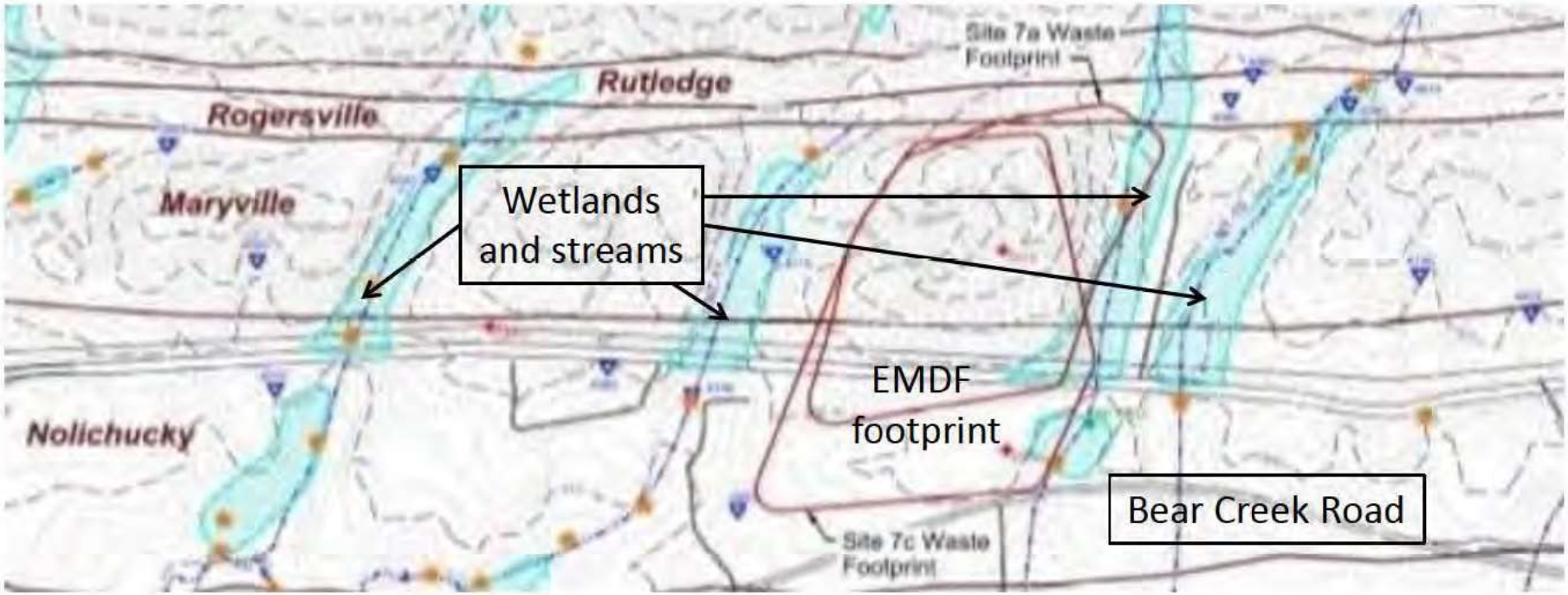
Will it nevertheless protect human health and the environment?

Maybe. People will find out sometime in the future.

But any new radioactive and hazardous waste disposal facility on the Oak Ridge Reservation should not repeat the same mistakes!

DOE now plans to build another radioactive and hazardous waste landfill in Bear Creek Valley, the Environment Management Disposal Facility (EMDF), and is asking for regulatory approval:

- **Without adequate site characterization to avoid areas where groundwater might intrude into the landfill buffer or liner**
- **Without waste acceptance limits based on a defensible risk assessment**
- **Without resolution of wastewater treatment issues**
- **Using cost savings that presume maximum economy of scale for on-site disposal as justification, despite uncertainties about the facility footprint and waste acceptance limits that may be driven by CERCLA requirements to protect human health and the environment and limit the landfill capacity**



How might the same mistakes be avoided?

More prescriptive rules and guidance from programs that are meant to regulate disposal of radioactive and hazardous waste should be incorporated into the CERCLA decision process.

Credible limits on the amount and concentration of hazardous chemicals and radionuclides that can be disposed in a landfill in Oak Ridge must be established and used to determine the volume of waste that should be buried on-site.

Before an alternative is chosen for on-site disposal, the site to be used for the landfill and the waste to be disposed should be characterized well enough to ensure it can be designed to protect human health and the environment.

Otherwise, the problem of contamination has not been solved, just moved to another place and time.

Attachment 2

Final Determination of Waste Lot 84.4

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FILE COPY

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DOE OVERSIGHT DIVISION
761 EMORY VALLEY ROAD
OAK RIDGE, TENNESSEE 37830-7072

April 3, 2012

Laura O. Wilkerson
Portfolio Federal Project Director
Oak Ridge National Laboratory Projects
U.S. Department of Energy
Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, TN 37831-8540

Final Determination of Waste Lot 84.4

Dear Ms. Wilkerson

References:
1.) Letter from John A. Owsley to Stephen H. McCracken, "Core Hole Eight Lot 84.4 Audit Findings," dated May 16, 2006.
2.) Letter from Stephen H. McCracken to Paul F. Clay, "Tennessee Department of Environment and Conservation Concerns about Environmental Management Waste Management Facility," dated May 19, 2006
3.) Letter from Stephen H. McCracken to John A. Owsley, "Response to the Tennessee Department of Environment and Conservation concerns related to Waste Lot 84.4," dated July 28, 2006.
4.) Letter from John A. Owsley to Laura O. Wilkerson, "Audit Waste lot 84.4 Findings and Required Actions," dated May 25, 2011.
5.) Letter from Laura O. Wilkerson to John A. Owsley, "Audit of Waste Lot 84.4: Findings and Required Actions," dated October 26, 2011.

The Tennessee Department of Environment and Conservation (TDEC) has received the Department of Energy (DOE) letter dated October 26, 2011. Based on as thorough review as possible given the available data, TDEC has made the following determinations:

1. TDEC does not contest the DOE assertion that the strategy used for characterization of Waste Lot 84.4 yields, on average, was a conservative assessment of the radionuclide inventories that contribute toward administrative waste acceptance limits at the Environmental Management Waste Management Facility (EMWMF). TDEC accepts DOE's position that a further recalculation of the sum-of-fractions is not necessary for Waste Lot 84.4.

2. In order to maintain an interpretation consistent with State of Tennessee (Rule 1200-02-11-.17-(6)), Nuclear Regulatory Commission (NRC) and DOE Order (DOE N 435.1) requirements,

radionuclide concentrations must be on a container basis for purposes of definition of wastes as TRU or GTCC. Containers should be sampled individually in cases such as Waste Lot 84.4, where much variability in TRU or GTCC radionuclide concentrations is indicated. In general, characterization should be adequate to assert with 95% confidence that no individual container will exceed TRU or GTCC limits. Since the audit of Waste Lot 84.4, the requirements of the administrative WAC for TRU and GTCC wastes have been interpreted on a container basis, and there has been increased diligence on the part of WAC attainment personnel to assure that no containers of potentially TRU or GTCC waste have been disposed. The incorporation of the following statement into EMWMF WAC Attainment Team Project Execution Plan will address this requirement. "Projects are admonished that the Tennessee waste classification is applied on a container-by-container basis. In instances where Class C waste is expected to be generated, profiles are required to discuss which portions of the waste lot are expected to be Class C waste, and the anomaly detection plan in Appendix A is required to discuss the specific methods that will be used to ensure no individual containers are greater than Class C wastes."

3. In the past, TDEC has expressed a desire to have the WAC attainment team contracted independently by DOE. In lieu of an independent WAC attainment team, TDEC will now require that the WAC Attainment Team participate in the DQO session(s) leading up to the creation of the Sampling and Analysis Plan (SAP) that becomes part of the WHP, as well as approve the DQOs that are developed for the SAP, and approve the subsequent SAP. These plans (in whole or in part) may be included in waste profiles as part of their CERCLA and other documentation. Regardless, waste profiles must provide sufficient information to independently evaluate any results generated or conclusions drawn regarding compliance with WAC attainment requirements. Although WHP sampling requirements should be viewed as necessary characterization requirements, these data may still be insufficient. Should data gaps be discovered either as a result of unexpected sample results or incomplete DQOs within the WHP (e.g., due to discovering new process knowledge), additional data will be required to meet the EMWMF DQOs.

The available evidence for evaluation to support these determinations includes:

- **1999 Soil Boring Data**
  The 1999 data from twelve IT soil borings that were distributed over the entire Tank W1-A excavation area. These data were submitted by letter to TDEC in 2002. They do not provide complete isotopic analysis and show some inconsistencies, but do reliably indicate that soils in the southern and eastern parts of the excavation area were not contaminated at levels approaching TRU or GTCC limits. They also provide evidence that the upper few feet of soil were generally much cleaner than soils 8-12 feet below ground surface. Soils from these cleaner regions of the excavation were primarily shipped off-site for disposal (~700 cubic yards) and as waste lot 84.3 (about 200 cubic yards), but some of these data may give an indication of the contents of some of the containers shipped as waste lot 84.4. Samples were taken from three borings that were within the excavated area but near the southern and eastern boundaries of the remaining material and Tank W1-A. Analytical data indicate that TRU limits were not reached at any depth in these borings, although some samples south of the tank had TRU constituents that exceeded 50 nCi/g.

- **1998 Soil Boring Data**
  Three samples from borings in 1998, including one composited from the top five feet of soil from two borings, another from five feet to refusal of these borings, and one from a discrete location about 12 feet below ground surface in the southernmost borehole. The discrete location was identified as having the highest surface radiological readings, but had lower analytical results for TRU constituents than the composite samples. The southernmost boring was also relatively close to the excavation boundary, and the data indicate the soil was neither TRU nor GTCC. These data were taken from the 1998 EECA for the Core Hole 8 Plume Source.

- **2006 Soil Boring Data**
  In 2006, 33 borings in the soils that remained after the excavation were collected. Of 53 total samples that were analyzed adequately to allow the TRU or GTCC contents to be assessed, 18 samples were taken from soils that lay between the tank and the surface of the excavation. The other samples were north and west of the tank. Analytical data indicated that four to six of the 18 samples (TW1A-SB23-A-01, TW1A-SB25-A-01, TW1A-SB35-A-01, TW1A-SB36-A-01, TW1A-SB44-A-01, and TW1A-SB46-B-01) should be classified as TRU, depending on whether alpha or gamma was used to quantify Americium 241. Likewise, 10 to 13 of the total 53 samples would exceed TRU limits. These data were provided by the Waste Acceptance Criteria (WAC) attainment team on request and locations were determined using the Oak Ridge Environmental Information System (OREIS) database. They were used by DOE to establish WAC attainment at Nevada National Security Site (NNSS) for the remaining soils at Tank W1-A, now being removed. Similarly, a ratio of Americium to total TRU constituents was used provide evidence of conservatism in the Waste Lot 84.4 estimate of the TRU and GTCC contents of nine shielded boxes that were disposed in EMWMF. The correlation between either Cesium 137 or Americium 241 and the plutonium isotopes in this data set is too poor, however, to provide much confidence that no box contained TRU or GTCC material. In addition, many of these samples came from north and west of the tank, some distance from the presumed source of soils that were disposed in EMWMF. While this is by far the largest usable data set available from the Tank W1-A area, it is probably not an ideal set with which to evaluate soils in lot 84.4.

- **2002 Grab Sample Data**
  In 2002, grab samples were obtained during excavation of "soils near the tank". While the precise location of these samples is not available in any documents TDCE has reviewed, the 2002 Removal Action Report states they came from Quadrant 1 of the excavation area, and the samples are likely to have been taken near the final boundary of the pit. Results from gamma spectroscopy on 31 samples and alpha spectroscopy on 9 samples were included in the waste profile for Waste Lot 84.4. Eight of the nine samples exceeded TRU limits. Containers of soil that yielded these samples were not sent to EMWMF, but other B12 boxes that exhibited less surface radiation were shipped in Waste Lot 84.4. Attempts were made to use scaling factors to estimate the radionuclide inventory of individual containers based on Cesium 137 results. Only Americium 241 and Cesium 137 results were available for soils representative of individual boxes that were shipped in the waste lot. Unfortunately, Cesium 137 correlated negatively with plutonium isotopes, the main contributors, with Americium 241, to TRU or GTCC in all samples. Using just these data and establishing a very weak linear correlation between plutonium isotopes and Americium 241, TDEC would infer that soils representative of Box BR-03S were TRU. Due to the spatial variability of Plutonium, and to a lesser degree, Americium, TDEC does not, however, propose that this set of soil samples is an adequate surrogate data set for soils actually shipped in Waste Lot 84.4. Nor does TDEC claim any validity for a statistical approach based on

these data that might be applied to predicting the contents of a given waste container in Waste Lot 84.4 such as BR-03S.

TDEC has attempted some statistical analyses of these data sets, individually and in combinations, and can only conclude that TRU concentrations in samples near the source area for Waste Lot 84.4 are highly variable. Looking at the approximately 30 samples (18 from 2006 soil borings, 1 from the older data set, and 12 from the 1999 borings) taken near the excavation boundary for which there are sufficient data to infer TRU content, it would appear that a composite of these samples would be neither TRU nor GTCC. There, are however, several analyses that indicate TRU and GTCC adjacent to excavated soils, and DOE has yet to present convincing evidence that the contents of every container in Waste Lot 84.4 was indeed low-level waste.

TDEC accepts that there may be other mitigating factors which reduce the chances that a TRU or GTCC container was disposed. In all probability, many of the B12 boxes that may have contained TRU soils were placed in storage and never shipped to EMWMF. Few samples showed TRU content greater than 200 nCi/g. If the contents of one or more containers were TRU, then if the gross weight of the container (including shielding in some cases) is used this might reduce the overall concentration of a waste package below TRU or GTCC limits. In addition, blending of cleaner soils from the top of the soil column with more contaminated soils below was used for dose reduction during excavation, and reduced the chances of the average concentration in a container exceeding the TRU or GTCC limits. One caveat to add, however, is that the efficacy of these factors depends on the spatial correlation of concentrations of radionuclides that comprise the TRU or GTCC lists with radionuclides responsible for dose as measured in the field. As stated before, these appear to be positively but weakly correlated due to variability in the data.

If you have any questions, please feel free to contact me at (865) 481-0995.

Sincerely

John A. Owsley

John Owsley
DOE Oversight

cc Arthur Collins, EPA
Jeff Crane, EPA
Dave Adler, DOE

jao1047a

APPENDIX A.
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

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Table A.1. Chemical-specific applicable or relevant and appropriate requirements for selected alternative

Media/chemical	Requirements	Prerequisite	Citation
Radionuclide emissions	Emissions of radionuclides (other than radon) to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/year. Radionuclide emission measurements shall be made at all release points which have a potential to discharge radionuclides into the air in quantities which could cause an effective does equivalent in excess of 1 percent of the standard. All radionuclides which could contribute greater than 10 percent of the potential effective dose equivalent for a release point shall be measured.	Radionuclide emissions from point sources at a DOE facility—**applicable**	40 *CFR* 61.92 40 *CFR* 61.93(b)(4)(i)
Radionuclide releases to the environment	Concentrations of radioactive material which may be released to the general environment in groundwater, surface water, air, soil, plants or animals must not result in an annual dose exceeding an equivalent of 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ of any member of the public.[12]. *NOTE: This requirement addresses radionuclide releases through all pathways. For the surface water pathway, landfill wastewater discharges must also meet the federal Clean Water Act, Tennessee Water Quality Control Act and other requirements that have been identified as relevant and appropriate to radionuclides in the wastewater discharge pursuant to the Dispute Resolution Decision regarding radiological discharges for landfill wastewater releases to the environment by the EPA Administrator on December 31, 2020. These requirements are listed as action-specific ARARs in Table A.3 under "Operation of an Onsite Landfill Wastewater Treatment System".*	Releases of radionuclides into the environment from an active licensed land disposal operation – **relevant and appropriate**	10 *CFR* 61.41 TDEC 0400-20-11-.16(2)
Radon releases to environment	No source at a DOE facility shall emit more than 20 picocuries per square meter per second (pCi/[m^2-sec]) (1.9 pCi/[ft^2-sec]) of radon-222 as an average for the entire source, into the air. This requirement will be part of any Federal Facilities Agreement reached between Environmental Protection Agency and DOE.	Radon releases to the environment at a DOE facility—**applicable**	40 *CFR* 61.192
Instream water quality criteria for release of landfill wastewater	Dissolved oxygen shall not be less than 5.0 mg/L. Substantial or frequent variations in dissolved oxygen levels, including diurnal fluctuations, are undesirable if caused by man-induced conditions. Diurnal fluctuations shall not be substantially different from the fluctuations noted in reference streams in the region. There shall always be sufficient dissolved oxygen present to prevent odors of decomposition and other offensive conditions. The pH value shall not fluctuate more than 1.0 unit over a period of 24 hours and shall not be outside the following ranges: 6.0–9.0.	Release of wastewater or effluents into surface water—**applicable** as instream criteria beyond the mixing zone	TDEC 0400-40-03-.03(3)(a) TDEC 0400-40-03-.03(4)(a) TDEC 0400-40-03-.03(5)(a) TDEC 0400-40-03-.03(6)(a) TDEC 0400-40-03-.03(3)(b) TDEC 0400-40-03-.03(4)(b) TDEC 0400-40-03-.03(5)(b) TDEC 0400-40-03-.03(6)(b)

[12] NOTE: Under these regulations, concentrations of radioactive material that may be released to the general environment in groundwater, surface water, air, soil, plants or animals must not result in an annual dose exceeding an equivalent of 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ of any member of the public with flexibility on apportionment of that dose among exposure pathways.

Table A.1. Chemical-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Media/chemical	Requirements	Prerequisite	Citation
Instream water quality criteria for release of landfill wastewater (cont.)	The hardness of or the mineral compounds contained in the water shall not impair its use for irrigation or livestock watering and wildlife.		TDEC 0400-40-03-.03(5)(c) TDEC 0400-40-03-.03(6)(c)
	There shall be no distinctly visible solids, scum, foam, oily slick, or the formation of slimes, bottom deposits, or sludge banks of such size or character that may be detrimental to fish and aquatic life or recreation or impair its use for irrigation or livestock watering and wildlife.		TDEC 0400-40-03-.03(3)(c) TDEC 0400-40-03-.03(4)(c) TDEC 0400-40-03-.03(5)(d) TDEC 0400-40-03-.03(6)(d)
	There shall be no turbidity, total suspended solids, or color in such amounts or of such character that will materially affect fish and aquatic life or result in any objectionable appearance to the water, considering the nature and location of the water.		TDEC 0400-40-03-.03(3)(d) TDEC 0400-40-03-.03(4)(d)
	The maximum water temperature shall not exceed 3 degrees C relative to an upstream control point. The temperature of the water shall not exceed 30.5 degrees C and the maximum rate of change shall be 2 degrees C per hour. There shall be no abnormal water temperature changes that may affect aquatic life unless caused by natural conditions. The temperature in flowing streams shall be measured at mid-depth. Temperature shall not interfere with its use for irrigation or livestock watering and wildlife purposes.		TDEC 0400-40-03-.03(3)(e) TDEC 0400-40-03-.03(4)(e) TDEC 0400-40-03-.03(5)(e) TDEC 0400-40-03-.03(6)(e)
	Waters shall not contain substances that will impart unpalatable flavor to fish or result in noticeable offensive odors in the vicinity of the water or otherwise interfere with fish or aquatic life.		TDEC 0400-40-03-.03(3)(f) TDEC 0400-40-03-.03(4)(g)
	Waters shall not contain substances or combination of substances including disease-causing agents which, by way of either direct exposure or indirect exposure through food chains, may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), physical deformations, or restrict or impair growth in fish or aquatic life or their offspring.	Release of wastewater or effluents into surface water—**applicable** as instream criteria beyond the mixing zone Point source discharge of radionuclides into surface water[13] – **relevant and appropriate**	TDEC 0400-40-03-.03(3)(g)
	Water shall not contain toxic substances that will render the water unsafe or unsuitable for water contact activities including the capture and subsequent consumption of fish and shellfish, or will propose toxic conditions that will adversely affect man, animal, aquatic life, or wildlife.		TDEC 0400-40-03-.03(4)(j)
	Water shall not contain other pollutants that will be detrimental to fish or aquatic life, or adversely affect the quality of the waters for recreation, irrigation, or livestock watering and wildlife.		TDEC 0400-40-03-.03(3)(h) TDEC 0400-40-03-.03(4)(k) TDEC 0400-40-03-.03(5)(f) and (g) TDEC 0400-40-03-.03(6)(f) and (g)

[13] NOTE: under TDEC 0400-40-03-.05 INTERPRETATION OF CRITERIA, mixing zones shall not apply to the discharge of bioaccumulative pollutants to waters of the state where the risk-based factors in Rule 0400-40-03-.03(4)(l) are exceeded for the pollutant group.

Table A.1. Chemical-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Media/chemical	Requirements	Prerequisite	Citation
Instream water quality criteria for release of landfill wastewater (cont.)	Water shall not contain iron at concentrations that cause toxicity or in such amounts that interfere with habitat due to precipitation or bacteria growth.		TDEC 0400-40-03-.03(3)(i)
	The concentration and 30-day average concentrations of ammonia shall not exceed the acute criterion and chronic criteria, respectively, calculated using the equations given in TDEC 0400-40-03-.03(3)(j).		TDEC 0400-40-03-.03(3)(j)
	Water shall not contain nutrients in concentrations that stimulate aquatic plant and/or algae growth to the extent that aquatic habitat is substantially reduced and/or biological integrity fails to meet regional goals or that the public's recreational uses of the water body or downstream waters are affected. Additionally, for waters classified for fish and aquatic life, the quality of downstream waters shall not be detrimentally affected. Interpretation of this provision may be made using the document Development of Regionally-based Interpretations of Tennessee's Narrative Nutrient Criterion and/or other scientifically defensible methods.		TDEC 0400-40-03-.03(3)(k) TDEC 0400-40-03-.03(4)(h)
	In waters classified for recreation, the concentration of the *e. coli* group shall not exceed 126 cfu per 100 mL as a geometric mean based on a minimum of 5 samples collected as specified in the regulation. The concentration of *e. coli* group in any individual sample shall not exceed 941 cfu per 100 mL.		TDEC 0400-40-03-.03(3)(l) TDEC 0400-40-03-.03(4)(f)
	Waters shall not be modified through the addition of pollutants or through physical alteration to the extent that diversity and/or productivity of aquatic biota within the receiving waters are substantially decreased or, in the case of wadeable streams, substantially different from conditions in reference streams in the same ecoregion. The parameters associated with this criterion are the aquatic biota measured. These are response variables.		TDEC 0400-40-03-.03(3)(m)
	Quality of stream habitat shall provide for development of a diverse aquatic community that meets regionally based biological integrity goals. Types of habitat loss include channel and substrate alterations, rock and gravel removal, stream flow changes, silt accumulation, precipitation of metals, and removal of riparian vegetation. For wadeable streams, instream habitat within each sub-ecoregion shall be generally similar to that found at reference streams. However, streams shall not be assessed as impacted by habitat loss if it has been demonstrated that the biological integrity goal has been met.		TDEC 0400-40-03-.03(3)(n)
	Stream flow shall support fish and aquatic life criteria and recreational use.		TDEC 0400-40-03-.03(3)(o) TDEC 0400-40-03-.03(4)(m)

Table A.1. Chemical-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Media/chemical	Requirements	Prerequisite	Citation
Antidegradation requirements	Effluent limitations may be required to insure [sic] compliance with the Antidegradation Statement in TDEC 0400-40-03-.06.	Point source discharge(s) of pollutants into waters of the U.S.—**applicable**	TDEC 0400-40-05-.10(4)
	New or increased discharges that would cause measurable degradation of the parameter that is unavailable shall not be authorized. Nor will discharges be authorized if they cause additional loadings of unavailable parameters that are bioaccumulative or that have criteria below current method detection levels. [14]	Waters with "unavailable"[as defined in TDEC 0400-40-03-.06(2)] parameters—**applicable**	TDEC 0400-40-03-.06(2)(a)
Antidegradation requirements (cont.)	No new or increased water withdrawals that will cause additional measurable degradation of the unavailable parameter shall be authorized. [15]		TDEC 0400-40-03-.06(2)(b)
	Where one or more of the parameters comprising the habitat criterion are unavailable, activities that cause additional degradation of the unavailable parameter or parameters above the level of de minimis shall not be authorized.		TDEC 0400-40-03-.06(2)(c)

ARAR = applicable or relevant and appropriate requirement
CFR = *Code of Federal Regulations*
CWA = Clean Water Act of 1972
DOE = U.S. Department of Energy
EMDF = Environmental Management Disposal Facility
PCB = polychlorinated biphenyl
TDEC = Tennessee Department of Environment and Conservation
U.S. = United States

[14] Tennessee determines whether a parameter is "unavailable" by referencing its CWA 303(d) list, available online. Based on the most recent (2020) report, Bear Creek is not meeting its designated recreational use for mercury and PCBs in fish, and nitrites/nitrates and cadmium in water. 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. This requirement will no longer be an ARAR if conditions improve, such that Bear Creek attains its designated use before EMDF begins discharging wastewater. If the currently "unavailable" parameters become "available" parameters under the rule, the new ARAR would be TDEC 0400-40-03-.06(3).
[15] The remedy does not involve water withdrawal.

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative

Location Resource	Requirements	Prerequisite	Citation
	Wetlands		
Presence of wetlands as defined in 10 *CFR* 1022.4	Incorporate wetland protection considerations into its planning, regulatory, and decision-making processes, and, to the extent practicable, minimize the destruction, loss, or degradation of wetlands; and preserve and enhance the natural and beneficial values of wetlands.	DOE actions that involve potential impacts to, or take place within wetlands—**applicable**	10 *CFR* 1022.3(a)(7) and (8)
	Undertake a careful evaluation of the potential effects of any proposed wetland action.		10 *CFR* 1022.3(b), (c), (d)
	Avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction of and occupancy and modification of wetlands. Avoid direct and indirect development in a wetland wherever there is a practicable alternative.		
	Identify, evaluate, and, as appropriate, implement alternative actions that may avoid or mitigate adverse wetland impacts.		
	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.		10 *CFR* 1022.13(a)(1)
	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 (§ 1022.4) 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.		10 *CFR* 1022.13(a)(2)
	Alternatives. Consider alternatives to the proposed action that avoid adverse impacts and incompatible development in a wetland area, including alternate sites, alternate actions, and no action. DOE shall evaluate measures that mitigate the adverse effects of actions in a wetland including, but not limited to, minimum grading requirements, runoff controls, design and construction constraints, and protection of ecologically sensitive areas.		10 *CFR* 1022.13(a)(3)
	If no practicable alternative to locating or conducting the action in the wetland is available, then before taking action design or modify the action in order to minimize potential harm to or within the wetland, consistent with the policies set forth in Executive Order 11990.		10 *CFR* 1022.14(a)

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Presence of jurisdictional wetlands as defined in 40 *CFR* 230.3, 33 *CFR* 328.3(a), and 33 *CFR* 328.4	No discharge of dredged or fill material into waters of the U.S., including jurisdictional wetlands, is permitted if there is a practical alternative that would have less adverse impact on the wetland or if it will cause or contribute significant degradation of waters of the U.S.	Actions that involve discharge of dredged or fill material into waters of U.S., including jurisdictional wetlands—**applicable**	40 *CFR* 230.10(a), (b), (c) and (d) 40 *CFR* 230, Subpart H
	Except as provided under [CWA] Sect. 404(b)(2), no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps [in accordance with 40 *CFR* 230.70 *et seq*. *Actions to Minimize Adverse Effects*] have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem. No discharge of dredged or fill material shall be permitted if it: Causes or contributes, after consideration of disposal site dilution and dispersion, to violations of any applicable State water quality standard; Violates any applicable toxic effluent standard or prohibition under Sect. 307 of the CWA: Jeopardizes the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or results in likelihood of the destruction or adverse modification of a habitat which is determined by the Secretary of Interior of Commerce, as appropriate, to be critical habitat under the Endangered Species Act of 1973, as amended. If an exemption has been granted by the Endangered Species Committee, the terms of such exemption shall apply in lieu of this subparagraph. Violates any requirement imposed by the Secretary of Commerce to protect any marine sanctuary designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972.		40 *CFR* 230.10(d) CWA Regulations – Sect. 404(b) Guidelines 40 *CFR* 230.10(b)
Mitigation of impacts to state wetlands as defined under TDEC 0400-40-07-.03	If an activity in a wetland results in an appreciable permanent loss of resource values, mitigation must be provided which results in no overall net loss of resource values from existing conditions. To the extent practicable, any required mitigation shall be completed, excluding monitoring, prior to, or simultaneous with, any impacts. Acceptable mitigation mechanisms include any combination of in-lieu fee programs, mitigation banks, or other mechanisms that are reasonably assured to result in no overall net loss of resource values from existing conditions. Acceptable mitigation methods are prioritized in the following order: restoration, enhancement, preservation, creation, or any other measures that are reasonably assured to result in no net loss of resource values from existing conditions. Compensatory measures must be at a ratio of 2:1 for restoration, 4:1 for creation and enhancement, and 10:1 for preservation, or at a best professional judgment ratio agreed to by the state.	Activity that would cause loss of wetlands as defined in TDEC 0400-40-07-.03—**applicable**	TDEC 0400-40-07-.04(7)(a) TDEC 0400-40-07-.04(7)(c)

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Presence of wetlands	Shall take action to minimize the destruction, loss or degradation of wetlands and to preserve and enhance beneficial values of wetlands. *NOTE:* Federal agencies required to comply with E.O. 11990 requirements. Shall avoid undertaking construction located in wetlands unless: (1) there is no practicable alternative to such construction, and (2) the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.	Federal actions that involve potential impacts to, or take place within, wetlands - **TBC**	Executive Order 11990 Section l.(a) *Protection of Wetlands* Executive Order 11990, Section 2.(a) *Protection of Wetlands*
Presence of Wetlands (as defined in 44 *CFR* 9.4)	The Agency shall minimize[16] the destruction, loss or degradation of wetlands. The Agency shall preserve and enhance the natural and beneficial wetlands values The Agency shall minimize: • Potential adverse impact the action may have on wetland values.	Federal *actions affecting or affected by Wetlands* as defined in 44 *CFR* 9.4 - **relevant and appropriate**	44 *CFR* 9.11(b)(2) and (b)(4) *Mitigation* 44 *CFR* 9.11(c)(3) *Minimization provisions*
General Compensatory Mitigation for Wetlands	Compensatory mitigation required to offset unavoidable impacts to waters of the United States authorized by DA permits. Compensatory mitigation requirements must be commensurate with the amount and type of impact that is associated with a particular DA permit. • Amount of required compensatory mitigation must be, to the extent practicable, sufficient to replace lost aquatic resource functions. • Compensatory mitigation may be provided through mitigation banks or in-lieu fee programs. • Implementation of the compensatory mitigation project shall be, to the maximum extent practicable, in advance of or concurrent with the impact-causing activity. *NOTE*: Although permits are not required per CERCLA Section 121(e)(1), consultation with the USACE recommended to determine mitigation of any adverse impacts. Such mitigation would be performed as part of the remedial action.	Alteration of wetlands requiring compensatory mitigation to replace lost aquatic resource functions – **relevant and appropriate**	40 *CFR* 230.93(a)(1) *General compensatory mitigation requirements*
	Compensatory mitigation may be performed using the methods of restoration, enhancement, establishment, and in certain circumstances preservation. Restoration should generally be the first option considered because the likelihood of success is greater and the impacts to potentially ecologically important uplands are reduced compared to establishment, and the potential gains in terms of aquatic resource functions are greater, compared to enhancement and preservation.	Alteration of wetlands requiring compensatory mitigation to replace lost aquatic resource functions – **relevant and appropriate**	40 *CFR* 230.93 (a)(2)

[16] *Minimize* means to reduce to smallest amount or degree possible. 44 *CFR* 9.4 Definitions.

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
General Compensatory Mitigation for Wetlands (cont.)	All compensatory mitigation projects must comply with the standards in this part [40 *CFR* Part 230], if they are to be used to provide compensatory mitigation for activities authorized by DA permits, regardless of whether they are sited on public or private lands and whether the sponsor is a governmental or private entity. *NOTE:* Although permits are not required per CERCLA Section 121(e)(1), consultation with the USACE recommended to determine mitigation of any adverse impacts. Such mitigation would be performed as part of the remedial action.		40 *CFR* 230.93 (a)(3)
	Required compensatory mitigation should be located within the same watershed as the impact site and should be located where it is most likely to successfully replace lost functions and services, taking into account such watershed scale features as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources (including the availability of water rights), trends in land use, ecological benefits, and compatibility with adjacent land uses.		40 *CFR* 230.93 (b) *Type and location of mitigation*
	Project site must be ecologically suitable for providing the desired aquatic resource functions. In determining the ecological suitability of the compensatory mitigation project site, the district engineer must consider, to the extent practicable, the factors in subsections (i) thru (vi). Applicants should propose compensation sites adjacent to existing aquatic resources or where aquatic resources previously existed.		40 *CFR* 230.93 (d)(1) and (3) *Site selection*
	In general, in-kind mitigation is preferable to out-of-kind mitigation because it is most likely to compensate for the functions and services lost at the impact site. Except as provided in paragraph (e)(2) of this section, the required compensatory mitigation shall be of a similar type to the affected aquatic resource.		40 *CFR* 230.93 (e)(1) *Mitigation type*
	The amount of required compensatory mitigation must be, to the extent practicable, sufficient to replace lost aquatic resource functions. Where appropriate functional or condition assessment methods or other suitable metrics are available, these methods should be used where practicable to determine how much compensatory mitigation is required. If a functional or condition assessment or other suitable metric is not used, a minimum one-to-one acreage or linear foot compensation ratio must be used.		40 *CFR* 230.93 (f)(1) *Amount of compensatory mitigation*
	Implementation of the compensatory mitigation project shall be, to the maximum extent practicable, in advance of or concurrent with the activity causing the authorized impacts. The district engineer shall require, to the extent appropriate and practicable, additional compensatory mitigation to offset temporal losses of aquatic functions that will result from the permitted activity.		40 *CFR* 230.93 (m) *Timing*

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Compensatory Mitigation Planning	Prepare a mitigation plan addressing objectives, site selection, site protection, baseline information, determination of credits, mitigation work plan, maintenance plan, performance standards, monitoring requirements, long-term management, and adaptive management. *NOTE:* Plan would be part of CERCLA document, such as a Remedial Action Work Plan. Plan to include items described in 40 *CFR* 230.94(c)(2) through (c)(14).[17]	Alteration of wetlands requiring compensatory mitigation to replace lost aquatic resource functions – **relevant and appropriate**	40 *CFR* 230.94(c) *Mitigation Plan*
Compensatory Mitigation Performance Standards	The approved mitigation plan must contain performance standards that will be used to assess whether the project is achieving its objectives. Performance standards should relate to the objectives of the compensatory mitigation project, so that the project can be objectively evaluated to determine if it is developing into the desired resource type, providing the expected functions, and attaining any other applicable metrics (e.g., acres). Performance standards must be based on attributes that are objective and verifiable. Ecological performance standards must be based on the best available science that can be measured or assessed in a practicable manner. Performance standards may be based on variables or measures of functional capacity described in functional assessment methodologies, measurements of hydrology or other aquatic resource characteristics, and/or comparisons to reference aquatic resources of similar type and landscape position. The use of reference aquatic resources to establish performance standards will help ensure that those performance standards are reasonably achievable, by reflecting the range of variability exhibited by the regional class of aquatic resources as a result of natural processes and anthropogenic disturbances. Performance standards based on measurements of hydrology should take into consideration the hydrologic variability exhibited by reference aquatic resources, especially wetlands.	Alteration of wetlands requiring compensatory mitigation to replace lost aquatic resource functions – **relevant and appropriate**	40 *CFR* 230.95 (a) E*cological Performance Standards* 40 *CFR* 230.95 (b) *Ecological Performance Standards*
Compensatory Mitigation Project Monitoring	Monitoring the compensatory mitigation project site is necessary to determine if the project is meeting its performance standards, and to determine if measures are necessary to ensure that the compensatory mitigation project is accomplishing its objectives. Compensatory mitigation project monitoring period shall be sufficient to demonstrate that project has met performance standards, but not less than 5 years.	Alteration of wetlands requiring compensatory mitigation to replace lost aquatic resource functions – **relevant and appropriate**	40 *CFR* 230.96 (a) and (b) *Monitoring*

[17] If mitigation obligations will be met by securing credits from approved mitigation banks or in-lieu fee programs, mitigation plan need include only items described in Sect. 230.94(c)(5) and (c)(6), and name of mitigation bank or in-lieu fee program. 40 *CFR* 230.94(c)(1).

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Compensatory Mitigation Project Management	The aquatic habitats, riparian areas, buffers, and uplands that comprise the overall compensatory mitigation project must be provided long-term protection through real estate instruments or other available mechanisms, as appropriate. For government property, long-term protection may be provided through federal facility management plans or integrated natural resources management plans. *NOTE:* Plan would be part of CERCLA document, such as a Remedial Action Work Plan and/or Operations and Maintenance Plan.	Alteration of wetlands on *government property* requiring compensatory mitigation to replace lost aquatic resource functions – **relevant and appropriate**	40 *CFR* 230.97 (a)(1) *Site Protection*
	Projects shall be designed, to the maximum extent practicable, to be self-sustaining once performance standards have been achieved. This includes minimization of active engineering features (e.g., pumps) and appropriate siting to ensure that natural hydrology and landscape context will support long-term sustainability. Where active long-term management and maintenance are necessary to ensure long-term sustainability (e.g., prescribed burning, invasive species control, maintenance of water control structures, easement enforcement), the responsible party must provide for such management and maintenance.		40 *CFR* 230.97 (b) *Sustainability*
Minor alterations to wetlands	Minor alteration to wetlands must be conducted in accordance with the requirements of the ARAP Program (TDEC 0400-40-07). The substantive general permit requirements for minor alteration to wetlands include the following: • Excavation and fill activities associated with wetland alteration shall be kept to a minimum • Wetlands outside of the impact areas shall be clearly marked with signs, high visibility fencing, or similar structures so that all the work performed by the contractor is solely within the permitted impact area. • Wetland alterations shall not cause measureable degradation to resource values and classified uses of hydraulically connected wetlands or other waters of the state, including disruption of sustaining surface or groundwater hydrology. • Temporary impacts to wetlands shall be mitigated by the removal and stockpiling of the first 12 in. of topsoil, prior to construction. Temporary wetland crossings or haul roads shall utilize timber matting. Gravel, riprap or other rock is not approved for construction of temporary crossings or haul roads across wetlands. Upon completion of construction activities, all temporary wetland impact areas are to be restored to pre-construction contours, and the stockpiled topsoil spread to restore these areas to pre-construction elevation. Other side-cast material shall not be placed within the temporary impact locations. Permanent vegetative stabilization using native species of all disturbed areas in or near the wetland must be initiated within 14 days of project completion. Non-native, non-invasive annuals may be used as cover crops until native species can be established.	Minor alterations of up to 0.10 acre of moderate resource value wetlands or of up to 0.25 acre of degraded and of low resource value wetlands — **applicable**	*TCA* 69-3-108(l) TDEC 0400-40-07-.01 TDEC ARAP General Permit for Minor Alterations to Wetlands (effective April 7, 2020) (**TBC**)

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Minor alterations to wetlands	• Erosion prevention and sediment control measures such as fences shall be removed following completion of construction. • The amount of fill, stream channel and bank modifications, or other impacts associated with the activity shall be limited to the minimum necessary to accomplish the project purpose. Shall utilize the least impactful practicable method of construction. • Clearing, grubbing, or other disturbance to wetland vegetation shall be kept at the minimum. Unnecessary native vegetation removal, including tree removal, and soil disturbance is prohibited. Native wetland vegetation must be reestablished in all areas of disturbance outside of any permanent structure after work is completed. • Activity may not result in a disruption or barrier to the movement of fish or other aquatic life and wetland dependent species upon project completion. • Blasting within 50 ft of any jurisdictional stream or wetland is prohibited. • Where practicable, all activities shall be accomplished during drier times of the year or when recent conditions have been dry at the impact location. All surface water flowing towards or from the construction activity shall be diverted using cofferdams and/or berms constructed of sandbags, steel sheeting, or other non-erodible, non-toxic material. All such diversion materials shall be located outside the wetland and removed upon completion of the work. Activities may be conducted in the water if working in the dry will likely cause additional degradation. If work is conducted in the water it must be of a short duration and with minimal impact. • All activities must be carried out in such a manner as will prevent violations of water quality criteria or impairment of the designated uses of the waters of the state • Erosion and sedimentation control shall be in place and functional before earthmoving operations begin and shall be designed according to the department's Erosion and Sediment Control Handbook. Permanent vegetation stabilization using native species of all disturbed areas in or near the stream channel must be initiated within 14 days of the project completion. Non-native, non-invasive annuals may be used as cover crops until native species can be established. • The use of monofilament-type erosion control netting or blanket is prohibited in the stream channel, stream banks, or any disturbed riparian areas within 30 ft of top of bank.		

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
	Floodplains		
Presence of floodplain as defined in 10 *CFR* 1022.4	Incorporate floodplain management goals into planning, regulatory, and decision-making processes, and, to the extent practicable, reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; restore and preserve natural and beneficial values served by floodplains; require the construction of DOE structures and facilities to be, at a minimum, in accordance with FEMA National Flood Insurance Program building standards; and promote public awareness of flood hazards by providing conspicuous delineations of past and probable flood heights on DOE property that is in an identified floodplain.	DOE actions that involve potential impacts to, or take place within, floodplains—**applicable**	10 *CFR* 1022.3(a)(1) through (6)
	Undertake a careful evaluation of the potential effects of any proposed floodplain action. Identify, evaluate, and, as appropriate, implement alternative actions that may avoid or mitigate adverse floodplain impacts.		10 *CFR* 1022.3(b) and (d)
	Avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. Avoid direct and indirect development in a floodplain wherever there is a practicable alternative.		10 *CFR* 1022.3(c)
	Consider alternatives to the proposed action that avoid adverse impacts and incompatible development in the floodplain, including alternate sites, alternate actions, and no action. DOE shall evaluate measures that mitigate the adverse effects of actions in a floodplain including, but not limited to, minimum grading requirements, runoff controls, design and construction constraints, and protection of ecologically sensitive areas.		10 *CFR* 1022.13(a)(3)
	If no practicable alternative to locating or conducting the action in the floodplain is available, then before taking action design or modify the action in order to minimize potential harm to or within the floodplain, consistent with the policies set forth in Executive Order 11988.		10 *CFR* 1022.14(a)
	Aquatic Resources		
Waters of the state as defined in *TCA* 69-3-103(45) – Bank stabilization	Bank stabilization activities along state waters must be conducted in accordance with the requirements of the ARAP Program (TDEC 0400-40-07). The substantive general permit requirements for stream bank stabilization include the following: • Any spraying, mowing, or other disturbance of the stabilization treatment that interferes with its ability to naturalize is prohibited. • Work performed by vehicles and other related heavy equipment may not be staged within the stream channel. Work performed by hand and related hand-operated equipment is allowed within the stream channel. • Materials used for bank stabilization shall consist of rock, wood, or products made specifically for use in earthen slope stabilization. Other salvaged materials not found in the natural environment cannot be used for bank stabilization.	Bank-stabilization activities affecting waters of the state—**applicable**	*TCA* 69-3-108(l) TDEC 0400-40-07-.01 TDEC ARAP General Permit for Bank Armoring and Vegetative Stabilization Activities (effective January 6, 2021) (**TBC**)

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Waters of the state as defined in *TCA* 69-3-103(45) – Bank stabilization (cont.)	• The amount of fill, stream channel and bank modifications, or other impacts associated with the activity shall be limited to the minimum necessary to accomplish the project purpose. Shall utilize the least impactful practicable method of construction. • Clearing, grubbing, or other disturbance to riparian vegetation shall be kept at the minimum necessary for slope construction and equipment operation. Unnecessary native riparian vegetation removal, including tree removal, is prohibited. Native riparian vegetation must be reestablished in all areas of disturbance outside of any permanent structure after work is completed. • Activity may not result in the permanent disruption to the movement of fish or other aquatic life upon project completion. • Blasting within 50 ft of any jurisdictional stream or wetland is prohibited. • Backfill activities must be accomplished in the least impactful manner possible that stabilizes the streambed and banks to prevent erosion. The completed activities may not disrupt or impound stream flow. • The use of monofilament-type erosion control netting or blanket is prohibited in the stream channel, stream banks, or any disturbed riparian areas within 30 ft of top of bank. • Where practicable, all activities shall be accomplished in the dry. All surface water flowing towards the work shall be diverted using cofferdams and/or berms constructed of sandbags, clean rock (no fines or soils), steel sheeting, or other non-erodible, non-toxic material. All such diversion materials shall be removed upon completion of the work. Any disturbance to the stream bed or banks must be restored to its original condition. Activities may be conducted in the water if working in the dry will likely cause additional degradation. If work is conducted in the water it must be of a short duration and with minimal impact and conform to the Division-approved methodology. • All activities must be carried out in such a manner as will prevent violations of water quality criteria or impairment of the designated uses of the waters of the state • Erosion and sedimentation control shall be in place and functional before earthmoving operations begin and shall be designed according to the department's Erosion and Sediment Control Handbook. Permanent vegetation stabilization using native species of all disturbed areas in or near the stream channel must be initiated within 14 days of the project completion. Non-native, non-invasive annuals may be used as cover crops until native species can be established. • Temporary stream crossings shall be limited to one point in the construction area and erosion control measures shall be utilized where stream bank vegetation is disturbed. Stream beds shall not be used as linear transportation routes for mechanized equipment, rather, the stream channel may be crossed perpendicularly with equipment provided no additional fill or excavation is necessary.		

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Waters of the state as defined in *TCA* 69-3-103(45) – Bank stabilization (cont.)	• Hard armoring bank stabilization treatment shall not exceed 300 linear ft for the treatment of one bank, or 200 linear ft per bank if the treatment includes both banks.		
Waters of the state as defined in *TCA* 69-3-103(45) – Culvert maintenance activities	The maintenance of existing serviceable structures or fills along waters of the state must be conducted in accordance with the requirements of the ARAP Program (TDEC 0400-40-07). The substantive general permit requirements for maintenance activities include the following: • The length of the pipe or culvert structure may not be increased in a manner that encapsulates any additional length of open stream or wetland • The capacity or diameter of the culvert may be increased during replacement, providing it does not result in channel widening or other channel destabilization • Dewatering of impoundments to conduct dam maintenance must be performed in a controlled manner designed to prevent the release of accumulated sediments into downstream waters. • All riprap associated with maintenance activities shall be placed to mimic the existing contours of the stream channel. Riprap shall be countersunk and placed at grade with the existing stream substrate. Voids in the riprap shall be filled with suitable bedload substrate to prevent stream flow loss within riprap areas. Suitable substrate does not include soil. • Work performed by vehicles and other heavy equipment may not be staged within the stream channel. Work performed by hand and related hand-operated equipment is allowed within the stream channel. • The amount of fill, stream channel and bank modifications, or other impacts associated with the activity shall be limited to the minimum necessary to accomplish the project purpose. Shall utilize the least impactful practicable method of construction. • Clearing, grubbing, or other disturbance to riparian vegetation shall be kept at the minimum necessary for slope construction and equipment operations. Unnecessary native riparian vegetation removal, including tree removal is prohibited. Native riparian vegetation must be reestablished in all areas of disturbance outside of any permanent structure after work is completed. • Widening of the stream channel is prohibited • Activity may not result in a permanent disruption to the movement of fish or other aquatic life upon project completion. • Blasting within 50 ft of any jurisdictional stream or wetland is prohibited.	Maintenance activities affecting waters of the state—**applicable**	*TCA* 69-3-108(l) TDEC 0400-40-07-.01 TDEC ARAP General Permit for Maintenance Activities (effective April 7, 2020) (**TBC**)

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Waters of the state as defined in *TCA* 69-3-103(45) – Culvert maintenance activities (cont.)	• Backfill activities must be accomplished in the least impactful manner possible that stabilizes the streambed and banks to prevent erosion. The completed activities may not disrupt or impound stream flow. • The use of monofilament-type erosion control netting or blanket is prohibited in the stream channel, stream banks, or any disturbed riparian areas within 30 ft of top of bank. • Where practicable, all activities shall be accomplished in the dry. All surface water flowing towards the work shall be diverted using cofferdams and/or berms constructed of sandbags, clean rock (no fines or soils), steel sheeting, or other non-erodible, non-toxic material. All such diversion materials shall be removed upon completion of the work. Any disturbance to the stream bed or banks must be restored to its original condition. Activities may be conducted in the flowing water if working in the dry will likely cause additional degradation. If work is conducted in the flowing water it must be of a short duration and with minimal impact and conform to the Division-approved methodology. • All activities must be carried out in such a manner as will prevent violations of water quality criteria or impairment of the designated uses of the waters of the state • Erosion and sedimentation control shall be in place and functional before earthmoving operations begin and shall be designed according to the department's Erosion and Sediment Control Handbook. Permanent vegetation stabilization using native species of all disturbed areas in or near the stream channel must be initiated within 14 days of the project completion. Non-native, non-invasive annuals may be used as cover crops until native species can be established. • Temporary stream crossings shall be limited to one point in the construction area and erosion control measures shall be utilized where stream bank vegetation is disturbed. Stream beds shall not be used as linear transportation routes for mechanized equipment, rather, the stream channel may be crossed perpendicularly with equipment provided no additional fill or excavation is necessary.		
Alteration of a Wet Weather Conveyance	Wet-weather conveyances may be altered provided the following conditions are met: • The activity must not result in the discharge of waste or other substances that may be harmful to humans or wildlife; • Material must not be placed in a location or manner so as to impair surface water flow into or out of any wetland area; and • Sediment shall be prevented from entering other waters of the state:	Activities that alter wet-weather conveyances— **applicable**	TCA 69-3-108(q)

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Alteration of a Wet Weather Conveyance (cont.)	• Erosion/sediment controls shall be designed according to size and slope of disturbed or drainage areas to detain runoff and trap sediment and shall be properly selected, installed, and maintained in accordance with manufacturer's specifications and good engineering practices. • Erosion/sediment control measures must be in place and functional before earthmoving operations begin, and must be constructed and maintained throughout the construction period. Temporary measures may be removed at the beginning of the work day, but shall be replaced at end of the work day. • Checkdams must be utilized where runoff is concentrated. Clean rock, log, sandbag or straw bale checkdams shall be properly constructed to detain runoff and trap sediment. Checkdams or other erosion control devices are not to be constructed in stream. Clean rock can be of various type and size depending on the application and must not contain fines, soils, or other wastes or contaminants. • Appropriate steps must be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the state. All spills shall be reported to the appropriate emergency management agency and TDEC. In event of a spill, measures shall be taken immediately to prevent pollution of waters of the state, including groundwater.		
Location encompassing aquatic ecosystem as defined as 40 *CFR* 230.3(c)	No discharge of dredged or fill material into an aquatic ecosystem is permitted if there is a practical alternative that would have less adverse impact on the aquatic ecosystem or if it will cause or contribute significant degradation of waters of the U.S. Except as provided under [CWA] Sect. 404(b)(2), no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps [in accordance with 40 *CFR* 230.70 *et seq*. *Actions to Minimize Adverse Effects*] have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.	Action that involves the discharge of dredged or fill material into "waters of the U.S.," including jurisdictional wetlands—**applicable**	40 *CFR* 230.10(a), and (c) CWA Regulations – Sect. 404(b) Guidelines 40 *CFR* 230.10(d) CWA Regulations – Sect. 404(b) Guidelines

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Location encompassing aquatic ecosystem as defined as 40 *CFR* 230.3(c) (cont.)	No discharge of dredged or fill material shall be permitted if it: Causes or contributes, after consideration of disposal site dilution and dispersion, to violations of any applicable State water quality standard; Violates any applicable toxic effluent standard or prohibition under Sect. 307 of the CWA: • Jeopardizes the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or results in likelihood of the destruction or adverse modification of a habitat which is determined by the Secretary of Interior of Commerce, as appropriate, to be critical habitat under the Endangered Species Act of 1973, as amended. If an exemption has been granted by the Endangered Species Committee, the terms of such exemption shall apply in lieu of this subparagraph. • Violates any requirement imposed by the Secretary of Commerce to protect any marine sanctuary designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972.		40 *CFR* 230.10(b)
Mitigation of impacts to a stream as defined in TDEC 0400-40-07-.03 which includes all surface water except wetlands and wet weather conveyances	If an activity in a stream results in an appreciable permanent loss of resource values, the applicant must provide mitigation which results in no overall net loss of resource values from existing conditions. To the extent practicable, any required mitigation shall be completed, excluding monitoring, prior to, or simultaneous with, any impacts. Acceptable mitigation mechanisms include any combination of in-lieu fee programs, mitigation banks, or other mechanisms that are reasonably assured to result in no overall net loss of resource values from existing conditions. Acceptable mitigation methods are prioritized in the following order: restoration, enhancement, preservation, creation, or any other measures that are reasonably assured to result in no net loss of resource values from existing conditions. Mitigation for impacts to streams must be developed in a scientifically defensible manner that demonstrates a sufficient increase in resource values to compensate for impacts. At a minimum, all new or relocated streams must include a vegetated riparian zone, demonstrate lateral and vertical channel stability, and have a natural channel bottom. All mitigation watercourses must maintain or improve flow and classified uses after mitigation is complete.	Activity that would result in an appreciable permanent loss of resource value of a stream as defined in TDEC 0400-40-07-.03 —**applicable**	TDEC 0400-40-07-.04(7)(a) TDEC 0400-40-07-.04(7)(b) 2019 Tennessee Stream Mitigation Guidelines (**TBC**) TDEC Stream Quantitative Tool Workbook (**TBC**)
Within area impacting stream or any other body of water *-and-* presence of wildlife resources (e.g., fish)	The effects of water-related projects on fish and wildlife resources and their habitat should be considered with a view to the conservation of fish and wildlife resources by preventing loss of and damage to such resources.	Action that impounds, modifies, diverts, or controls waters, including navigation and drainage activities— **relevant and appropriate**	Fish and Wildlife Coordination Act [16 *USC* 662(a)]

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
	Cultural Resources		
Presence of historical resources on public land	Federal agencies must take into account the effects of their undertakings on historic properties.	Federal agency undertaking that may impact historical properties listed or eligible for inclusion on the National Register of Historic Places—**applicable**	36 *CFR* 800.1(a)
	Determine whether the proposed federal action is an undertaking as defined in §800.16(y) and, if so, whether it is a type of activity that has the potential to cause effects on historic properties.		36 *CFR* 800.3(a)
	Determine and document the area of potential effects, as defined in §800.16(d). Review existing information on historic properties within the area of potential effects, including any data concerning possible historic properties not yet identified.		36 *CFR* 800.4(a)(1)–(2)
	Take the steps necessary to identify historic properties within the area of potential effects.		36 *CFR* 800.4(b)
	Apply the National Register criteria (36 *CFR* 63) to properties identified within the area of potential effects that have not been previously evaluated for National Register eligibility. If the agency official determines any of the National Register criteria are met and the SHPO/THPO agrees, the property shall be considered eligible for the National Register for Sect. 106 purposes.		36 *CFR* 800.4(c)(1)–(2)
	Shall apply the criteria of adverse effect to historic properties within the area of potential effects.		36 *CFR* 800.5(a)
	Shall ensure that a determination, finding, or agreement under the procedures in this subpart is supported by sufficient documentation to enable any reviewing parties to understand its basis.		36 *CFR* 800.11(a)
Presence of archaeological resources on public land	No person may excavate, remove, damage, or otherwise alter or deface, or attempt to excavate, remove, damage, or otherwise alter or deface any archaeological resource located on public lands or Indian lands unless such activity is pursuant to a permit issued under §7.8 or exempted by §7.5(b) of this part.	Action that would cause the irreparable loss or destruction of significant historic or archaeological resources or data on public land—**applicable**	43 *CFR* 7.4(a)
Presence of human remains, funerary objects, sacred objects, or objects of cultural patrimony	Intentional excavation of human remains, funerary objects, sacred objects, or objects of cultural patrimony from federal or tribal lands may be conducted only if: • The objects are excavated or removed following the requirements of the ARPA (16 *USC* 470aa et seq.) and its implementing regulations, and • The disposition of the objects is consistent with their custody as described in §10.6.	Action involving alteration of terrain that might cause irreparable loss or destruction of any discovered significant scientific, prehistoric, historic, or archaeological resources—**applicable**	43 *CFR* 10.3(b)(1) and (3)

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Presence of human remains, funerary objects, sacred objects, or objects of cultural patrimony (cont.)	Must take reasonable steps to determine whether a planned activity may result in the excavation of human remains, funerary objects, sacred objects, or objects of cultural patrimony from federal lands.		43 *CFR* 10.3(c)
	If inadvertent discovery occurred in connection with an on-going activity on federal or tribal lands, in addition to providing the notice described above, must stop activities in the area of the inadvertent discovery and make a reasonable effort to protect the human remains, funerary objects, sacred objects, or objects of cultural patrimony discovered inadvertently.	Excavation activities that inadvertently discover such resources on federal lands or under federal control—**applicable**	43 *CFR* 10.4(c)
	Must take immediate steps, if necessary, to further secure and protect inadvertently discovered human remains, funerary objects, sacred objects, or objects of cultural patrimony, including, as appropriate, stabilization or covering.		43 *CFR* 10.4(d)(ii)
Presence of a cemetery	Intentional desecration of a place of burial without legal privilege or authority to do so is prohibited.	Action that would alter or destroy property in a cemetery—**applicable**	*TCA* 39-17-311(a)(1)
	Disinterment of a corpse that has been buried or otherwise interred, without legal privilege or authority to do so, is prohibited.		*TCA* 39-17-312(a)(2)
Endangered, Threatened, or Rare Species			
Presence of federally endangered or threatened species, as designated in 50 *CFR* 17.11 and 17.12 or critical habitat of such species	Actions that jeopardize the existence of a listed species or results in the destruction or adverse modification of critical habitat must be avoided or reasonable and prudent mitigation measures taken.	Action that is likely to jeopardize fish, wildlife, or plant species or destroy or adversely modify critical habitat—**applicable**	16 *USC* 1531 et seq., Endangered Species Act Sect. 7(a)(2)
Presence of Tennessee-listed endangered or rare plant species as listed in TDEC 0400-06-02-.04	May not knowingly uproot, dig, take, remove, damage, destroy, possess, or otherwise disturb for any purposes any endangered species.	Action impacting rare plant species including but not limited to federally listed endangered species—**applicable**	16 *USC* 1531 et seq. *TCA* 70-8-309(a) TDEC 0400-06-02-.04 Tennessee Natural Heritage Program Rare Plant List (2016) (**TBC**)

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Presence of Tennessee non-game species as defined in *TCA* 70-8-103 and listed in TWRA Proclamations 00-14 and 00-15	May not take (i.e., harass, hunt, capture, kill or attempt to kill), possess, transport, export, or process wildlife species. May not knowingly destroy the habitat of such species. Certain exceptions may be allowed for reasons such as education, science, etc., or where necessary to alleviate property damage or protect human health or safety. Upon good cause shown and where necessary to protect human health or safety, endangered or threatened species or "in need of management" species may be removed, captured, or destroyed.	Action impacting Tennessee non-game species, including wildlife species which are "in need of management" (as listed in TWRA Proclamations 00-14 and 00-15 as amended by 00-21)—**applicable**	*TCA* 70-8-104(b) and (c) *TCA* 70-8-106(e) TWRA Proclamations 00-14, Sect. II and 00-15, Sect. II, as amended by Proclamation 00-21 **(TBC)**
Presence of migratory birds as defined in 50 *CFR* 10.13, and their habitats	Unlawful killing, possession, and sale of migratory bird species, as defined in 50 *CFR* 10.13, native to the U.S. or its territories is prohibited.	Action that is likely to impact migratory birds—**applicable**	16 *USC* 703-704
	Requirements are as follows: • 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

ARAP = aquatic resource alteration permit
ARPA = Archaeological Resources Protection Act
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR = Code of Federal Regulations
CWA = Clean Water Act of 1972
DA = Department of the Army
DOE = U.S. Department of Energy
FEMA = U.S. Federal Emergency Management Agency
SHPO = State Historic Preservation Officer
TBC = to-be-considered (guidance)
TCA = Tennessee Code Annotated
TDEC = Tennessee Department of Environment and Conservation
THPO = Tennessee Historic Preservation Officer
TWRA = Tennessee Wildlife Resources Agency
U.S. = United States
USACE = U.S. Army Corps of Engineers
USC = United States Code

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative

Action	Requirements	Prerequisite	Citation
	Siting		
Siting of a RCRA landfill	A new facility where treatment, storage, or disposal of hazardous waste will be conducted must not be located within 200 ft of a fault which has had displacement in Holocene time. A facility located in a 100-year floodplain [as defined in TDEC 0400-12-0 l-.06(2)(iii)] must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste, unless it can be demonstrated that procedures are in effect which will cause the waste to be removed safely, before flood waters can reach the facility.	Construction of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.18(a)(1) 40 *CFR* 264.18(b)(1) TDEC 0400-12-0 l-.06(2)(i)
Siting requirements for a TSCA Landfill	Shall be located in thick, relatively impermeable formations such as large area clay pans. Where this is not possible, the soil shall have a high clay and silt content with the following parameters: (i) In place soil thickness, 4-ft or compacted soil liner thickness, 3 ft; (ii) Permeability (cm/sec), equal to or less than 1×10^{-7}; (iii) Percent soil passing No. 200 Sieve, > 30; (iv) Liquid Limit, > 30; and (v) Plasticity Index > 15. The landfill must be located above the historical high groundwater table. Floodplains, shorelands, and groundwater recharge areas shall be avoided. The site shall have monitoring wells and leachate collection. There shall be no hydraulic connection between the site and standing or flowing surface water. The bottom of the landfill liner system or natural in-place soil barrier shall be at least 50 ft from the historical high water table. The landfill site shall be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping. *[NOTE: A waiver under TSCA 40 CFR 761.75(c)(4) is requested for (1) two portions of 40 CFR 761.75(b)(3) to address the hydraulic connection between the site and standing or flowing surface water and the requirement for an in-place soil barrier of at least 50 ft [other requirements of this citation will be met] and (2) 40 CFR 761.75(b)(5).]*	Construction of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(1) 40 *CFR* 761.75(b)(3) 40 *CFR* 761.75(b)(5)
TSCA waivers	An owner or operator of a chemical waste landfill may submit evidence to the Regional Administrator that operation of the landfill will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of paragraph (b) of this section are not met. On the basis of such evidence and any other available information, the Regional Administrator may in his discretion find that one or more of the requirements of paragraph (b) of this section is not necessary to protect against such a risk and may waive the requirements in any approval for that landfill. *[Note: Waiver of any technical requirement shall be made as part of the CERCLA Record of Decision process. The CERCLA remedy protectiveness standard will apply in addition to the TSCA standard.]*	Construction of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(c)(4)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Siting requirements and performance objectives for LLW disposal facility	Land disposal facilities must be sited, designed, operated, closed and controlled after closure so that reasonable assurance exists that exposures to humans are within the limits established in the performance objectives. *[NOTE: Performance Objectives are those given at TDEC 0400-20-11-.16(1), (2), (4), and (5).*	Construction of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.16(1)
	Stability of the site after closure. The disposal facility must be sited, designed, used, operated and closed to achieve long-term stability of the disposal site and to eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure so that only surveillance, monitoring or minor custodial care are required.	Construction of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.16(5)
	Disposal site shall be capable of being characterized, modeled, analyzed and monitored.	Construction of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(1)(b)
	Within the region where the facility is to be located, a disposal site should be selected so that projected population growth and future developments are not likely to affect the ability of the disposal facility to meet performance objectives. *[NOTE: Performance Objectives are those given at TDEC 0400-20-11-.16(1), (2), (4), and (5).]*	Construction of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(1)(c)
	Areas must be avoided having known natural resources which, if exploited, would result in failure of the cell to meet performance objectives. *[NOTE: Performance Objectives are those given at TDEC 0400-20-11-.16(1), (2), (4), and (5).]*	Construction of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(1)(d)
	Disposal site must be generally well drained and free of areas of flooding and frequent ponding, and waste disposal shall not take place in a 100- year floodplain or wetland.	Construction of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(1)(e)
	Upstream drainage area must be minimized to decrease the amount of runoff which could erode or inundate the disposal unit.	Construction of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(1)(f)
	The disposal site must provide sufficient depth to the water table that groundwater intrusion, perennial or otherwise, into the waste will not occur. If it can be conclusively shown that disposal site characteristics will result in molecular diffusion being the predominant means of radionuclide movement and the rate of movement will result in the performance objectives of Rules of the TDEC 0400-20-11-.16 being met, wastes may be disposed below the water table. In no case will waste disposal be permitted in the zone of fluctuation of the water table. *[NOTE: Performance Objectives are those given at TDEC 0400-20-11-.16(1), (2), (4), and (5).]*	Construction of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(1)(g)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Siting requirements and performance objectives for LLW disposal facility (cont.)	The hydrogeologic unit used for disposal shall not discharge groundwater to the surface within the disposal site. *[NOTE: An exception, variance or exemption to this requirement will be requested under TDEC 0400-20-04-.08.]*	Construction of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(1)(h)
Exemption of TDEC 0400-20-11-17(h) requirement	The Department may, upon application by any person or upon its own initiative, grant exemptions, variance, or exceptions from the requirements of these regulations which are not prohibited by statute and which will not result in undue hazard to public health and safety or property. *[NOTE: The exemption, variance or exception from the requirement shall be made as part of the CERCLA Record of Decision process. The CERCLA remedy protectiveness standard will apply in addition to the DRH standard.]*		TDEC 0400-20-04-.08
Siting requirements and performance objectives for LLW disposal facility (cont.)	Areas must be avoided where tectonic processes such as faulting, folding, seismic activity may occur with such frequency to affect the ability of the site to meet the performance objectives. *[NOTE: Performance Objectives are those given at TDEC 0400-20-11-.16(1), (2), 4), and (5).]*	Construction of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(1)(i)
	Areas must be avoided where surface geologic processes such as mass wasting, erosion, slumping, landsliding or weathering may occur with such frequency and extent to affect the ability of the disposal site to meet performance objectives or preclude defensible modeling and prediction of long-term impacts. *[NOTE: Performance Objectives are those given at TDEC 0400-20-11-.16(1), (2), (4), and (5).]*	Construction of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(1)(j)
	The disposal site must not be located where nearby activities or facilities could impact the site's ability to meet performance objectives or mask environmental monitoring. *[NOTE: Performance Objectives are those given at TDEC 0400-20-11-.16(1), (2), (4), and (5).]*	Construction of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(1)(k)
Siting of new commercial hazardous waste management facility	New land-based units are prohibited if they cannot demonstrate the technical practicability of a corrective action program at the site, based on the availability of current or new and innovative technologies that could practicably achieve groundwater remediation. The demonstration shall specify how a corrective action response will be effectively implemented to remediate a release to groundwater within the facility property boundary and shall illustrate all the factors that are necessary to be in compliance with Rule 0400-12-01-.06(6).	Construction of a new commercial hazardous waste management facility—**relevant and appropriate**	TDEC 0400-12-02-.03(2)(e)(1)(i)(III)
General Landfill Design			
Preparedness and prevention	Facilities must be designed, constructed, maintained, and operated to prevent any unplanned release of hazardous waste or hazardous waste constituents into the environment and minimize the possibility of fire or explosion. All facilities must be equipped with communication and fire suppression equipment and undertake additional measures, as specified in TDEC 0400-12-01-.06(3).	Operation of a RCRA hazardous waste facility—**applicable**	40 *CFR* 264.30-264.37 TDEC 0400-12-01-.06(3)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Site design for a LLW disposal facility	Site design features must be directed toward long-term isolation and avoidance of the need for continuing active maintenance after site closure.	Design of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(2)(a)
	Disposal site design and operation must be compatible with the disposal site closure and stabilization plan and lead to disposal site closure that provides assurance that the performance objectives will be met. *[NOTE: Performance Objectives are those given at TDEC 0400-20-11-.16(1), (2), (4), and (5).]*	Design of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(2)(b)
	Disposal site must be designed to complement and improve, where appropriate, the ability of the disposal site's natural characteristics to assure that the performance objectives will be met. *[NOTE: Performance Objectives are those given at TDEC 0400-20-11-.16(1), (2), (4), and (5).]*	Design of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(2)(c)
	Covers must be designed to minimize to the extent practicable water infiltration, to direct percolating or surface water away from the disposed waste and to resist degradation by surface geologic processes and biotic activity.	Design of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(2)(d)
	Surface features must direct surface water drainage away from disposal units at velocities and gradients which will not result in erosion that will require ongoing active maintenance in the future.	Design of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(2)(e)
	Disposal site must be designed to minimize to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal and the contact of percolating or standing water with wastes after disposal.	Design of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(2)(f)
	A buffer zone of land must be maintained between any disposal unit and the disposal boundary and beneath the disposed waste. The buffer zone shall be of adequate dimensions to carry out environmental monitoring activities specified in paragraph (4) of this rule and take mitigative measures if needed.	Design of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(3)(h)
Landfill Liner System and Geologic Buffer			
Liner design requirements for a TSCA landfill	Synthetic membrane liners shall be used when the hydrologic or geologic conditions at the landfill require such in order to achieve the permeability equivalent to the soils in paragraph (b)(1) of this section. Whenever a synthetic liner is used at a landfill site, special precautions shall be taken to insure [sic] that its integrity is maintained and that it is chemically compatible with PCBs. Adequate soil underlining and cover shall be provided to prevent excessive stress or rupture of the liner. The liner must have a minimum thickness of 30 mil.	Design of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(2)
Liner and leachate collection design for a RCRA landfill	The owner or operator of a landfill unit on which construction commences after January 29, 1992, must install two or more liners and a leachate collection and removal system above and between such liners.	Design of a RCRA landfill—**applicable**	40 *CFR* 264.301(c) TDEC 0400-12-01-.06(14)(b)(3)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Liner system for RCRA landfill	(i) The liner system must include: A. A top liner, designed and constructed of materials (e.g., geomembrane) to prevent the migration of hazardous constituents into the liner during active life and the post-closure period; and B. A composite bottom liner, consisting of at least two components. The upper component must be designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into this component during the active life and post-closure care period. The lower component must be designed and constructed of materials to minimize the migration of hazardous constituents if a breach in the upper component were to occur. The lower component must be constructed of at least 3 ft (91 cm) of compacted soil material with a hydraulic conductivity of no more than 1×10^{-7} cm/sec. (ii) Liners must comply with paragraphs (1)(i)(I), (II), and (III) of this section.	Design of a RCRA landfill—**applicable**	40 *CFR* 264.301(c)(1) TDEC 0400-12-01-.06(14)(b)(3)(i)(I)
Liner for a RCRA landfill	A liner that is designed, constructed, and installed to prevent any migration of wastes out of the landfill to the adjacent subsurface soil or groundwater or surface water at any time during the active life (including the closure period) of the landfill. The liner must be constructed of materials that prevent wastes from passing into the liner during the active life of the facility. The liner must be: (i) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with the waste or leachate to which they are exposed, climatic conditions, or stress from installation or daily operation; (ii) Placed on a foundation or base capable of supporting the liner and resistance to the pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift; and (iii) Installed to cover all surrounding earth likely to be in contact with waste or leachate.	Design of a RCRA landfill—**applicable**	40 *CFR* 264.301(a)(1) TDEC 0400-12-01-.06(14)(b)(1)(i)
Leachate collection and removal system	Must be designed, constructed, operated, and maintained to collect and remove leachate from the landfill during the active life and post-closure period and ensure that the leachate depth over the liner does not exceed 30 cm. The leachate collection and removal system must comply with TDEC 0400-12-01-.06(14)(b)(1)(ii)(I) and (II).	Design of a RCRA landfill—**applicable**	40 *CFR* 264.301(c)(2) TDEC 0400-12-01-.06(14)(b)(1)(ii)
Leak detection system	The leachate collection and removal system between the liners, and immediately above the bottom composite liner in the case of multiple leachate collection and removal systems, is also a leak detection system. This leak detection system must be capable of detecting, collecting, and removing leaks of hazardous constituents at the earliest practicable time through all areas of the top liner likely to be exposed to waste or leachate during the active life and post-closure care period. The requirements for a leak detection system in this paragraph are satisfied by installation of a system that is, at a minimum:	Design of a RCRA landfill—**applicable**	40 *CFR* 264.301(c)(3) TDEC 0400-12-01-.06(14)(b)(3)(iii)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Leak detection system (cont.)	(i) Constructed with a bottom slope of 1 percent or more; (ii) Constructed of granular drainage materials with a hydraulic conductivity of 1×10^{-2} cm/sec or more and a thickness of 12 in. (30.5 cm) or more; or constructed of synthetic or geonet drainage materials with a transmissivity of 3×10^{-5} m^2/sec or more; (iii) Constructed of materials that are chemically resistant to the waste managed in the landfill and the leachate expected to be generated, and of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes, waste cover materials, and equipment used at the landfill; (iv) Designed and operated to minimize clogging during the active life and post-closure care period; and (v) Constructed with sumps and liquid removal methods (e.g., pumps) of sufficient size to collect and remove liquids from the sump and prevent liquids from backing up into the drainage layer. Each unit must have its own sump(s). The design of each sump and removal system must provide a method for measuring and recording the volume of liquids present in sump and of liquids removed.		
Leak detection system action leakage rate	(1) The action leakage rate is the maximum design flow rate that the LDS can remove without the fluid head on the bottom liner exceeding l ft. The action leakage rate must include an adequate safety margin to allow for uncertainties in the design (e.g., slope, hydraulic conductivity, thickness of drainage material), construction, operation, and location of the LDS, waste and leachate characteristics, likelihood and amounts of other sources of liquids in the LDS, and proposed response actions. (2) To determine if the action leakage rate has been exceeded, the owner or operator must convert the weekly or monthly flow rate from the monitoring data obtained under TDEC 0400-12-01-.06(14)(d)(3) to an average daily flow rate (gallons per acre per day) for each sump.	Design of a RCRA landfill—**applicable**	40 *CFR* 264.302 TDEC 0400-12-01-.06(14)(c)
Geologic buffer	Underlying the liners shall be a geologic buffer which shall have: (i) A maximum hydraulic conductivity of 1.0×10^{-5} cm/s and measures at least 10 ft from the bottom of the liner to the seasonal high water table of the uppermost unconfined aquifer or the top of the formation of a confined aquifer or (ii) Have a maximum hydraulic conductivity of 1.0×10^{-6} cm/s and measures not less than 5 ft from the bottom of the 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 of a solid waste landfill—**relevant and appropriate**	TDEC 0400-11-01-.04(4)(a)(2)
	Stormwater Control for Landfill		
Run-on/runoff control systems	Run-on control system must be capable of preventing flow onto the active portion of the landfill during peak discharge from a 25-year storm event. Runoff management system must be able to collect and control the water volume from a runoff resulting from a 24-hour, 25-year storm event.	Design of a RCRA landfill—**applicable**	40 *CFR* 264.301(g) TDEC 0400-12-01-.06(14)(b)(7) 40 *CFR* 264.301(h) TDEC 0400-12-01-.06(14)(b)(8)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Run-on/runoff control systems (cont.)	If the landfill site is below the 100-year floodwater elevation, the operator shall provide surface water diversion dikes around the perimeter of the landfill site with a minimum height equal to 2 ft above the 100-year floodwater elevation. If the landfill site is above the 100-year floodwater elevation, the operators shall provide diversion structures capable of diverting all of the surface water runoff from a 24-hour, 25-year storm.	Design of a TSCA landfill—**applicable**	40 *CFR* 761.75(b)(4)(i) and (ii)
	Construction Requirements		
Activities causing fugitive dust emissions	Shall take reasonable precautions to prevent particulate matter from becoming airborne. Reasonable precautions shall include, but are not limited to the following: • Use, where possible, of water or chemicals for control of dust in demolition of existing buildings or structures, construction operations, grading of roads, or the clearing of land; • Application of asphalt, water, or suitable chemicals on dirt roads, materials stock piles, and other surfaces which can create airborne dusts; and • Shall not cause or allow fugitive dust to be emitted in such a manner to exceed 5 minute/hour or 20 minute/day beyond property boundary lines on which emission originates.	Use, construction, alteration, repair or demolition of a building, or appurtenances or a road or the handling, transport, or storage of material—**applicable**	TDEC 1200-3-8-.01(1) TDEC 1200-3-8-.01(1)(a) TDEC 1200-3-8-.01(1)(b) TDEC 1200-3-8-.01(2)
Activities causing stormwater runoff	Shall develop and implement stormwater management controls to ensure compliance with the terms and conditions of *General Permit No. TNR050000* ("Stormwater Multi-Sector General Permit for Industrial Activities") or any applicable site-specific permit. Shall develop and maintain a stormwater pollution prevention/control plan prepared in accordance with good engineering practices and with the factors outlined in 40 *CFR* 125.3(d)(2) or (3) as appropriate and any additional requirements listed in Part 11 for the particular sector of industrial activity. The plan shall identify potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges associated with industrial activity.	Existing and new stormwater discharges associated with industrial activity—**applicable**	*TCA* 69-3-108(e) through (j) *TCA* 69-3-108(l) TDEC 0400-40-10-.03(2)(a) *General Permit No. TNR05-0000,* Sector K (effective July 20, 2020) (**TBC**) *General Permit No. TNR050000,* Sect. 4 (**TBC**)
	Stormwater pollution prevention plans shall include, at a minimum, the items identified in *General Permit No. TNR050000 Sector K.3*, including a description of potential pollution sources, stormwater management measures and controls, preventive maintenance, spill prevention and response procedures, and sediment and erosion controls.	Stormwater discharges associated with industrial activity at hazardous waste treatment, storage or disposal facilities—**TBC**	*General Permit No. TNR050000 Sector K.3* (**TBC**)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Construction quality assurance	During construction or installation, liners and cover systems must be inspected for uniformity, damage and imperfections (e.g., holes, cracks, thin spots, etc.). Immediately after construction or installation: (1) Synthetic liners and covers must be inspected to ensure tight seams and joints and the absence of tears, punctures, or blisters; and (2) Soil-based and admixed liners and covers must be inspected for imperfections including lenses, cracks, channels, root holes, or other structural non-uniformities that may cause an increase in the permeability of the liner or cover.	Construction of a RCRA landfill—**applicable**	40 *CFR* 264.303(a) TDEC 0400-12-01-.06(14)(d)(1)
Construction of new outfall structure for discharge of wastewater	Construction of intake and outfall structures activities along state waters must be conducted in accordance with the requirements of the ARAP Program (TDEC 0400-40-07). The substantive general permit requirements for stream bank stabilization include the following: Construction, maintenance, repair, rehabilitation or replacement of intake or outfall structures shall be carried out in such a way that work: • Shall be located and oriented so as to avoid permanent alteration or damage to the integrity of the stream channel including the opposite stream bank. Alignment of the structure (except for diffusers) should be as parallel to the stream flow as is practicable, with the discharge pointed downstream. Underwater diffusers may be placed perpendicular to stream flow for more complex mixing. • Intake and outfall structures shall be designed to minimize harm and prevent impoundment of normal or base flows. • Velocity dissipation devices shall be placed as needed at discharge locations to provide a non-erosive velocity from the structure • Headwalls, bank stabilization materials, and any other hard armoring associated with the installation of each structure shall be limited to a total of 25 ft along the receiving stream bank. • The amount of fill, stream channel and bank modifications, or other impacts associated with the activity shall be limited to the minimum necessary to accomplish the project purpose. Shall utilize the least impactful practicable method of construction. • Clearing, grubbing, or other disturbance to riparian vegetation shall be kept at the minimum necessary for slope construction and equipment operations. Unnecessary native vegetation removal, including tree removal is prohibited. Native riparian vegetation must be reestablished in all areas of disturbance outside of any permanent structure after work is completed. • Widening of the stream channel is prohibited. • Activity may not result in a permanent disruption to the movement of fish or other aquatic life upon project completion.	Construction of intake and outfall structures in waters of the state—**applicable**	*TCA* 69-3-108(l) TDEC 0400-40-07-.01 TDEC General Permit for Construction of Intake and Outfall Structures (effective April 7, 2020) (**TBC**)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Construction of new outfall structure for discharge of wastewater (cont.)	• Blasting within 50 ft of any jurisdictional stream or wetland is prohibited. • Backfill activities must be accomplished in the least impactful manner possible that stabilizes the streambed and banks to prevent erosion. The completed activities may not disrupt or impound stream flow. • The use of monofilament-type erosion control netting or blanket is prohibited in the stream channel, stream banks, or any disturbed riparian areas within 30 ft of top of bank. • Where practicable, all activities shall be accomplished in the dry. All surface water flowing towards the work shall be diverted using cofferdams and/or berms constructed of sandbags, clean rock (containing no fines or soils), steel sheeting, or other non-erodible, non-toxic material. All such diversion materials shall be removed upon completion of the work. Any disturbance to the stream bed or banks must be restored to its original condition. Activities may be conducted in the flowing water if working in the dry will likely cause additional degradation. If work is conducted in the flowing water it must be of a short duration and with minimal impact and conform to the Division-approved methodology. • All activities must be carried out in such a manner as will prevent violations of water quality criteria or impairment of the designated uses of the waters of the state • Erosion and sedimentation control shall be in place and functional before earthmoving operations begin and shall be designed according to the department's Erosion and Sediment Control Handbook. Permanent vegetation stabilization using native species of all disturbed areas in or near the stream channel must be initiated within 14 days of the project completion. Non-native, non-invasive annuals may be used as cover crops until native species can be established. • Temporary stream crossings shall be limited to one point in the construction area and erosion control measures shall be utilized where stream bank vegetation is disturbed. Stream beds shall not be used as linear transportation routes for mechanized equipment, rather, the stream channel may be crossed perpendicularly with equipment provided no additional fill or excavation is necessary.		
Activities causing stormwater runoff (e.g., clearing, grading, excavation)	Implement good construction management techniques (including sediment and erosion, vegetative controls, and structural controls) in accordance with the substantive requirements of *General Permit No. TNR10-0000* and *TNR05-0000*, to ensure stormwater discharge is properly managed and: • Does not violate water quality criteria as stated in TDEC 0400-40-03-.03, including, but not limited to, prevention of discharge that cause a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of waters of the state for any designated uses for that water body by TDEC 0400-40-04; • Does not contain distinctly visible floating scum, oil, or other matter; • Does not cause an objectionable color contrast in the receiving stream; and	Stormwater discharges associated with construction activities that disturb ≥ 1 acre total—**relevant and appropriate**	*TCA* 69-3-108(1) Tennessee General Permit No. TNR10-0000, Sects. 5.3.2 and 5.4.1 (effective October 1, 2016) **(TBC)**

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Activities causing stormwater runoff (e.g., clearing, grading, excavation) (cont.)	• Results in no materials in concentrations sufficient to be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream. • Discharges that would cause measurable degradation of waters with unavailable parameters are not authorized. To be eligible to obtain and maintain coverage, must satisfy, at a minimum, the following additional requirements for discharges into waters with unavailable parameters for siltation and habitat alterations due to in-channel erosion: o Measures used at the site must be designed to control stormwater runoff generated by a 5-year, 24-hour storm event at a minimum. Additional physical or chemical treatment of stormwater runoff, such as use of treatment chemicals, may be necessary to minimize the amount of sediment being discharged when clay and other fine particle soils are found on sites.		
	Emissions and Effluents		
Control of emissions from a WWTU treatment system	Onsite remediation and treatment of contaminated water using air strippers is an exempted air contaminant source provided the emissions are no more than 5 tons per year of any regulated pollutant that is not a hazardous air pollutant and less than 1,000 lb per year of each hazardous air pollutant.	Emissions of air pollutants from new air contaminant sources—**applicable**	TDEC 1200-03-09-.04(4)(d)(24)
Activities causing stormwater runoff (e.g., during operations)	Shall develop and implement stormwater management controls to insure [sic] compliance with the terms and conditions of *General Permit No. TNR050000* ("Stormwater Multi-Sector General Permit for Industrial Activities") or any applicable site-specific permit and with TDEC 0400-40-10-.03(2)(c).	Stormwater discharges associated with industrial activity—**applicable**	*TCA* 69-3-108(e) through (j) *TCA* 69-3-108(l) TDEC 0400-40-10-.03(2)(a) TDEC 0400-40-10-.03(2)(c) *General Permit No. TNR050000*, Sector K (effective July 20, 2020) (**TBC** guidance)
	Shall develop and maintain a stormwater pollution prevention/control plan prepared in accordance with good engineering practices and with the factors outlined in 40 *CFR* 125.3(d)(2) or (3) as appropriate and any additional requirements listed in Part 11 for the particular sector of industrial activity. The plan shall identify potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges associated with industrial activity.		*General Permit No. TNR050000*, Sect. 4
	Stormwater pollution prevention plans shall include, at a minimum, the items identified in *General Permit No. TNR050000 Sector K.3*, including a description of potential pollution sources, stormwater management measures and controls, preventive maintenance, spill prevention and response procedures, and sediment and erosion controls.	Stormwater discharges associated with industrial activity at hazardous waste treatment, storage or disposal facilities—**TBC**	*General Permit No. TNR050000* Sector K.3

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
	Secondary Waste and Waste Acceptance Criteria Attainment		
Characterization of solid waste (e.g., contaminated PPE, equipment, spent filters)	Must determine if waste is hazardous waste or if waste is excluded under TDEC 0400-12-01-.02(1)(d); and Must determine if waste is listed under TDEC 0400-12-01-.02(4); or Must characterize waste by using prescribed testing methods or applying generator knowledge based on information regarding material or processes used.	Generation of solid waste as defined in TDEC 0400-12-01-.02(1)(b), and which is not excluded under TDEC 0400-12-01-.02(1)(d)(1)—**applicable**	40 *CFR* 262.11(a) and (b) TDEC 0400-12-01-.03(1)(b)(1) TDEC 0400-12-01-.03(1)(b)(2) 40 *CFR* 262.11(c) TDEC 0400-12-01-.03(1)(b)(3) 40 *CFR* 262.11(d) TDEC 0400-12-01-.03(1)(b)(4)
Characterization of hazardous waste	If waste is determined to be hazardous, must refer to TDEC 0400-12-01-.02, .05, .06, .09, .10, and .12 for possible exclusions or restrictions pertaining to management of the specific waste. Must obtain a detailed chemical and physical analysis of a representative sample of the waste(s) which at a minimum contains all the information which must be known to treat, store, or dispose of the waste in accordance with TDEC 0400-12-01-.06 and TDEC 0400-12-01-.10. Must obtain a detailed chemical and physical analysis of a representative sample of the waste(s) which at a minimum contains all the information which must be known to treat, store, or dispose of the waste in accordance with TDEC 0400-12-01-.06 and TDEC 0400-12-01-.10. Must determine if the waste meets the treatment standards in subparagraphs (3)(a), (3)(f), or (3)(j) of TDEC 0400-12-01-.10 by testing in accordance with prescribed methods or use of generator knowledge of waste. Must determine each EPA Hazardous Waste Number (Waste Code) to determine the applicable treatment standards under TDEC 0400-12-01-.10(3). Must determine the underlying hazardous constituents [as defined in TDEC 0400-12-01-.10(1)(b)(10)] in the waste.	Generation of RCRA hazardous waste for storage, treatment, or disposal—**applicable** Generation of RCRA characteristically hazardous waste (and is not D001 non-wastewaters treated by CMBST, RORGS, or POLYM of subparagraph (3)(c) of TDEC 0400-12-01-.10) for storage, treatment, or disposal—**applicable**	40 *CFR* 262.11(e) TDEC 0400-12-01-.03(1)(b)(5) 40 *CFR* 262.11(d)(2) TDEC 0400-12-01-.06(2)(d)(1) 40 *CFR* 264.13(a)(1) TDEC 0400-12-01-.06(2)(d)(1) 40 *CFR* 268.7(a) TDEC 0400-12-01-.10(1)(g)(1) 40 *CFR* 268.9(a) TDEC 0400-12-01-.10(1)(i)(1)
Management of hazardous waste onsite	A generator who treats, stores, or disposes of hazardous waste onsite must comply with the applicable [substantive] standards and requirements set forth in TDEC 0400-12-01-.05, .06, .07, and .09.	Generation of RCRA hazardous waste for storage, treatment, or disposal onsite—**applicable** if secondary wastes are determined to be hazardous	40 *CFR* 262.10, Note 2 TDEC 0400-12-01-.03(1)(a)(2)(i)(II)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Temporary storage of hazardous waste in containers onsite – "Satellite Accumulation Area"	A generator may accumulate as much as 55 gal of hazardous waste at or near any point of generation where wastes initially accumulate which is under the control of the operator of the process generating the waste provided: • If a container holding hazardous waste is not in good condition, or if it begins to leak, the generator must immediately transfer the hazardous waste from this container to a container that is in good condition and does not leak, or immediately transfer and manage the waste in a central accumulation area operated in compliance with Part (g)2 or (h)1 of this paragraph. • The generator must use a container made of or lined with materials that will not react with, and are otherwise compatible with, the hazardous waste to be accumulated, so that the ability of the container to contain the waste is not impaired. • A container holding hazardous waste must be closed at all times during accumulation, except when adding, removing, or consolidating waste: or, when temporary venting of a container is necessary for the proper operation of equipment or to prevent dangerous situations, such as build-up of extreme pressure. • Container must be marked or labeled with the words "Hazardous Waste" and an indication of the hazards of the contents.	Accumulation of 55 gal or less of RCRA hazardous waste at or near any point of generation—**applicable**	40 *CFR* 262.15(a)(1), (2), (4), and (5) TDEC 0400-12-01-.03(1)(f)(1)(i), (ii), (iv), and (v)
Temporary storage of hazardous waste in containers onsite – "90-Day Storage Area"	A generator may accumulate hazardous waste at the facility provided that: • The waste is placed in containers that comply with the air emission standards TDEC 0400-12-01-.05((27), (28), and (29); • If a container holding hazardous waste is not in good condition, or if it begins to leak, the generator must immediately transfer the hazardous waste from this container to a container that is in good condition, or immediately manage the waste in some other way that complies with the conditions for exemption of this part; • The generator must use a container made of or lined with materials that will not react with, and are otherwise compatible with, the hazardous waste to be stored, so that the ability of the container to contain the waste is not impaired; • A container holding hazardous waste must always be closed during accumulation, except when it is necessary to add or remove waste. A container holding hazardous waste must not be opened, handled, or stored in a manner that may rupture the container or cause it to leak. • Container must be marked or labeled with the words "Hazardous Waste", an indication of the hazards of the contents, and the date upon which each period of accumulation begins clearly visible for inspection on each container	Accumulation of RCRA hazardous waste onsite as defined in TDEC 0400-12-01-.01(2)(a)—**applicable**	40 *CFR* 262.17(a)(1)(i) through (iv) TDEC 0400-12-01-.03(1)(h)(1)(i)(I) through (IV) 40 *CFR* 262.17(a)(5)(i) TDEC 0400-12-01-.03(1)(h)(1)(v)(I)
Use and management of hazardous waste in containers	If container is not in good condition (e.g., severe rusting, structural defects) or if it begins to leak, must transfer waste into container in good condition. Use container made or lined with materials compatible with waste to be stored so that the ability of the container is not impaired.	Storage of RCRA hazardous waste in containers—**applicable**	40 *CFR* 264.171 TDEC 0400-12-01-.06(9)(b) 40 *CFR* 264.172 TDEC 0400-12-01-.06(9)(c)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Use and management of hazardous waste in containers (cont.)	Container holding hazardous waste must always be kept closed during storage, except to add/remove waste. Container holding hazardous waste must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak.		40 *CFR* 264.173(a) and (b) TDEC 0400-12-01-.06(9)(d)
Operation of a RCRA container area	Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or containers must be elevated or otherwise protected from contact with accumulated liquid.	Storage in containers of RCRA hazardous waste that do not contain free liquids—**applicable**	40 *CFR* 264.175(c) TDEC 0400-12-01-.06(9)(f)(3)
Storage of RCRA hazardous waste with free liquids in containers	Area must have a containment system designed and operated in accordance with TDEC 0400-12-01-.06(9)(f)(2) as follows: • A base must underlie the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed; • Base must be sloped or the containment system must be otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or precipitation, unless the containers are elevated or are otherwise protected from contact with accumulated liquids; • Must have sufficient capacity to contain 10 percent of the volume of containers or volume of largest container, whichever is greater; • Run-on into the system must be prevented unless the collection system has sufficient capacity to contain any run-on which might enter the system, along with the volume required for containers as listed immediately above; and • Spilled or leaked waste and accumulated precipitation must be removed from the sump or collection area in as timely a manner as is necessary to prevent overflow of the collection system.	Storage of RCRA hazardous waste with free liquids or storage of waste codes F020, F021, F022, F023, F026, and F027 that do not contain free liquids in containers—**applicable**	40 *CFR* 264.175(a) and (d) TDEC 0400-12-01-.06(9)(f)(1)-(2) 40 *CFR* 264.175(b)(1) TDEC 0400-12-01-.06(9)(f)(2)(i) 40 *CFR* 264.175(b)(2) TDEC 0400-12-01-.06(9)(f)(2)(ii) 40 *CFR* 264.175(b)(3) TDEC 0400-12-01-.06(9)(f)(2)(iii) 40 *CFR* 264.175(b)(4) TDEC 0400-12-01-.06(9)(f)(2)(iv) 40 *CFR* 264.175(b)(5) TDEC 0400-12-01-.06(9)(f)(2)(v)
Characterization and management of universal waste	A large quantity handler of universal waste must manage universal waste in accordance with [substantive requirements of] TDEC 0400-12-01-.12 in a way that prevents releases of any universal waste or component of a universal waste to the environment. Must label or mark the universal waste to identify the type of universal waste. A large quantity handler of universal waste must immediately contain all releases of universal wastes and other residues from universal wastes, and must determine whether any material resulting from the release is hazardous waste, and if so, must manage the hazardous waste in compliance with all applicable requirements.	Generation of universal waste [as defined in TDEC 0400-12-01-.12] for disposal—**applicable** Generation of universal waste [as defined in TDEC 0400-12-01-.12] for disposal—**applicable**	40 *CFR* 273 TDEC 0400-12-01-.12 40 *CFR* 273.34 TDEC 0400-12-01-.12(3)(e) 40 *CFR* 273.37 TDEC 0400-12-01-.12(3)(h)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Disposal of universal waste	The generator of the universal waste must determine whether the waste exhibits a characteristic of hazardous waste. If it is determined to exhibit such a characteristic, it must be managed in accordance with TDEC 0400-12-01-.01 through -.10. If the waste is not hazardous, the generator may manage and dispose of it in any way that is in compliance with applicable federal, state, and local solid waste regulations.	Generation of universal waste [as defined in TDEC 0400-12-01-.12] for disposal—**applicable**	40 *CFR* 273.33 TDEC 0400-12-01-.12(3)(d)
Management and storage of used oil	Used oil generators shall not store used oil in units other than tanks, containers, or units subject to regulation under TDEC 0400-12-01-.05 or -.06. Containers and aboveground tanks used to store used oil at generator facilities must be in good condition (no severe rusting, apparent structural defects, or deterioration) and not leaking (no visible leaks). Containers and aboveground tanks used to store used oil at generator facilities must be labeled or marked clearly with the words "Used Oil." Upon detection of a release of used oil to the environment, a generator must stop the release; contain, clean up, and properly manage the released used oil; and, if necessary, repair or replace any leaking used oil storage containers or tanks prior to returning them to service.	Generation and storage of used oil [as defined in TDEC 0400-12-01-.11(1)(a)] and possible release—**applicable**	40 *CFR* 279.22(a) TDEC 0400-12-01-.11(3)(c)(1) 40 *CFR* 279.22(b)(1) and (2) TDEC 0400-12-01-.11(3)(c)(2)(i) and (ii) 40 *CFR* 279.22(c)(1) and (2) TDEC 0400-12-01-.11(3)(c)(3)(i) and (ii) 40 *CFR* 279.22(d) TDEC 0400-12-01-.11(3)(c)(4)
Disposal of beryllium-containing waste and beryllium-contaminated equipment	Beryllium-containing waste, and beryllium-contaminated equipment and other items that are disposed of as waste, must be disposed of in sealed, impermeable bags, containers, or enclosures to prevent the release of beryllium dust during handling and transportation.	Preparation of beryllium-containing waste and beryllium-contaminated equipment for disposal - **applicable**	10 *CFR* 850.32(b)
Management of PCB waste (e.g., contaminated PPE, equipment, wastewater)	Any person storing or disposing of PCB waste must do so in accordance with 40 *CFR* 761, Subpart D. Any person cleaning up and disposing of PCBs shall do so based on the concentration at which the PCBs are found.	Generation of waste containing PCBs at concentrations ≥ 50 ppm—**applicable** Generation of PCB remediation waste as defined in 40 *CFR* 761.3—**applicable**	40 *CFR* 761.50(a) 40 *CFR* 761.61
Temporary storage of PCB waste (e.g., PPE, rags) in a container(s)	Storage area must be clearly marked as required by 40 CFR 761.40(a)(10). Any leaking PCB items and their contents shall be transferred immediately to a properly marked non-leaking container(s). Container(s) shall be in accordance with requirements set forth in DOT HMR at 49 *CFR* 171–180.	Storage of PCBs and PCB items at concentration ≥ 50 ppm for disposal—**applicable**	40 CFR 761.65(c)(3) 40 *CFR* 761.65(c)(5) 40 *CFR* 761.65(c)(6)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Disposal of containers of TSCA PCB wastes	Container(s) shall be marked as illustrated in 40 *CFR* 761.45(a).	Disposal of PCBs or PCB items in chemical waste landfill—**applicable**	40 *CFR* 761.40(a)(1)
Disposal of PCB cleaning solvents, abrasives, and equipment	May be reused after decontamination in accordance with 761.79.	Generation of PCB wastes from the cleanup of PCB remediation wastes—**applicable**	40 *CFR* 761.61(a)(5)(v)(B)
Risk-based disposal of PCB remediation waste or bulk product waste	May dispose of in a manner other than prescribed in 40 *CFR* 761.61(a) or (b) if approved in writing by EPA and method will not pose an unreasonable risk of injury to health or the environment.	Disposal of PCB remediation waste—**applicable**	40 *CFR* 761.61(c) 40 *CFR* 761.62(c)
Performance-based disposal of PCB remediation waste	Shall be disposed according to 40 *CFR* 761.60(a) or (e), or decontaminate in accordance with 40 *CFR* 761.79.	Disposal of liquid PCB remediation waste—**applicable**	40 *CFR* 761.61(b)(1)
	May dispose by one of the following methods: • In a high-temperature incinerator approved under 40 *CFR* 761.70(b); • By an alternate disposal method approved under 40 *CFR* 761.60(e); • In a chemical waste landfill approved under 40 *CFR* 761.75; • In a facility with a coordinated approval issued under 40 *CFR* 761.77; or • Through decontamination in accordance with 40 *CFR* 761.79.	Disposal of non-liquid PCB remediation waste [as defined in 40 *CFR* 761.3]—**applicable**	40 *CFR* 761.61(b)(2) 40 *CFR* 761.61(b)(2)(i) 40 *CFR* 761.61(b)(2)(ii)
Performance-based disposal of PCB bulk product waste	PCB bulk product waste may disposed of by one of the following: • In a chemical waste landfill approved under Sect. 761.75; • In a hazardous waste landfill permitted by EPA under §3004 of RCRA or by authorized state under §3006 of RCRA.	Disposal of PCB bulk product waste as defined in 40 *CFR* 761.3—**applicable**	40 *CFR* 761.62(a)(2) and (3)
Disposal of PCB decontamination waste and residues	Such waste shall be disposed of at their existing PCB concentration unless otherwise specified in 40 *CFR* 761.79(g)(1-6).	Generation of PCB decontamination waste and residues—**applicable**	40 *CFR* 761.79(g)
Disposal of decontaminated PCB wastes as non-TSCA wastes	Materials from which PCBs have been removed in accordance with the standards under 40 *CFR* 761.79(b) or to an alternate risk-based decontamination standard approved by EPA under 40 *CFR* 761.79(h)(5) are considered unregulated for disposal under Subpart D of TSCA.	Generation of PCB wastes, including water, organic liquids—**applicable**	40 *CFR* 761.79(a)(4)
Disposal of TSCA PCB wastes	PCBs and PCB items shall be placed in a manner that will prevent damage to containers or articles.	Disposal of PCBs or PCB items in chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(8)(i)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Disposal of TSCA PCB wastes (e.g., from drained electrical equipment)	Bulk liquids not exceeding 500 ppm PCBs may be disposed of provided such waste is pretreated and/or stabilized (e.g., chemically fixed, evaporated, mixed with dry inert absorbent) to reduce its liquid content or increase its solid content so that a non-flowing consistency is achieved to eliminate the presence of free liquids prior to final disposal. PCB container of liquid PCBs with a concentration between 50 and 500 ppm PCB may be disposed of if each container is surrounded by an amount of inert sorbent material capable of absorbing all of the liquid contents of the container.	Disposal of PCB container with liquid PCB between 50 ppm and 500 ppm into a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(8)(ii)
Placement of untreated waste in a land disposal facility	This part identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances under which an otherwise prohibited waste may continue to be land disposed.	Treatment of characteristic hazardous waste—**applicable**	40 *CFR* 268.1(a) TDEC 0400-12-01-.10(1)(a)(1)
Disposal of RCRA hazardous waste in a land-based unit	May be land disposed only if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at TDEC 0400-12-01-.10(3)(a) before land disposal. The table lists either "total waste" standards, "waste-extract" standards, or "technology-specific" standards [as detailed further in TDEC 0400-12-01-.10(3)(c)].	Land disposal, as defined in TDEC 0400-12-01-.10(1)(b), of RCRA-restricted waste—**applicable**	40 *CFR* 268.40(a) TDEC 0400-12-01-.10(3)(a)
	For characteristic wastes (D001–D043) that are subject to the treatment standards, all underlying hazardous constituents must meet the UTSs specified in TDEC 0400-12-01-.10(3)(i).	Land disposal of restricted RCRA characteristic wastes (D001–D043) that are not managed in a wastewater treatment unit that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I non-hazardous injection well—**applicable**	40 *CFR* 268.40(e) TDEC 0400-12-01-.10(3)(a)(5)
	Are not prohibited if the wastes no longer exhibit a characteristic at the point of land disposal, unless the wastes are subject to a specified method of treatment other than DEACT in TDEC 0400-12-01-.10(3)(a), or are D003 reactive cyanide.	Land disposal of RCRA-restricted characteristic wastes—**applicable**	40 *CFR* 268.1(c)(4)(iv) TDEC 0400-12-01-.10(1)(a)(3)(iv)
	Prior to land disposal, soil contaminated with hazardous waste must be treated to meet the applicable alternative treatment standards of TDEC 0400-12-01-.10(3)(j)(3) or according to the applicable UTSs in TDEC 0400-12-01-.10(3)(i) applicable to the listed hazardous waste and/or applicable characteristic of hazardous waste if the soil is characteristic.	Land disposal, as defined in TDEC 0400-12-01-.10(1)(b), of RCRA-restricted hazardous soils—**applicable**	40 *CFR* 268.49(b) TDEC 0400-12-01-.10(3)(j)(2)
Variance from a treatment standard for RCRA restricted hazardous wastes	A variance from a treatment standard may be approved if it is: • Not physically possible to treat the waste to the level specified in the treatment standard, or by the method specified as the standard; or • Inappropriate to require the waste to be treated to the level specified in the treatment standard or by the method specified as the treatment standard even though such treatment is technically possible.	Generation of a RCRA hazardous waste requiring treatment prior to land disposal—**applicable**	40 *CFR* 268.44 TDEC 0400-12-01-.10(3)(e)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Treatment and disposal of hazardous debris in a land disposal unit	(a) *Treatment standards.* Hazardous debris must be treated prior to land disposal as follows unless Department determines under TDEC 0400-12-01-.02(1)(c)(6)(ii) that the debris is no longer contaminated with hazardous waste or the debris is treated to the waste-specific treatment standard in this subpart for the waste contaminating the debris:	Treatment of characteristic hazardous debris—**applicable**	40 *CFR* 268.45(a) TDEC 0400-12-01-.10(3)(f)(1)
	(1) *General.* Hazardous debris must be treated for each "contaminant subject to treatment" defined by TDEC 0400-12-01-.10(3)(f)(2) using the technology or technologies identified in Table 1 of this subparagraph.		
	(2) *Characteristic debris.* Hazardous debris that exhibits the characteristic of ignitability, corrosivity, or reactivity identified under TDEC 0400-12-01-.02(3)(b), (c), and (d), respectively, must be deactivated by treatment using one of the technologies identified in Table 1 of this subparagraph.	Treatment of characteristic hazardous debris—**applicable**	40 *CFR* 268.45(a) TDEC 0400-12-01-.10(3)(f)(1)
	(3) *Mixtures of debris types.* The treatment standards of Table 1 in this subparagraph must be achieved for each type of debris contained in a mixture of debris types. If an immobilization technology is used in a treatment train, it must be the last treatment technology used.		
	(4) *Mixtures of contaminant types*. Debris that is contaminated with two or more contaminants subject to treatment identified under TDEC 0400-12-01-.10(3)(f)(2) must be treated for each contaminant using one or more treatment technologies identified in Table 1 of this subparagraph. If an immobilization technology is used in a treatment train, it must be the last treatment technology used.		
	(5) *Waste PCBs*. Hazardous debris that is also a waste PCB under 40 *CFR* 761 is subject to the requirements of either 40 *CFR* 761 or the requirements of this section, whichever are more stringent.		
	(b) *Contaminants subject to treatment.* Hazardous debris must be treated for each "contaminant subject to treatment." The contaminants subject to treatment must be determined as follows:		40 *CFR* 268.45(b)(1) TDEC 0400-12-01-.10(3)(f)(2)(i)
	(1) *Toxicity characteristic debris.* The contaminants subject to treatment for debris that exhibits the TC by TDEC 0400-12-01-.02(3)(e) are those EP constituents for which the debris exhibits the TC.		
	(c) *Conditioned exclusion of treated debris.* Hazardous debris that has been treated using one of the specified extraction or destruction technologies in Table 1 of this subparagraph and that does not exhibit a characteristic of hazardous waste identified under TDEC 0400-12-01-.02(3) after treatment is not a hazardous waste and need not be managed in a subtitle C facility. Hazardous debris contaminated with a listed waste that is treated by an immobilization technology specified in Table 1 is a hazardous waste and must be managed in a subtitle C facility.		40 *CFR* 268.45(c) TDEC 0400-12-01-.10(3)(f)(3)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Disposal requirements for particular RCRA waste forms and types	Except as provided in TDEC 0400-12-01-.06(14)(m)(2), and in TDEC 0400-12-01-.06(14)(q), ignitable or reactive RCRA waste must not be placed in a landfill unless the waste and the landfill meet all applicable provisions of TDEC 0400-12-01-.10; and (1) the resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under TDEC 0400-12-01-.02(3)(b) and (d); and (2) TDEC 0400-12-01-.06(2)(h)(2) is complied with. Must not be placed into a cell unless TDEC 0400-12-01-.06(2)(h)(2) is compiled with (see below).	Disposal of ignitable or reactive RCRA waste—**applicable** Disposal of incompatible wastes in a RCRA landfill—**applicable**	40 *CFR* 264.312(a) TDEC 0400-12-01-.06(14)(m)(1) 40 *CFR* 264.313 TDEC 0400-12-01-.06(14)(n)
Treatment and disposal of ignitable, reactive, or incompatible RCRA wastes	Must take precautions to prevent reactions which: • Generate extreme heat, pressure, fire or explosion, or produce uncontrolled fumes or gases which pose a risk of fire or explosion; • Produce uncontrolled toxic fumes or gases which threaten human health or the environment; • Damage the structural integrity of the device or facility.	Operation of a RCRA facility that treats, stores, or disposes of ignitable, reactive, or incompatible wastes—**applicable**	40 *CFR* 264.17(b) TDEC 0400-12-01-.06(2)(h)(2)
Disposal of bulk or containerized liquids in a RCRA landfill	May not dispose of bulk or non-containerized liquid hazardous waste or hazardous waste containing free liquids (whether or not sorbents have been added) in any landfill.	Placement of bulk or non-containerized RCRA hazardous waste—**applicable**	40 *CFR* 264.314(a) TDEC 0400-12-01-.06(14)(o)(1)
Disposal of containers in RCRA landfill	May not place containers holding free liquid in a landfill unless the liquid is mixed with an absorbent, solidified, removed, or otherwise eliminated. Sorbents used to treat free liquids to be disposed of in landfills must be non-biodegradable as described in TDEC 0400-12-01-.06(14)(o)(4)(i). Unless they are very small, containers must be either at least 90 percent full when placed in the landfill, or crushed, shredded, or similarly reduced in volume to the maximum practical extent before burial in the landfill.	Placement of containers containing RCRA hazardous waste in a landfill—**applicable**	40 *CFR* 264.314(c) TDEC 0400-12-01-.06(14)(o)(3) 40 *CFR* 264.314(d) TDEC 0400-12-01-.06(14)(o)(4) 40 *CFR* 264.315 TDEC 0400-12-01-.06(14)(p)
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. Characterization data shall, at a minimum, include the following information relevant to the management of the waste: • 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) DOE M 435.1-1(IV)(I)(2)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Packaging of LLW for disposal	Must not be packaged for disposal in cardboard or fiberboard boxes.	Generation of LLW for disposal at a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(7)(a)(1)
	Must be solidified or packaged in sufficient absorbent material to absorb twice the volume of liquid.	Generation of liquid LLW for disposal at a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(7)(a)(2)
	Shall contain as little free standing and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1 percent of the volume.	Generation of solid LLW containing liquid for disposal at a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(7)(a)(3)
	Must not be capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures or of explosive reaction with water.	Generation of LLW for disposal at a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(7)(a)(4)
	Must not contain, or be capable of, generating quantities of toxic gases, vapor, or fumes.	Generation of LLW for disposal at a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(7)(a)(5)
	Must not be pyrophoric.	Generation of LLW for disposal at a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(7)(a)(6)
	Must have structural stability either by processing the waste or placing the waste in a container or structure that provides stability after disposal.	Generation of LLW for disposal at a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(7)(b)(1)
	Must be converted into a form that contains as little free standing and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1 percent of the volume of the waste when the waste is in a disposal container designed to ensure stability, or 0.5 percent of the volume of the waste for waste processed to a stable form.	Generation of liquid LLW or LLW containing liquids for disposal at a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(7)(b)(2)
	Void spaces within the waste and between the waste and its package must be reduced to the extent practicable.	Generation of LLW for disposal at a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.17(7)(b)(3)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
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)
	Shall be stored in a location and manner that protects the integrity of waste for the expected time of storage and minimizes worker exposure.		DOE M 435.1-1(IV)(N)(3)
	Shall be managed to identify and segregate LLW from mixed waste.		DOE M 435.1-1(IV)(N)(6)
	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)
	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.		DOE M 435.1-1(IV)(L)(1)(b)
	Containers shall be marked such that their contents can be identified.		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		
Transportation of hazardous waste onsite	The generator manifesting requirements of TDEC 0400-12-01-.03(3) and TDEC 0400-12-01-.03(4)(c)(2) do not apply. Generator or transporter must comply with the requirements set forth in TDEC 0400-12-01-.04(4)(a) and (b) in the event of a discharge of hazardous waste on a private or public right-of-way.	Transportation of hazardous wastes on a public or private right-of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way—**applicable**	40 *CFR* 262.20(f) TDEC 0400-12-01-.03(3)(a)(6)
Transportation of universal waste offsite	Offsite shipments of universal waste by a large quantity handler of universal waste shall be made in accordance with TDEC 0400-12-01-.12(3)(i).	Preparation of offsite shipments of universal waste by a large quantity generator of universal waste—**applicable**	40 *CFR* 273.38 TDEC 0400-12-01-.12(3)(i)
Transportation of used oil offsite	Except as provided in TDEC 0400-12-01-.11(3)(e)(1)–(3), generators must ensure that their used oil is transported by transporters who have obtained EPA ID numbers.	Preparation of offsite shipment of used oil by generators of used oil—**applicable**	40 *CFR* 279.24 TDEC 0400-12-01-.11(3)(e)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Transportation of LLW off-site	LLW waste shall be packaged and transported in accordance with DOE O 460.1A and DOE O 460.2. 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(I)(1)(E)(11) DOE M 435.1-1(IV)(L)(2)
	General Operations		
Incompatible wastes	Incompatible wastes must not be placed in the same landfill cell unless TDEC 0400-12-01-.06(2)(h)(2) is complied with.	Disposal of incompatible wastes in a RCRA landfill—**applicable**	40 *CFR* 264.313 TDEC 0400-12-01-.06(14)(n)
Waste placement	Wastes must be emplaced in a manner that maintain the package integrity during emplacement, minimizes the void spaces between packages and permit the void spaces to be filled. Void spaces between packages must be filled with earth or other material to reduce future subsidence within the disposal unit. Closure and stabilization measures as set forth in the closure plan must be carried out as each disposal unit is filled and covered. Active waste disposal operations must not have an adverse effect on completed closure and stabilization measures.	Disposal of LLW on land—**relevant and appropriate** Disposal of LLW on land—**relevant and appropriate** Disposal of LLW on land—**relevant and appropriate** Disposal of LLW on land—**relevant and appropriate**	TDEC 0400-20-11-.17(3)(d) TDEC 0400-20-11-.17(3)(e) TDEC 0400-20-11-.17(3)(i) TDEC 0400-20-11-.17(3)(j)
Security system	Must prevent the unknowing entry and minimize the possibility for unauthorized entry of persons or livestock onto active portion of the facility or comply with provisions of TDEC 0400-12-01-.06(2)(e)(2) and TDEC 0400-12-01-.06(2)(e)(3). Unless a natural barrier adequately deters access by the general public, either warning signs and fencing must be installed and maintained as follows, or the requirements of paragraph (c)(1) of this section must be met. (1) Warning signs must be displayed at all entrances and at intervals of 100 m (330 ft) or less along the property line of site or along the perimeter of the sections of site where asbestos-containing waste material is deposited. The warning signs must: (i) Be posted in such a manner and location that a person can easily read the legend; and (ii) Conform to the requirements of 51 cm × 36 cm (20 in. × 14 in.) upright format signs specified in 29 *CFR* 1910.145(d)(4) and this paragraph; and (iii) Display the legend, as listed in 40 *CFR* 61.154(b)(1)(iii), in the lower panel with letter sizes and styles of a visibility at least equal to those specified in this paragraph. The perimeter of the disposal site must be fenced in a manner adequately to deter access by the general public.	Operation of a RCRA landfill—**applicable** Operation of an active waste disposal site that receives ACM from a source covered under 40 *CFR* 61.145—**applicable**	40 *CFR* 264.14 TDEC 0400-12-01-.06(2)(e) 40 *CFR* 61.154(b)(1) 40 *CFR* 61.154(b)(2)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Security system (cont.)	Supporting facilities: (i) A 6-ft woven mesh fence, wall, or similar device shall be placed around the site to prevent unauthorized access. (ii) Roads shall be maintained to and within the site which are adequate to support the operation and maintenance of the site without causing safety or nuisance problems or hazardous conditions. (iii) Site shall be operated and maintained to prevent hazardous conditions resulting from spilled liquids and windblown materials.	Construction of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(9)
General inspections	Operators must inspect facility for malfunctions and deterioration, operator errors, and discharges, often enough to identify and correct any problems. Operators must remedy any deterioration or malfunction of equipment or structures on a schedule that ensures that the problem does not lead to an environmental or human health hazard.	Operation of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.15(a) TDEC 0400-12-01-.06(2)(f)(1) 40 *CFR* 264.15(c) TDEC 0400-12-01-.06(2)(f)(3)
Inspection of landfill following storms	Must inspect landfill weekly and after storm events to detect evidence of any of the following: (i) Deterioration, malfunctions, or improper operation of run-on and runoff control systems; (ii) Proper functioning of wind dispersal control systems, where present; and (iii) The presence of leachate in and proper functioning of leachate collection and removal systems, where present.	Operation of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.303(b) TDEC 0400-12-01-.06(14)(d)(2)
Inspection of landfill	Must record the amount of liquids removed from the leak detection system sumps at least weekly during the active life and closure period.	Operation of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.303(c)(1) TDEC 0400-12-01-.06(14)(d)(3)(i)
Personnel training	Operators must ensure personnel adequately trained in hazardous waste, emergency response, monitoring equipment maintenance, alarm system procedures, etc.	Operation of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.16 TDEC 0400-12-01-.06(2)(g)
Construction quality assurance program	Operators must develop and implement a Construction Quality Assurance Program to ensure that the unit meets or exceeds all design criteria and specifications for all physical components including: foundations, dikes, liners, geomembranes, leachate collection and removal systems, leak detection systems, and final covers in accordance with remaining provisions of TDEC 0400-12-01-.06(2)(j).	Operation of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.19 TDEC 0400-12-01-.06(2)(j)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Contingency plan	Operators must have a contingency plan, designed to minimize hazards to human health and the environment from fires, explosions, or other unplanned sudden releases of hazardous waste to air, soil, or surface water in accordance with TDEC 0400-12-01-.06(4)(c). Operators must have at least one emergency coordinator on the facility premises responsible for coordinating emergency response measures in accordance with TDEC 0400-12-01-.06(4)(g).	Operation of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.51 TDEC 0400-12-01-.06(4)(b) 40 *CFR* 264.55 TDEC 0400-12-01-.06(4)(f)
Inventory requirements	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)
	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)
	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)
	Boundaries and locations of each disposal unit must be accurately located and mapped by means of a land survey. Units must be marked in such a way that the boundaries of each unit can be easily defined. Three permanent survey marker control points, referenced to USGS or NGS survey control stations, must be established on site to facilitate surveys. The USGS or NGS control states must provide horizontal and vertical controls as checked against USGS or NGS record files.	Land disposal of LLW—**relevant and appropriate**	TDEC 0400-20-11-.17(3)(g)
Leak detection system operation	Must collect and remove liquids in the leak detection system sumps to minimize the head on the bottom liner.	Operation of a RCRA landfill—**applicable**	40 *CFR* 264.301(c)(4) TDEC 0400-12-01-.06(14)(b)(3)(iv)
Run-on/runoff control systems	Collection and holding facilities must be emptied or otherwise expeditiously managed after storm events to maintain design capacity of the system.	Operation of a RCRA landfill—**applicable**	40 *CFR* 264.301(i) TDEC 0400-12-01-.06(14)(b)(9)
Wind dispersal control system	Must cover or manage the landfill to control wind dispersal of particulate matter.	Operation of a RCRA landfill—**applicable**	40 *CFR* 264.301(j) TDEC 0400-12-01-.06(14)(b)(10)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Response actions for leak detection system	Must have a response action plan which sets forth the actions to be taken if action leakage rate has been exceeded.	Operation of a RCRA landfill leak detection system—**applicable**	40 *CFR* 264.304(a) TDEC 0400-12-01-.06(14)(e)(1)
	Must determine to the extent practicable the location, size, and cause of any leak. Must determine whether waste receipt should cease or be curtailed; whether any waste should be removed from the unit for inspection, repairs, or controls; and whether or not the unit should be closed.	Flow rate into the leak detection system exceeds action leakage rate for any sump—**applicable**	40 *CFR* 264.304(b)(3) TDEC 0400-12-01-.06(14)(e)(2)(iii) 40 *CFR* 264.304(b)(4) TDEC 0400-12-01-.06(14)(e)(2)(iv)
	Must determine any other short- or long-term actions to be taken to mitigate or stop leaks.	Flow rate into the leak detection system exceeds action leakage rate for any sump—**applicable**	40 *CFR* 264.304(b)(5) TDEC 0400-12-01-.06(14)(e)(2)(v)
	To make the leak and/or remediation determinations, (1) Must: (i) Assess the source and amounts of the liquids by source; (ii) Conduct a hazardous constituent or other analyses of the liquids in the leak detection system to identify sources and possible location of leaks, and the hazard and mobility of the liquid; and (iii) Assess the seriousness of leaks in terms of potential for escaping into the environment; or (2) Document why such assessments are not needed.	Operation of a RCRA landfill leak detection system—**applicable**	40 *CFR* 264.304(c) TDEC 0400-12-01-.06(14)(e)(3)
Operation of a landfill accepting asbestos waste	Either discharge no visible emissions to the outside air; or Rather than meet the no visible emission requirement of paragraph (a) of this section, at the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material that has been deposited at the site during the operating day or previous 24-hour period shall: (1) Be covered with at least 15 cm (6 in.) of compacted non-ACM, or (2) Be covered with a resinous or petroleum-based dust suppression agent that effectively binds dust and controls wind erosion. Such an agent shall be used in the manner and frequency recommended for the particular dust by the dust suppression agent manufacturer to achieve and maintain dust control.	Disposal of ACM—**applicable**	40 *CFR* 61.154(a)(1) 40 *CFR* 61.154(c)(1)
	Unless a natural barrier adequately deters access by the general public, either warning signs and fencing must be installed and maintained as follows, or the requirements of paragraph (c)(1) of this section must be met.	Operation of an active waste disposal site that receives ACM from a source covered under 40 *CFR* 61.145—**applicable**	40 *CFR* 61.154(b)(1)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Operation of a landfill accepting asbestos waste (cont.)	(1) Warning signs must be displayed at all entrances and at intervals of 100 m (330 ft) or less along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material is deposited. The warning signs must: (i) Be posted in such a manner and location that a person can easily read the legend; and (ii) Conform to the requirements of 51 cm × 36 cm (20 in. × 14 in.) upright format signs specified in 29 *CFR* 1910.145(d)(4) and this paragraph; and (iii) Display the legend, as listed in 40 *CFR* 61.154(b)(1)(iii), in the lower panel with letter sizes and styles of a visibility at least equal to those specified in this paragraph. The perimeter of the disposal site must be fenced in a manner adequately to deter access by the general public.		40 *CFR* 61.154(b)(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 ft 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 10 ft 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 10 ft 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	Collection and holding facilities associated with run-on and run-off control systems must be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system. Run-on and run-off must be managed separately from leachate. Other control measures (e.g., temporary mulching or seeding, silt barriers) must be taken as necessary to control erosion of the site.	Operation of a Subtitle D solid waste landfill—**relevant and appropriate**	TDEC 0400-11-01.04(2)(i)
	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)
	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)
Environmental Monitoring Requirements			
Pre-operations monitoring	A preoperational monitoring program must be conducted to provide basic environmental data on the disposal site characteristics including information about the ecology, meteorology, climate, hydrology, geology, geochemistry and seismology of the disposal site. For those characteristics that are subject to seasonal variation, data must cover at least a 12-month period.	Land disposal of LLW— **relevant and appropriate**	TDEC 0400-20-11-.17(4)(a)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Corrective measures based on monitoring	Must have plans for taking corrective measures if migration of radionuclides would indicate that the performance objectives may not be met. *[NOTE: Performance Objectives are those given at TDEC 0400-20-11-.16(1), (2), (4), and (5).]*	Land disposal of LLW—**relevant and appropriate**	TDEC 0400-20-11-.17(4)(b)
Construction and operations monitoring	During site construction and operation, shall maintain a monitoring program, including a monitoring system. The monitoring system must be capable of providing early warning of releases of radionuclides from the disposal unit before they leave the site boundary.	Land disposal of LLW—**relevant and appropriate**	TDEC 0400-20-11-.17(4)(c)
Post-operations monitoring	After the disposal site is closed, post-operational surveillance of the disposal site shall be maintained by a monitoring system based on the operating history and the closure and stabilization of the disposal site.	Land disposal of LLW—**relevant and appropriate**	TDEC 0400-20-11-.17(4)(d)
Groundwater and surface water monitoring	The groundwater and surface water from the disposal site area must be sampled prior to commencing operation for use as baseline data.	Construction of TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(6)(i)(A)
Surface water monitoring	Designated surface water course shall be sampled at least monthly when the landfill is being used for disposal.	Operation of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(6)(i)(B)
Leachate collection system	Leachate collection systems shall be monitored monthly for quantity and physicochemical characteristics of leachate produced. The leachate should be either treated to acceptable limits for discharge in accordance with a state or federal permit or disposed of by another state or federally approved method. Water analysis shall be conducted as provided in paragraph (b)(6)(iii) of this section.	Operation of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(7)
Monitoring well construction and operation	All monitoring wells shall be cased and the annular space between the monitor zone (zone of saturation) and the surface shall be completely backfilled with Portland cement or an equivalent material and plugged with Portland cement to effectively prevent percolation of surface water into the well bore. The well opening at the surface shall have a removable cap to provide access and to prevent entrance of rainfall or stormwater runoff. The groundwater monitoring well shall be pumped to remove the volume of liquid initially contained in the well before obtaining a sample for analysis. The discharge shall be treated to meet applicable state or federal standards or recycled to the chemical waste landfill.	Construction and operation of a TSCA groundwater monitoring well—**applicable**	40 *CFR* 761.75(b)(6)(ii)(B)
Operation of leachate collection system	After the cover is installed, must record the amount of liquids removed from the leak detection system at least monthly. If the liquid level in the sump stays below the pump operating level for two consecutive months, the amount of liquids in the sumps must be recorded at least quarterly. If the liquid level in the sump stays below the pump operating level for two consecutive quarters, the amount of liquids in the sumps must be recorded at least semi-annually. If at any time during the post-closure care period the pump operating level is exceeded at units on quarterly or semi-annual recording schedules, the owner or operator must return to monthly recording of amounts of liquids removed from each sump until the liquid level again stays below the pump operating level for 2 consecutive months.	Closure of a RCRA landfill—**applicable**	40 *CFR* 264.303(c)(2) TDEC 0400-12-01-.06(14)(d)(3)(ii)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
General post-closure care	Must maintain and monitor a groundwater monitoring system and comply with all other applicable provisions of TDEC 0400-12-01-.06(6).	Closure of a RCRA landfill—**applicable**	40 *CFR* 264.310(b)(4) TDEC 0400-12-01-.06(14)(k)(2)(iv)
Determining RCRA concentration limits	Concentration limits shall be determined taking into account those constituents that are reasonably expected to be contained in or derived from waste present in the landfill. These limits must not exceed those listed in TDEC 0400-12-01-.06(6)(e), Table 1.	RCRA hazardous constituents detected in groundwater in the uppermost aquifer underlying a hazardous waste landfill—**applicable**	40 *CFR* 264.94(a) TDEC 0400-12-01-.06(6)(e)(1)
Groundwater monitoring well construction	All monitoring wells must be cased in a manner that maintains the integrity of the monitoring well bore hole. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples. The annular space (i.e., the space between the bore hole and well casing) above the sampling depth must be sealed to prevent contamination of samples and the groundwater.	Construction of RCRA groundwater monitoring well—**applicable**	40 *CFR* 264.97(c) TDEC 0400-12-01-.06(6)(h)(3)
Groundwater monitoring requirements for RCRA hazardous waste landfills	The groundwater monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths to yield samples from the uppermost aquifer that: • Represent the quality of background groundwater; • Represent the quality of groundwater passing the point of compliance; and • Allow for the detection of contamination when the hazardous waste or constituents have migrated from the waste management area to the uppermost aquifer.	Operation of a detection monitoring program under TDEC 0400-12-01-.06(6)(i)—**applicable**	40 *CFR* 264.97(a) TDEC 0400-12-01-.06(6)(h)(1)
	Groundwater monitoring program must include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide a reliable indication of groundwater quality below the waste management area.		40 *CFR* 264.97(d) TDEC 0400-12-01-.06(6)(h)(4)
	Groundwater monitoring program must include sampling and analytical methods that are appropriate and accurately measure hazardous constituents in groundwater samples.		40 *CFR* 264.97(e) TDEC 0400-12-01-.06(6)(h)(5)
	Groundwater monitoring program must include a determination of the groundwater surface elevation each time groundwater is sampled.		40 *CFR* 264.97(f) TDEC 0400-12-01-.06(6)(h)(6)
	The number and size of samples collected to establish background and measure groundwater quality at the point of compliance shall be appropriate for the form of statistical test employed following generally accepted statistical principles.		40 *CFR* 264.97(g) TDEC 0400-12-01-.06(6)(h)(7)
	The owner or operator will specify one of the following statistical methods to be used in evaluating groundwater monitoring data for each hazardous constituent. The statistical test chosen shall be conducted separately for each hazardous constituent in each well. Where PQLs are used in any of the following statistical procedures to comply with TDEC 0400-12-01-.06(6)(h)(9)(v), the PQL must be proposed by the owner or operator and approved by Tennessee and EPA through the CERCLA process. Use of any of the following statistical methods must be protective of human health and the environment and must comply with the performance standards outlined in TDEC 0400-12-01-.06(6)(h)(9).		40 *CFR* 264.97(h) TDEC 0400-12-01-.06(6)(h)(8)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Groundwater monitoring requirements for RCRA hazardous waste landfills (cont.)	• A parametric ANOVA followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.		40 *CFR* 264.97(h)(1) TDEC 0400-12-01-.06(6)(h)(8)(i)
	• An ANOVA based on ranks followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.		40 *CFR* 264.97(h)(2) TDEC 0400-12-01-.06(6)(h)(8)(ii)
	• A tolerance or prediction interval procedure in which an interval for each constituent is established from the distribution of background data and level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.	Operation of a detection monitoring program under TDEC 0400-12-01-.06(6)(i)—**applicable**	40 *CFR* 264.97(h)(3) TDEC 0400-12-01-.06(6)(h)(8)(iii)
	• A control chart approach that gives control limits for each constituent.		40 *CFR* 264.97(h)(4) TDEC 0400-12-01-.06(6)(h)(8)(iv)
	• Another statistical test method submitted by the owner or operator and approved by Tennessee and EPA through the CERCLA process.		40 *CFR* 264.97(h)(5) TDEC 0400-12-01-.06(6)(h)(8)(v)
	Any statistical method chosen under TDEC 0400-12-01-.06(6)(h)(8) shall comply with the following performance standards, as appropriate:		40 *CFR* 264.97(i) TDEC 0400-12-01-.06(6)(h)(9)
	• The statistical method used to evaluate groundwater monitoring data shall be appropriate for the distribution of chemical parameters or hazardous constituents. If the distribution of the chemical parameters or hazardous constituents is shown by the owner or operator to be inappropriate for a normal theory test, then the data should be transformed or a distribution-free theory test should be used. If the distributions for the constituents differ, more than one statistical method may be needed.		40 *CFR* 264.97(i)(1) TDEC 0400-12-01-.06(6)(h)(9)(i)
	• If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a groundwater protection standard, the test shall be done at a Type I error level no less than 0.01 for each testing period. If a multiple comparisons procedure is used, the Type I experiment wise error rate for each testing period shall be no less than 0.05; however, the Type I error of no less than 0.01 for individual well comparisons must be maintained. This performance standard does not apply to tolerance intervals, prediction intervals, or control charts.		40 *CFR* 264.97(i)(2) TDEC 0400-12-01-.06(6)(h)(9)(ii)
	• If a control chart approach is used to evaluate groundwater monitoring data, the specific type of control chart and its associated parameter values shall be proposed by the owner or operator and approved by Tennessee and EPA through the CERCLA process.		40 *CFR* 264.97(i)(3) TDEC 0400-12-01-.06(6)(h)(9)(iii)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Groundwater monitoring requirements for RCRA hazardous waste landfills (cont.)	• If a tolerance interval or a prediction interval is used to evaluate groundwater monitoring data, the levels of confidence, and, for tolerance intervals, the percentage of the population that the interval must contain, shall be proposed by the owner or operator and approved by Tennessee and EPA through the CERCLA process. These parameters will be determined after considering the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern.		40 *CFR* 264.97(i)(4) TDEC 0400-12-01-.06(6)(h)(9)(iv)
	• The statistical method shall account for data below the limit of detection with one or more statistical procedures that are protective of human health and the environment. Any PQL approved by Tennessee and EPA through the CERCLA process under TDEC 0400-12-01-.06(6)(h)(8) that is used in the statistical method shall be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility.		40 *CFR* 264.97(i)(5) TDEC 0400-12-01-.06(6)(h)(9)(v)
	• If necessary, the statistical method shall include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.	Operation of a detection monitoring program under TDEC 0400-12-01-.06(6)(i)—**applicable**	40 *CFR* 264.97(i)(6) TDEC 0400-12-01-.06(6)(h)(9)(vi)
Detection monitoring	Must monitor for specified indicator parameters, waste constituents, or reaction products that provide a reliable indication of the presence of hazardous constituents in groundwater.	Operation of a detection monitoring program under TDEC 0400-12-01-.06(6)(i)—**applicable**	40 *CFR* 264.98(a) TDEC 0400-12-01-.06(6)(i)(1)
	Must install a groundwater monitoring system at the compliance point as specified under TDEC 0400-12-01-.06(6)(f) that complies with TDEC 0400-12-01-.06(6)(h)(1)(ii) and TDEC 0400-12-01-.06(6)(h)(3).		40 *CFR* 264.98(b) TDEC 0400-12-01-.06(6)(i)(2)
	Must conduct a monitoring program for each specified chemical parameter and hazardous constituent.		40 *CFR* 264.98(c) TDEC 0400-12-01-.06(6)(i)(3)
	Sampling frequency shall be sufficient to determine whether there is statistically significant evidence of contamination.		40 *CFR* 264.98(d) TDEC 0400-12-01-.06(6)(i)(4)
	Must determine the groundwater flow rate and direction in the uppermost aquifer annually at a minimum.		40 *CFR* 264.98(e) TDEC 0400-12-01-.06(6)(i)(5)
	Must determine whether there is statistically significant evidence of contamination of any specified chemical parameter or hazardous constituent at a specified frequency.		40 *CFR* 264.98(f) TDEC 0400-12-01-.06(6)(i)(6)
	If there is statistically significant evidence of contamination at any monitoring well at the compliance point, must follow the substantive provisions of this subsection [TDEC 0400-12-01-.06(6)(i)(7)].		40 *CFR* 264.98(g) TDEC 0400-12-01-.06(6)(i)(7)
Surface water monitoring post-closure	Designated surface water course shall be sampled on a frequency of no less than once every 6 months after final closure of the disposal area.	Closure of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(6)(i)(C)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
	Closure and Post-closure Requirements		
Decontamination/ disposal of equipment	During the partial and final closure periods, all equipment, structures, etc. must be properly disposed of or decontaminated unless otherwise specified in TDEC 0400-12-01-.06(10)(h), TDEC 0400-12-01-.06(11)(i), TDEC 0400-12-01-.06(12)(i), TDEC 0400-12-01-.06(13)(k), and TDEC 0400-12-01-.06(14)(k).	Closure of a RCRA landfill—**applicable**	40 *CFR* 264.114 TDEC 0400-12-01-.06(7)(e)
Closure of RCRA landfill and other RCRA hazardous waste management units	Must close the unit in a manner that: (a) Minimizes the need for further maintenance; and (b) Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and (c) Complies with the closure requirements of this part, including, but not limited to, the requirements of TDEC 0400-12-01-.06(9)(i), TDEC 0400-12-01-.06(10)(h), TDEC 0400-12-01-.06(11)(i), TDEC 0400-12-01-.06(12)(i), TDEC 0400-12-01-.06(13)(k), TDEC 0400-12-01-.06(14)(k), TDEC 0400-12-01-.06(15)(l), TDEC 0400-12-01-.06(16) and (17), TDEC 0400-12-01-.06(27)(b) through (d), and TDEC 0400-12-01-.06(33)(c).	Closure of a RCRA hazardous waste management facility—**applicable**	40 *CFR* 264.111 TDEC 0400-12-01-.06(7)(b)
Closure of RCRA landfill	Must cover the landfill or cell with a final cover designed and constructed to: (1) Provide long-term minimization of migration of liquids through the closed landfill; (2) Function with minimum maintenance; (3) Promote drainage and minimize erosion or abrasion of the cover; (4) Accommodate settling and subsidence so that the cover's integrity is maintained; and (5) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.	Closure of a RCRA hazardous waste management landfill—**applicable**	40 *CFR* 264.310(a) TDEC 0400-12-01-.06(14)(k)
Closure of RCRA temporary storage area – "90-Day Storage Area"	The generator must close the waste accumulation unit in a manner that: • Minimizes the need for further maintenance by controlling, minimizing, or eliminating, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere, • Removes or decontaminates all contaminated equipment, structures, and soil and any remaining hazardous waste residues from waste accumulation units, • Any hazardous waste generated in the process of closing either the generator's facility or unit(s) accumulating hazardous waste must be managed in accordance with all applicable standards of Parts 262, 263, 265 and 268 of this chapter.	Accumulation of RCRA hazardous waste on-site as defined in TDEC 0400-12-01-.01(2)(a)—**applicable**	40 *CFR* 262.17(a)(8)(iii)(1)-(3) TDEC 0400-12-01-.03(1)(h)(1)(viii)(III)I and II

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Clean closure of a RCRA container storage area	Must remove all hazardous waste and residues from containment system. Remaining containers, liners, bases, and soil containing or contaminated with hazardous waste or residues must be decontaminated or removed.	Management of RCRA hazardous waste in a container storage area—**applicable**	40 *CFR* 264.178 TDEC 0400-12-01-.06(9)(i)
Clean closure of TSCA storage facility	A TSCA/RCRA storage facility closed under RCRA is exempt from the TSCA closure requirements of 40 *CFR* 761.65(e).	Closure of TSCA/RCRA storage facility—**applicable**	40 *CFR* 761.65(e)(3)
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)
	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)
Duration	Post-closure care must begin after closure and continue for at least 30 years after that date.	Closure of a RCRA landfill—**applicable**	40 *CFR* 264.117(a) TDEC 0400-12-01-.06(7)(h)
Protection of facility	Post-closure use of property must never be allowed to disturb the integrity of the final cover, liners, or any other components of the containment system or the facility's monitoring system unless necessary to reduce a threat to human health or the environment.	Closure of a RCRA landfill—**applicable**	40 *CFR* 264.117(c) TDEC 0400-12-01-.06(7)(h)(3)
Post-closure plan	Must have a written post-closure plan which identifies planned monitoring activities and frequency at which they will be performed for groundwater monitoring, containment systems, and cap maintenance.	Closure of a RCRA landfill—**applicable**	40 *CFR* 264.118 TDEC 0400-12-01-.06(7)(i)
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.		40 *CFR* 264.119(a) TDEC 0400-12-01-.06(7)(j)(1)
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.		40 *CFR* 264.119(b) TDEC 0400-12-01-.06(7)(j)(2)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
General post-closure care	After final closure, owner or operator must: (i) Maintain the effectiveness and integrity of the final cover including making repairs to the cap as necessary to correct effects of settling, erosion, etc.; (ii) Continue to operate the leachate collection and removal system until leachate is no longer detected; (iii) Maintain and monitor the leachate detection system in accordance with TDEC 0400-12-01-.06(14)(b)(3)(iii)(IV), TDEC 0400-12-01-.06(14)(b)(3)(iv), and TDEC 0400-12-01-.06(14)(d)(3); (iv) Maintain and monitor a groundwater monitoring system and comply with all other applicable provisions of TDEC 0400-12-01-.06(6); (v) Prevent run-on and runoff from eroding or otherwise damaging final cover; and (vi) Protect and maintain surveyed benchmarks used to locate waste cells.	Closure of a RCRA landfill—**applicable**	40 *CFR* 264.310(b) TDEC 0400-12-01-.06(14)(k)(2)
LLW disposal facility pre-closure activities	Prior to closure of the disposal site, the following information will be obtained: • Any additional geologic, hydrologic, or other disposal site data pertinent to the long-term containment of emplaced radioactive wastes obtained during the operation period. • The result of tests, experiments or other analyses relating to backfill of excavated areas, closure and sealing, waste migration and interaction with emplacement media, or any other test, experiments or analysis pertinent to the long-term containment of emplaced waste within the disposal site. • Any proposed revision of plans for decontamination and/or dismantlement of surface operational facilities, backfilling of excavated areas, or stabilization of the disposal site for post-closure care. Any significant new information regarding the environmental impact of closure activities and long-term performance of the disposal site.	Closure of a LLW disposal facility—**relevant and appropriate**	TDEC 0400-20-11-.12(1)
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)]: Must either discharge no visible emissions to the outside air; <u>or</u> Cover the ACM with at least 6 in. of compacted non-asbestos-containing material and grow and maintain a cover of vegetation on the area adequate to prevent exposure of the asbestos-containing waste; <u>or</u> 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* 61.154(g) TDEC 1200-3-11-.02(5)(g) 40 *CFR* 61.151(a)(1) TDEC 1200-3-11-.02(2)(l)(1)(i) 40 *CFR* 61.151(a)(2) TDEC 1200-3-11-.02(2)(l)(1)(ii) 40 *CFR* 61.151(a)(3) TDEC 1200-3-11-.02(2)(l)(1)(iii)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Closure of an asbestos-containing waste disposal area (cont.)	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) or comply with 40 *CFR* 61.151(a)(2) or (a)(3). 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).		40 *CFR* 61.151(b) TDEC 1200-3-11-.02(2)(l)(2) 40 *CFR* 61.151(c) TDEC 1200-3-11-.02(2)(l)(3)
Closure of groundwater monitoring well(s)	Shall be completely filled and sealed in such a manner that vertical movement of fluid either into or between formation(s) containing groundwater classified pursuant to rule 0400-45-06-.05(1) through the bore hole is not allowed. Shall be performed in accordance with the provisions for Seals at 0400-45-06-(6)(e), (f), and (g); for Fill Materials at 0400-45-06-.09(6)(h) and (i); for Temporary Bridges at 0400-45-06-.09(6)(j); for Placement of Sealing Materials at 0400-45-06-.09(7)(a) and (b); and Special Conditions at 0400-45-06-09(8)(a) and (b), as appropriate.	Permanent plugging and abandonment of a well—**relevant and appropriate**	TDEC 0400-45-06-.09(6)(d) TDEC 0400-45-06-.09(6)(e) through (j) TDEC 0400-45-06.09(7) TDEC 0400-45-06.09(8)(a) TDEC 0400-45-06.09(8)(b)
Operation of an Onsite Landfill Wastewater Treatment System			
Prevention of pollution through application of treatment	In order to permit the reasonable and necessary uses of the Waters of the State, existing pollution should be corrected as rapidly as practicable, and future pollution prevented through the level of treatment technology applicable to a specific source or that greater level of technology necessary to meet water quality standards; i.e., modeling and stream survey assessments, treatment plants or other control measures.[18] Technology-based treatment requirements cannot be satisfied through the use of "non-treatment" techniques such as flow augmentation and in-stream mechanical aerators.	Point source discharge of pollutants as defined in 40 *CFR* 122.2 into surface water—**applicable** Point source discharge of radionuclides into surface water—**relevant and appropriate**	TDEC 0400-40-03-.02(4) *General considerations* 40 *CFR* 125.3(f)
Application of most stringent criteria	Since all Waters of the State are classified for more than one use, the most stringent criteria will be applicable.		TDEC 0400-40-03-.02(5) *General considerations*
Compliance with narrative water quality criteria	Interpretation and application of narrative criteria shall be based on available scientific literature and EPA guidance and regulations.	Point source discharge of pollutants as defined in 40 *CFR* 122.2 into surface water —**applicable** Point source discharge of radionuclides into surface water—**relevant and appropriate**	TDEC 0400-40-03-.02(10) *General considerations*

[18] Treatment may be necessary to meet Tennessee water quality standards. Consistent with the Administrator's Decision dated December 31,2020, TBEL requirements are not considered relevant and appropriate to discharges of radionuclides at this Site.

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Application of stream flow for water quality criteria	Fish and aquatic life water quality criteria shall generally be applied on the basis of stream flows equal to or exceeding the 7-day minimum, 10-year recurrence interval. All other criteria shall be applied on the basis of stream flows equal to or exceeding the 30-day minimum 5-year recurrence interval.	Discharge of pollutants as defined in 40 *CFR* 122.2 into surface water Classified as *Fish and Aquatic Life*—**applicable** Discharge of radionuclides into surface water Classified as *Fish and Aquatic Life*—**relevant and appropriate**	TDEC 0400-40-03-.05(4) *Interpretation of criteria*
	The frequency, magnitude and duration of deviations from normal water conditions shall be considered in interpreting the water quality criteria. When interpreting pathogen data, samples collected during or immediately after significant rain events may be treated as outliers unless caused by point source dischargers.	Point source discharge of pollutants as defined in 40 *CFR* 122.2 into surface water—**applicable** Point source discharge of radionuclides into surface water—**relevant and appropriate**	TDEC 0400-40-03-.05(5) *Interpretation of criteria*
Application of water quality criteria	The criteria and standards provide that all discharges of sewage, industrial waste, and other waste shall receive the degree of treatment or effluent reduction necessary to comply with water quality standards, or state or federal laws and regulations pursuant thereto, and where appropriate will comply with the "Standards of Performance" as required by the Tennessee Water Quality Control Act, (T.C.A., §§ 69-3-101, et seq.). (See FN 1.)	Point source discharge of pollutants as defined in 40 *CFR* 122.2 into surface water—**applicable** Point source discharge of radionuclides into surface water—**relevant and appropriate**	TDEC 0400-40-03-.05(6) *Interpretation of criteria*
	Where naturally formed conditions or background water quality conditions are substantial impediments to attainment of the water quality standards, these conditions shall be taken into consideration in establishing any effluent limitations or restriction on discharge to such waters. For purposes of water quality assessment, exceedances of water quality standards caused by natural conditions will not be considered the condition of pollution impairment.	Point source discharge of pollutants as defined in 40 *CFR* 122.2 into surface water—**applicable** Point source discharge of radionuclides into surface water—**relevant and appropriate**	TDEC 0400-40-03-.05(7) *Interpretation of criteria*

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Use of Reporting Limits	All chemical data reported under this rule shall be generated using "sufficiently sensitive" analytical methods approved under 40 *CFR* 136 (2018) or required under 40 *CFR* Chapter I, subchapter N or O (2018). An approved method is "sufficiently sensitive" when: (a) The method ML is at or below the level of the applicable water quality criterion or the effluent limit established for the measured pollutant or pollutant parameter; or (b) The method ML is above the applicable water quality criterion or the effluent limit established, but the amount of the pollutant or pollutant parameter actually measured is high enough that the method detects and quantifies the level of the pollutant or pollutant parameter; or (c) Demonstration is made showing that the method used has the lowest ML of the approved methods for the measured pollutant or pollutant parameter in the sample/matrix being analyzed. (Documentation supporting this demonstration is to be submitted with reported data and shall include narrative justification for why the method chosen is believed to have the lowest ML of all approved methods identified in 40 *CFR* 136 (2018). The Director shall determine whether the submitted information demonstrates sufficient method sensitivity.) When there is no analytical method that has been approved under 40 *CFR* 136 (2018) or required under 40 *CFR* Chapter I, subchapter N or O (2018), and a specific method is not otherwise required by the Director, the applicant may use any suitable method but shall provide a description of the method. When selecting a suitable method, factors such as a method's precision, accuracy, or resolution must be considered when assessing the performance of the method.	Point source discharge of pollutants as defined in 40 *CFR* 122.2 into surface water—**applicable** Point source discharge of radionuclides into surface water—**relevant and appropriate**	TDEC 0400-40-03-.05(8)
Target Risk Level for Recreation WQC	The 10^{-5} risk level is used for all carcinogenic pollutants.	Derivation of WQC for pollutants in surface water classified for Recreation use—**applicable** Derivation of WQC Equivalents for radionuclides in surface water classified for Recreation use—**relevant and appropriate**	TDEC 0400-40-03.-03(4)(j) Footnote c

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Establishing effluent limits using a calculated numeric water quality criterion	Permitting authority must establish effluent limits using a calculated numeric water quality criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use. Such criterion may be derived using an explicit State policy or regulation interpreting its narrative water quality criterion, supplemented with other relevant information which may include EPA's Water Quality Standards Handbook, October 1983, risk assessment data, exposure data…and current EPA criteria documents. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the terms "permit" and "permittee" reflect regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision, and "permittee" to mean DOE.]*	Determination of effluent limits where a State has not established a water quality criterion for a specific pollutant—**applicable** Determination of effluent limits where a State has not established a water quality criterion for radionuclides—**relevant and appropriate**	40 *CFR* 122.44(d)(1)(vi)(A)
Operation and maintenance of treatment and control systems	Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the condition of this permit. This provision requires the operation of backup or auxiliary facilities or similar systems, which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the terms "permit" and "permittee" reflect regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision, and "permittee" to mean DOE.]*	Point source discharge of pollutants as defined in 40 *CFR* 122.2 into surface water where treatment is used—**applicable** Point source discharge of radionuclides into surface water where treatment is used—**relevant and appropriate**	TDEC 0400-40-05-.07(2)(c)
Monitoring of effluent	Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.	Point source discharge of pollutants as defined in 40 *CFR* 122.2 into surface water—**applicable** Point source discharge of radionuclides into surface water—**relevant and appropriate**	TDEC 0400-40-05-.07(2)(h)
	Permittee shall take all reasonable steps to minimize any adverse impact to the waters of Tennessee resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the terms "permit" and "permittee" reflect regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision, and "permittee" to mean DOE.]*		TDEC 0400-40-05-.07(2)(q)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Minimum monitoring requirements	To assure compliance with permit limitations, requirements to monitor: (i) The mass (or other measurement specified in the permit) for each pollutant limited in the permit; (ii) The volume of effluent discharged from each outfall; (iii) Other measurements as appropriate including pollutants in internal waste streams under §122.45(i); pollutants in intake water for net limitations under §122.45(f); frequency, rate of discharge, etc., for non-continuous discharges under §122.45(e); pollutants subject to notification requirements under§ 122.42(a); and pollutants in sewage sludge or other monitoring as specified in 40 *CFR* 503; or as determined to be necessary on a case-by-case basis pursuant to Sect. 405(d)(4) of the CWA. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the terms "permit" and "permittee" reflect regulatory language; in this remedial action, "permit" can generally be taken to mean the Sampling and Analysis Plan, and "permittee" to mean DOE.]*	Point source discharge of pollutants as defined in 40 *CFR* 122.2 into surface water—**applicable** Point source discharge of radionuclides into surface water—**relevant and appropriate**	40 *CFR* 122.44(i)(1) *Monitoring requirements*
Waiver for monitoring certain pollutants under existing permit	The Director may authorize a discharger subject to technology-based effluent limitations guidelines and standards in an NPDES permit to forego sampling of a pollutant found at *40* CFR Subchapter N of this chapter if the discharger has demonstrated through sampling and other technical factors that the pollutant is not present in the discharge or is present only at background levels from intake water and without any increase in the pollutant due to activities of the discharger. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the terms "permit" and "permittee" reflect regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision, and "permittee" to mean DOE.]*	Discharge of pollutants subject to TBELs in existing NPDES Permit—**applicable**	40 *CFR* 122.44(a)(2)(i) *Monitoring waivers for certain guideline-listed pollutants*
Monitoring parameter waiver demonstration	Any request for this waiver must be submitted when applying for a reissued permit or modification of a reissued permit. The request must demonstrate through sampling or other technical information, including information generated during an earlier permit term that the pollutant is not present in the discharge or is present only at background levels from intake water and without any increase in the pollutant due to activities of the discharger. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the terms "permit" and "permittee" reflect regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision, and "permittee" to mean DOE.]*	Discharge of pollutants subject to TBELs in existing NPDES Permit—**applicable**	40 *CFR* 122.44(a)(2)(iii)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Monitoring parameter waiver demonstration (cont.)	Any grant of the monitoring waiver must be included in the permit as an express permit condition and the reasons supporting the grant must be documented in the permit's fact sheet or statement of basis. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the terms "permit" and "permittee" reflect regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision, and "permittee" to mean DOE.]*	Discharge of pollutants subject to TBELs in existing NPDES Permit—**applicable**	40 *CFR* 122.44(a)(2)(iv)
Development of effluent limitations	For new sources, technology-based effluent limitations shall require the greatest degree of effluent reduction achievable through application of the best available demonstrated control technology, which shall be new source performance standards, if available.	Discharges of pollutants as defined in 40 *CFR* 122.2 from "new sources"—**applicable**	TDEC 0400-40-05-.08(1)(b)
	Toxic effluent limitations shall be based on consideration of the toxicity of the pollutant, its persistence, its degradability, the usual or potential presence of the affected organisms in any waters, the importance of the affective organisms, and the nature and extent of the effect of the toxic pollutant on such organisms.	Discharge of toxic pollutants as defined in 40 *CFR* 122.2 into surface water—**applicable** Point source discharge of radionuclides into surface water—**relevant and appropriate**	TDEC 0400-40-05-.08(1)(d)
	All effluent limitations or standards shall meet or exceed any minimum standards promulgated by the Administrator and currently effective under the Federal Water Pollution Control Act, P.L. 92-500 as amended or any subsequent applicable acts.		TDEC 0400-40-05-.08(1)(f)
	All pollutants shall receive treatment or corrective action to insure compliance with effluent limitations established by the EPA pursuant to Sects. 301 and 302 and standards of performance for new sources pursuant to Sect. 306, effluent limitations and prohibitions and pretreatment standards pursuant to Sect. 307 of the Federal Water Pollution Control Act, P.L. 92-500 as amended; also to insure compliance with any approved water quality standard.		TDEC 0400-40-05-.08(1)(g)
Compliance Point for Discharge	All permit effluent limitations, standards, and prohibitions shall be established for each outfall or discharge point of the permitted facility, except as otherwise provided for BMPs where limitations on effluent or internal waste streams are infeasible *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the term "permit" reflects regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision.]*	Point source discharge of pollutants as defined in 40 *CFR* 122.2 into surface water—**applicable** Point source discharge of radionuclides into surface water—**relevant and appropriate**	TDEC 0400-40-05-.08(1)(k)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Compliance Point for Discharge (cont.)	All permit effluent limitations, standards, and prohibitions shall be expressed as maximum daily and monthly average, unless impracticable. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the term "permit" reflects regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision.]*	Continuous discharge of pollutants as defined in 40 *CFR* 122.2 into surface water—**applicable** Continuous discharge of radionuclides into surface water—**relevant and appropriate**	TDEC 0400-40-05-.08(1)(m)
Effluent Limitations for metals	All permit effluent limitations, standards, or prohibitions for a metal shall be expressed as "total recoverable metal" unless a promulgated effluent guideline specifies otherwise. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the term "permit" reflects regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision.]*	Point source discharge of pollutants as defined in 40 *CFR* 122.2 into surface water—**applicable** Point source discharge of radionuclides that are also metals into surface water—**relevant and appropriate**	TDEC 0400-40-05-.08(1)(p)
Measurement of effluent standards	Any discharge which is not a minor discharge or activity, or that contains a toxic pollutant for which an effluent standard has been established shall be monitored for the following: • Flow (in million gal per day); and • Pollutants which are subject to reduction or elimination under the terms and conditions of the permit *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the term "permit" reflects regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision. "Pollutant" in this requirement shall include all radionuclides for which an effluent limitation is established under this remedial action.]*	Point source discharge of pollutants as defined in 40 *CFR* 122.2 into surface water—**applicable** Point source discharge of radionuclides into surface water—**relevant and appropriate**	TDEC 0400-40-05-.08(1)(s)
Discharge of wastewater from RCRA hazardous waste landfills	Except as provided in 40 *CFR* 125.30 through 125.32, any existing point source subject to this subpart must achieve the Effluent Limitations listed in the regulation for each regulated parameter[19] which represent the application of BPT.	Discharge of wastewater[20] from landfills subject to 40 *CFR* 264, from an "*existing* "source –**applicable**	40 *CFR* 445.11 *Effluent limitations attainable by the application of BPT.*

[19] Radionuclides are not on the list of *regulated parameters*.

[20] "*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." 40 *CFR* 445. 2(f). "*Contaminated storm water* means storm water which comes in direct contact with landfill wastes, the waste handling and treatment areas, or landfill wastewater as defined in paragraph (f) of this section. Some specific areas of a landfill that may produce contaminated storm water include (but are not limited to): the open face of an active landfill with exposed waste (no cover added); the areas around wastewater treatment operations; trucks, equipment or machinery that has been in direct contact with the waste; and waste dumping areas." 40 *CFR* 445.2(b).

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Discharge of wastewater from RCRA hazardous waste landfills (cont.)	Except as provided in 40 *CFR* 125.30 through 125.32, any existing point source subject to this subpart must achieve the following effluent limitations which represent the application of BAT: Limitations for ammonia (as N), a-terpineol, aniline, benzoic acid, naphthalene, p-cresol, phenol, pyridine, arsenic, chromium and zinc are the same as the corresponding limitations specified in §445.11.		40 *CFR* 445.13 *Effluent limitations representing the degree of effluent reduction attainable by the application of BAT.*
	Any new source subject to this subpart must achieve the following performance standards: Standards are the same as those specified in § 445.11.	Discharge of wastewater[18] from landfills subject to 40 *CFR* Part 264, from a "*new*" source—a**pplicable**	40 *CFR* 445.14 *New source performance standards*
Establishing effluent limits for whole effluent toxicity	When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and where appropriate, the dilution of the effluent in the receiving water. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the term "permit" reflects regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision.]*	Discharge of pollutant as defined under 122.2 or pollutant parameters that causes or has the reasonable potential to cause, or contributes to an excursion above any State water quality standard, including State narrative criteria for water quality – **applicable** Discharge of radionuclides that causes or has the reasonable potential to cause, or contributes to an excursion above any State water quality standard, including State narrative criteria for water quality – **relevant and appropriate**	40 *CFR* 122.44(d)(1)(ii)
	When the permitting authority determines, using the procedures in paragraph (d)(1)(ii) of this section, that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the numeric criterion for whole effluent toxicity, the permit must contain effluent limits for whole effluent toxicity. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the term "permit" reflects regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision.]*		40 *CFR* 122.44(d)(1)(iv)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Establishing effluent limits for whole effluent toxicity (cont.)	Except as provided in this subparagraph, when the permitting authority determines, using the procedures in paragraph (d)(l)(ii) of this section, toxicity testing data, or other information, that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative criterion within an applicable State water quality standard, the permit must contain effluent limits for whole effluent toxicity. Limits on whole effluent toxicity are not necessary where the permitting authority demonstrates in the fact sheet or statement of basis of the NPDES permit, using the procedures in paragraph (d)(l)(ii) of this section, that chemical-specific limits for the effluent are sufficient to attain and maintain applicable numeric and narrative State water quality standards. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the term "permit" reflects regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision.]*		40 *CFR* 122.44(d)(1)(v)
Discharge into surface waters	For industrial discharges without applicable federal effluent guidelines, best professional judgment should be employed to determine appropriate effluent limitations and standards.	Point source discharge of pollutants into surface water —**applicable**	TDEC 0400-40-05-.09(1)(b)
Discharge to a surface water not meeting water quality standards	No permit may be issued: (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 Sects. 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 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. *[NOTE: DOE is not required to obtain a permit for any part of a remedial action conducted entirely onsite, per CERCLA §121(e). Use of the term "permit" reflects regulatory language; in this remedial action, "permit" can generally be taken to mean the Record of Decision. "Pollutant" in this requirement shall include all radionuclides for which an effluent limitation is established under this remedial action.]*	Point source discharge of pollutants into surface water —**applicable**	40 *CFR* 122.4(i)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Radionuclide releases in effluents; protection of the public	Operations involving releases of radioactivity in effluents from the land disposal facility shall be governed by the 25/75/25 mrem/year dose limits in 10 *CFR* 61.41.	The operation of radioactive waste land disposal facilities—**relevant and appropriate**	TDEC 0400-20-11-.16(4) 10 *CFR* 61.43
Non-continuous batch discharges (those discharges which are not continuous as defined in 40 *CFR* 122.2) of landfill wastewater	Non-continuous discharges shall be particularly described and limited, considering the following factors, as appropriate: • Frequency, • Total mass, • Maximum rate of discharge of pollutants during the discharge, and • Mass or concentration of specified pollutants.	Non-continuous discharge of pollutants to surface waters—**applicable** Point source discharge of radionuclides into surface water—**relevant and appropriate**	40 *CFR* 122.45(e)
Temporary bypass of waste stream	Bypass is prohibited unless: • Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; • There were no feasible alternatives to bypass; condition not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance. A bypass that does not cause effluent limitations to be exceeded may be allowed only if bypass is necessary for essential maintenance to assure efficient operation.	Bypass, as defined in TDEC 0400-40-05-.02(15), of waste stream—**applicable** Bypass, as defined in TDEC 0400-40-05-.02(15), of waste stream—**relevant and appropriate** to radionuclides	TDEC 0400-40-05-.07(2)(l) TDEC 0400-40-05-.07(2)(m)
LLW Treatment and Storage Facility Design	Low-level waste systems and components shall be designed to maintain waste confinement. Areas in new and modifications to existing low-level waste management facilities that are subject to contamination with radioactive or other hazardous materials shall be designed to facilitate decontamination. Engineering controls shall be incorporated in the design and engineering of low-level waste treatment and storage facilities to provide volume inventory data and to prevent spills, leaks, and overflows from tanks or confinement systems. Monitoring and/or leak detection capabilities shall be incorporated in the design and engineering of low-level waste treatment and storage facilities to provide rapid identification of failed confinement and/or other abnormal conditions.	Construction of a LLW treatment or storage facility - **TBC**	DOE M 435.1-1 (IV)M.(2)(a) DOE M 435.1-1 (IV)M.(2)(c) DOE M 435.1-1 (IV)M.(2)(d) DOE M 435.1-1 (IV)M.(2)(e)
Management of water generated from EMDF landfill	Onsite wastewater treatment units that are part of a wastewater treatment facility subject to regulation under Sect. 402 or Sect. 307(b) of the CWA are exempt from the requirements of RCRA Subtitle C for all tank systems, conveyance systems (whether piped or trucked), and ancillary equipment used to store or transport RCRA contaminated water.	Onsite wastewater treatment units subject to regulation under §402 or §307(b) of the CWA—**applicable** if water is determined to be hazardous	40 *CFR* 264.1(g)(6) 40 *CFR* 260.10 40 *CFR* 270.1(c)(2)(v) TDEC 0400-12-01-.06(1)(b)(2)(v) TDEC 0400-12-01-.01(2)(a) TDEC 0400-12-01-.07(1)(b)(4)(iv)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Disposal of wastewaters containing RCRA hazardous constituents	Disposal is not prohibited if the wastes are managed in a treatment system which subsequently discharges to waters of the U.S. under the CWA unless the wastes are subject to a specified method of treatment other than DEACT in TDEC 0400-12-01-.10(3)(a) or are D003 reactive cyanide.	Disposal of RCRA restricted hazardous wastes that are hazardous only because they exhibit a hazardous characteristic and are not otherwise prohibited under TDEC 0400-12-01-.10— **applicable** if water is determined to be hazardous	40 *CFR* 268.1(c)(4)(i) TDEC 0400-12-01-.10(1)(a)(3)(iv)(I)

ACM = asbestos-containing material
ANOVA = analysis of variance
ARAP = aquatic resource alteration permit
BAT = best available technology economically
BMP = best management practice
BPT = best practicable control technology
CERCLA = Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR = *Code of Federal Regulations*
CMBST = combustion
CWA = Clean Water Act of 1972
DEACT = deactivation
DOE = U.S. Department of Energy
DOE M = U.S. Department of Energy Manual
DOT = U.S. Department of Transportation
DRH = Tennessee Division of Radiological Health
EMDF = Environmental Management Disposal Facility
EP = extraction procedure
EPA = U.S. Environmental Protection Agency
HMR = Hazardous Materials Regulations
ID = identification number
LDS = leak detection system
LLW = low level (radioactive) waste
ML = minimum level
NGS = National Geodetic Survey
No. = number
NPDES = National Pollutant Discharge Elimination System
PCB = polychlorinated biphenyl
POLYM = polymerization
PPE = personal protective equipment
PQL = practical quantitation limit
RCRA = Resource Conservation and Recovery Act of 1976
RORGS = recovery of organics
TBEL = technology-based effluent limit
TBC = to-be-considered (guidance)
TC = toxicity characteristic
TCA = Tennessee Code Annotated
TDEC = Tennessee Department of Environment and Conservation
TSCA = Toxic Substances Control Act of 1976
U.S. = United States
USGS = U.S. Geological Survey
UTS = universal treatment standard
WQC = water quality criteria
WWTU = wastewater treatment unit

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Order number: F.0615.029.0007 Report number: DOE/OR/01-2535&D1
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Subcategory: 4.6.a Correspondence

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Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Roger Petrie, TDEC, DOE Oversight Division, re: TDEC Comment Letter - Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, TN DOE/OR/01-2535&D1 September 2012]

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Subcategory: 4.6.a Correspondence

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Published: July 18, 2013
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Published: November 27, 2013
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August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0019
Published: December 19, 2013
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Jeffrey L. Crane, U.S. EPA, Region IV, re: Limited Phase I Site Characterization Plan for the Proposed Environmental Management Disposal Facility (EMDF) October 22, 2013 DOE Oak Ridge Reservation Oak Ridge, Tennessee]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0022 Report number: DOE/OR/01-2535&D3
Published: April 1, 2015
Document Title: [Letter to Jeffrey L. Crane, U.S. EPA, Region IV, and Roger Petrie, TDEC, DOE Oversight Division, from Laura Wilkerson, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of the Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee(DOE/OR/01-2535&D3)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0027 Report number: DOE/OR/01-2535&D3
Published: August 6, 2015
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Jeffrey L. Crane, U.S. EPA, Region IV, re: D1 Remedial Investigation/Feasibility Study for CERCLA Oak Ridge Reservation Waste Disposal (DOE/OR/01-2535&D3; April 2015) DOE Oak Ridge Reservation Oak Ridge, Tennessee]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0028 Report number: DOE/OR/01-2535&D3
Published: August 6, 2015
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: TDEC Comment Letter - Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, TN DOE/OR/01-2535&D3 March 2015]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0033 Report number: DOE/OR/01-2535&D4
Published: March 10, 2016
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy Young, TDEC, DOE Oversight Division, re: Department of Energy's Proposed Evaluation of In-Cell Macroencapsulation of Mercury in the D4 Remedial Investigation/Feasibility Study (RI/FS) for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Oak Ridge Reservation Waste Disposal Oak Ridge, Tennessee (DOE/OR/01-2535&D4)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0034 Report number: DOE/OR/01-2535&D4
Published: March 16, 2016
Document Title: [Letter to Jeffrey L. Crane, U.S. EPA, Region IV, and Randy Young, TDEC, DOE Oversight Division, from Brian Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of the Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2535&D4) and Extension Request for the Appendix E Milestones for the Environmental Management Disposal Facility Project]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0036 Report number: DOE/OR/01-2535&D4
Published: March 23, 2016
Document Title: [Letter to Jeffrey L. Crane, U.S. EPA, Region IV, and Randy Young, TDEC, DOE Oversight Division, from Brian Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of the Erratum to the Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act, Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2535&D4)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.028.0040 Report number: DOE/OR/01-2535&D4
Published: May 16, 2016
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy Young, TDEC, DOE Oversight Division, re: TDEC Comment Letter - Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, TN - DOE/OR/01-2535&D4 - March 2016]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0041 Report number: DOE/OR/01-2535&D4
Published: May 20, 2016
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Jeffrey L. Crane, U.S. EPA, Region IV, re: D2 Remedial Investigation/Feasibility Study for CERCLA Program Waste Disposal (DOE/OR/01-2535&D4; March 2016) DOE Oak Ridge Reservation, Oak Ridge, Tennessee]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0043 Report number: DOE/OR/01-2535&D4
Published: June 17, 2016
Document Title: [Letter to David Adler, U.S. DOE-ORO, from Chris Thompson, TDEC, DOE Oversight Division, re: Response to Department of Energy (DOE) Questions on Environmental Management Disposal Facility]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0045 Report number: DOE/OR/01-2535&D3
Published: August 24, 2016
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy Young, TDEC, DOE Oversight Division, re: Proposed Path Forward of the Informal Dispute for the Proposed Environmental Management Disposal Facility on the Oak Ridge Reservation]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0050 Report number: DOE/OR/01-2535&D2
Published: December 9, 2016
Document Title: [Letter to David G. Adler, U.S. DOE-ORO, and Brian Henry, U.S. DOE-ORO, from Richard Campbell, U.S. EPA, Region IV, and Chris Thompson, U.S. EPA, Region IV, re: EPA Letter to Support Identification of Site 7c as a Potential On-Site Disposal Option (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0051 Report number: DOE/OR/01-2535&D2
Published: December 20, 2016
Document Title: [Letter to Randall Chaffins, U.S. EPA, Region IV, and Shari Meghreblian, TDEC, DOE Oversight Division, from John Mullis, U.S. DOE-ORO, re: Informal Dispute Resolution Agreement]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0052 Report number: DOE/OR/01-2535
Published: January 13, 2017
Document Title: [Letter to John A. Mullis, II, U.S. DOE-ORO, from Shari L. Meghreblian, TDEC, re: EMDF D5 Remedial Investigation and Feasibility Study (RI/FS)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0056 Report number: DOE/OR/01-2535&D5
Published: February 28, 2017
Document Title: [Letter to Carl Froede, U.S. EPA, Region IV, and Randy Young, TDEC, DOE Oversight Division, from Brian Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of the Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2535&D5)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0060 Report number: DOE/OR/01-2535&D5
Published: April 21, 2017
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy Young, TDEC, DOE Oversight Division, re: TDEC Comment Letter - Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, TN DOE/OR/01-2535&D5 February 2017]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0061 Report number: DOE/OR/01-2535&D5
Published: June 21, 2017
Document Title: [Letter to John Blevins, U.S. DOE-ORO, from Franklin Hill, U.S. EPA, Region IV, re: Remedial Investigation/Feasibility Study for CERCLA Oak Ridge Reservation Waste Disposal Oak Ridge, Tennessee (Environmental Management Disposal Facility)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0062 Report number: DOE/OR/01-2535&D5
Published: July 18, 2017
Document Title: [Letter to Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO and John Michael Japp, U.S. DOE-ORO, re: Response to Comments for the Remedial Investigation/Feasibility Study for Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2535&D5)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0067 Report number: DOE/OR/01-2535&D5
Published: January 11, 2018
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of Errata Pages for the Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act, Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2535&D5)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0069 Report number: DOE/OR/01-2535&D5
Published: January 23, 2018
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: TDEC Comment Letter - Errata Pages for the Remedial Investigation/Feasibility Study for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2535&D5)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0094
Published: August 24, 2018
Document Title: [Letter to Chris P. Thompson, TDEC, and Jay A. Mullis, DOE-ORO, from Constance A. Jones, U.S. EPA, Region IV, re: EPA Statement of Dispute on the D2 Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee (DT)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0131
Published: September 28, 2018
Document Title: [Letter to Shari Meghreblian, TDEC DOE Oversight Division, and Onis "Trey" Glenn, III, U.S. EPA Region IV, from John A. Mullis, II, U.S. DOE-ORO, re: Documentation of Federal Facility Agreement Dispute Elevation to the Senior Executive Committee]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0132
Published: October 03, 2018
Document Title: [Letter to Shari L. Meghreblian, TDEC DOE Oversight Division, and John A. Mullis, II, U.S. DOE-ORO from Franklin Hill, U.S. EPA, Region IV, re: EPA Letter Regarding the Written Statement of Dispute on the D2 Focused Feasibility Study (FFS) for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0142 Report number: DOE/OR/01-2535&D5
Published: February 26, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: High-Level Cost Evaluation Questions: Follow-Up to Tennessee Department of Environment and Conservation Request (November 29, 2018) for Backup Information Used in the Development of the Cost Estimates for the Comparison of Disposal Alternatives Associated With Oak Ridge Reservation CERCLA Waste Disposal]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0150
Published: March 21, 2019
Document Title: [Letter to John A. Mullis, II, U.S. DOE-ORO, and David W. Salyers, TDEC, DOE Oversight Division, from Mary S. Walker, U.S. EPA, Region IV, re: EPA's Written Disposition in the Formal Dispute on August 24, 2018, on the Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee (DT)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0156 Report number: DOE/OR/01-2535&D5
Published: May 10, 2019
Document Title: [Letter to Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Response to High-Level Cost Evaluation Questions: Follow-Up to Tennessee Department of Environment and Conservation Request (November 29, 2018) for Backup Information Used in the Development of the Cost Estimates for the Comparison of Disposal Alternatives Associated With Oak Ridge Reservation CERCLA Waste Disposal]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.a Correspondence

Order number: F.0615.029.0174 Report number: DOE/OR/01-2535&D5
Published: August 30, 2019
Document Title: [Letter to Mark S. Watson, City of Oak Ridge, from John Michael Japp, U.S. DOE-ORO, re: Comment Resolution for City of Oak Ridge Comments on the Remedial Investigation/Feasibility Study for Disposal of Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2535&D5)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.b Secondary Reports

Order number: F.0615.029.0021 Report number: DOE/ORO-2468 (Rev. 1)
Published: October 22, 2013
Document Title: Limited Phase I Site Characterization Plan for the Proposed Environmental Management Disposal Facility Site as Requested by Tennessee Department of Environment and Conservation

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.b Secondary Reports

Order number: F.0615.029.0080 Report number: DOE/OR/01-2770&D1
Published: April 2018
Document Title: Phase 2 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee [DOE/OR/01-2770&D1]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.b Secondary Reports

Order number: F.0615.029.0088 Report number: DOE/OR/01-2770&D2
Published: July 2018
Document Title: Phase 2 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.b Secondary Reports

Order number: F.0615.029.0143 Report number: UCOR-5204
Published: February 2019
Document Title: Storm Water Pollution Prevention Plan for Phase 3 Characterization Road Construction for the e Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.b Secondary Reports

Order number: F.0615.029.0189 Report number: UCOR-5215
Published: August 2019
Document Title: Stormwater Management Requirements for Early Site Preparation for the Proposed On-site Waste Disposal Facility, Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.b Secondary Reports

Order number: F.0615.029.0233 Report number: UCOR-5550
Published: April 2022
Document Title: Development of Fish Tissue and Surface Water Preliminary Remediation Goals for Radionuclides of Interest for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.c Secondary Report Correspondence

Order number: F.0615.036.0086
Published: May 22, 2017
Document Title: [Letter to Shari Meghreblian, TDEC, DOE Oversight Division, and Franklin Hill, U.S. EPA, Region IV, from John A. Mullis, II, U.S. DOE-ORO, re: Invocation of Formal Dispute Under Section XXVI, Resolution of Disputes, of the Oak Ridge Reservation Federal Facility Agreement]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.c Secondary Report Correspondence

Order number: F.0615.036.0085
Published: June 30, 2017
Document Title: [Letter to Anne Heard, U.S. EPA, Region IV, and Robert J. Martineau, Jr., from John A. Mullis, II, U.S. DOE-ORO, re: Formal Dispute Under Section XXVI, Resolution of Disputes, of the Oak Ridge Reservation Federal Facility Agreement Regarding the Environmental Management Disposal Facility]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.c Secondary Report Correspondence

Order number: F.0615.029.0079 Report number: DOE/OR/01-2770&D1
Published: May 1, 2018
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Phase 2 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee DOE/OR/01-2770&D1]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.c Secondary Report Correspondence

Order number: F.0615.029.0083 Report number: DOE/OR/01-2770&D1
Published: June 1, 2018
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Carl Froede Jr., U.S. EPA, Region IV, re: EPA Comments on the Phase 2 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2770&D1) (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.c Secondary Report Correspondence

Order number: F.0615.029.0084 Report number: DOE/OR/01-2770&D1
Published: June 4, 2018
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, Oversight Division, re: TDEC Comments - Phase 2 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee DOE/OR/01-2770&D1, April 2017]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.c Secondary Report Correspondence

Order number: F.0615.029.0087 Report number: DOE/OR/01-2770&D2
Published: July 30, 2018
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of the Phase 2 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2770&D2)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.c Secondary Report Correspondence

Order number: F.0615.029.0106 Report number: DOE/OR/01-2770&D2
Published: August 27, 2018
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Carl Froede Jr., U.S. EPA, Region IV, re: EPA Comments on the Phase 2 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2770&D2) (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.f Document References

Order number: F.0615.029.0239
Published: February 22, 2021
Document Title: Oak Ridge Regulatory Partnership Framework, Emerging Issues Team: EMDF Issues to ROD

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.f Document References

Order number: F.0615.029.0238
Published: August 25, 2021
Document Title: Emerging Issues Team (EIT) Agreement for Public Engagement Through the EMDF ROD

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.f Document References

Order number: F.0615.029.0236
Published: October 8, 2021
Document Title: Mercury Management Approach for Discharges to Bear Creek - EMDF ROD

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.f Document References

Order number: F.0615.029.0237
Published: May 3, 2022
Document Title: Emerging Issues Team (EIT)-Developed Approach to EMDF Wastewater Management for Radionuclides

Category: 4.0 Remedial Response
Subcategory: 4.6 Remedial Investigation/Feasibility Study Reports
Subcategory: 4.6.g Record of Communication

Order number: F.0615.029.0187
Published: October 26, 2018
Document Title: [E-mail to Glenn Trey, U.S. EPA, from Jay Mullis, U.S. DOE-ORO, re: FFS Dispute Draft Discharge Limits]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports

Order number: F.0615.029.0119 Report number: DOE/OR/01-2664&D1
Published: April 2015
Document Title: Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports

Order number: F.0615.029.0127 Report number: DOE/OR/01-2664&D2
Published: February 2016
Document Title: Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports

Order number: F.0615.029.0211 Report number: DOE/OR/01-2664&D3
Published: June 2021
Document Title: Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports

Order number: F.0615.029.0235 Report number: DOE/OR/01-2664&D4
Published: June 2022
Document Title: Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0077
Published: March 14, 2013
Document Title: [Letter to Mark Whitney, U.S. DOE-ORO, from Franklin Hill, U.S. EPA, Region IV, re: Ensure the Appropriate Evaluation is Conducted and Documented to Address the DOE Proposal to Change its Operating Practices for Solid Waste Landfill Leachate at EMWMF]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0118 Report number: DOE/OR/01-2664&D1
Published: April 22, 2015
Document Title: [Letter to Jeffrey L. Crane, U.S. EPA, Region IV, and Roger Petrie, TDEC, DOE Oversight Division, from Laura Wilkerson, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of the Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee (DOE/OR/01-2664&D1)]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0122 Report number: DOE/OR/01-2664&D1
Published: July 31, 2015
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Jeffrey L. Crane, U.S. EPA, Region IV, re: D1 Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste (DOE/OR/01-2664&D1; April 2015) DOE Oak Ridge Reservation Oak Ridge, Tennessee]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0121 Report number: DOE/OR/01-2664&D1
Published: August 20, 2015
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: 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&D1 - April 2015]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0126 Report number: DOE/OR/01-2664&D2
Published: February 23, 2016
Document Title: [Letter to Jeffrey L. Crane, U.S. EPA, Region IV, and Randy Young, TDEC, DOE Oversight Division, from Brian Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of the 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)]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0128 Report number: DOE/OR/01-2664&D2
Published: March 31, 2016
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy Young, TDEC, DOE Oversight Division, re: Focused Feasibility Study (FFS) for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee (DOE/OR/01-2664&D2)]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0129 Report number: DOE/OR/01-2664&D2
Published: April 1, 2016
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Jeffrey L. Crane, U.S. EPA, Region IV, re: D2 Focused Feasibility for CERCLA Landfill Combined Waste Water Management (DOE/OR/01-2664&D2; February 2016) DOE Oak Ridge Reservation Oak Ridge, Tennessee]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0130 Report number: DOE/OR/01-2664&D2
Published: June 16, 2016
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Jeffrey L. Crane, U.S. EPA, Region IV, re: EPA R4 Dispute Position at the DOE Paducah Gaseous Diffusion Plant and the Informal Dispute Over the D2 Focused Feasibility for CERCLA Landfill Combined Waste Water Management (DOE/OR/01-2664&D2; February 2016) DOE Oak Ridge Reservation, Oak Ridge, Tennessee]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0117 Report number: DOE/OR/01-2664&D2
Published: August 24, 2018
Document Title: [Letter to John A. Mullis, II, U.S. DOE-ORO, and Onis Trey Glenn, III, U.S. EPA, Region IV, from Shari Meghreblian, TDEC DOE Oversight Division re: TDEC Comments on the Three Issues That Need to be Resolved Prior to Issuance of a Proposed Plan (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0141 Report number: DOE/OR/01-2664&D2
Published: January 16, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Federal Facility Agreement Informal Dispute Discussions Regarding Path Forward for Beta 4 Complex Ancillary Facilities]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0155 Report number: DOE/OR/01-2664&D2
Published: April 5, 2019
Document Title: [Letter to John A. Mullis, II, U.S. DOE-ORO, and Mary S. Walker, U.S. EPA, Region IV, from David W. Salyers, TDEC DOE Oversight Division re: State of Tennessee Position in the Formal Dispute Initiated by the U.S. Environmental Protection Agency on August 24, 2018, on the 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)]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0161 Report number: DOE/OR/01-2664&D2
Published: April 5, 2019
Document Title: [Letter to Andrew R. Wheeler, U.S. EPA, from John A. Mullis II, U.S. DOE-ORO, re: Appeal of U.S. Environmental Protection Agency's Region IV Position Regarding Water Discharge Limits for Radionuclides]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0162 Report number: DOE/OR/01-2664&D2
Published: April 18, 2019
Document Title: [Letter to Andrew R. Wheeler, U.S. EPA, from David W. Salyers, TDEC, DOE Oversight Division, re: State of Tennessee Perspective on letter from John A. Mullis to Andrew R. Wheeler dated April 5, 2019, Appeal of U.S. Environmental Protection Agency's Region IV Position Regarding Water Discharge Limits for Radionuclides]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0163 Report number: DOE/OR/01-2664&D2
Published: April 18, 2019
Document Title: [Letter to Jay A Mullis II, U.S. DOE-ORO, from Susan Parker Bodine, U.S. EPA, Region IV, re: Acknowledgement of Elevation of Dispute under the FFA Regarding the Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0164 Report number: DOE/OR/01-2664&D2
Published: June 21, 2019
Document Title: [Letter to Andrew R. Wheeler, U.S. EPA, from Thomas L. Cubbage, III, U.S. DOE, re: Letter Dated April 5, 2019, from Manager Mullis seeking review of the March 21, 2019 decision by EPA which is declined to approve the Water Management Practices at Oak Ridge Reservation (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0165 Report number: DOE/OR/01-2664&D2
Published: July 5, 2019
Document Title: [Letter to Andrew R. Wheeler, U.S. EPA, from David W. Salyers, TDEC, DOE Oversight Division, re: State of Tennessee Perspective on letter from Thomas L. Cubbage III to Andrew R. Wheeler dated June 21, 2019, Regarding Discharge Limits for Landfill Wastewater from Existing and Proposed CERCLA Mixed-Waste Landfills in Oak Ridge, Tennessee]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0160 Report number: DOE/OR/01-2664&D2
Published: July 8, 2019
Document Title: [Letter to David Adler, U.S. DOE-ORO, from Chuck Head, TN Environment & Conservation, re: Proposed Environmental Management Disposal Facility - Groundwater Conditions at the Proposed DOE-OR Environmental Management Disposal Facility]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0175
Published: August 21, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Tennessee Department of Environment and Conservation (TDEC) Comments on the July 10, 2019 Groundwater Model Presentation for the Proposed Environmental Management Disposal Facility (EMDF)]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0202 Report number: DOE/OR/01-2664&D2
Published: December 31, 2020
Document Title: [Letter to John A. Mullis, II., U.S. DOE-ORO, and David W. Salyers, TDEC, from Andrew R. Wheeler, U.S. EPA, Region IV, re: Oak Ridge Dispute Decision Letter Dated December 31, 2020, Between EPA, TDEC, and DOE Regarding the Discharge to Surface Water of Wastewaters Generated During a Response Action Under the CERCLA at the Oak Ridge Reservation Facility (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0203 Report number: DOE/OR/01-2664&D2
Published: January 19, 2021
Document Title: [Letter to John A. Mullis, II, U.S. DOE-ORO, and David W. Salyers, TDEC, from Peter C. Wright, U.S. EPA, Region IV, re: Andrew R. Wheeler's December 31, 2020. Final Decision Resolving Dispute Among EPA, TDEC, and DOE Regarding the Oak Ridge Reservation, Updates to ORR Wastewater FFS ARARs Table Final January 19, 2021 (DT)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0210 Report number: DOE/OR/01-2664&D3
Published: June 23, 2021
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and Roger B. Petrie, U.S. DOE-ORO, re: Transmittal of the 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)]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0213 Report number: DOE/OR/01-2664&D3
Published: July 22, 2021
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Carl R. Froede, Jr., U.S. EPA, Region IV, re: EPA Comments on Revised 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)]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0218 Report number: DOE/OR/01-2664&D4
Published: October 28, 2021
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and Roger B. Petrie, U.S. DOE-ORO, re: Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee (DOE/OR/01-2664&D4)]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0234 Report number: DOE/OR/01-2664&D4
Published: June 1, 2022
Document Title: [Letter to Samantha Urquhart-Foster, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and Roger B. Petrie, U.S. DOE-ORO, re: Transmittal of the Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee (DOE/OR/01-2664&D4)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.a Correspondence

Order number: F.0615.029.0240 Report number: DOE/OR/01-2664&D4
Published: June 29, 2022
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: 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&D4)]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.b Secondary Reports

Order number: F.0615.029.0193 Report number: UCOR-5095/R2
Published: April 2020
Document Title: Composite Analysis for the Environmental Management Waste Management Facility and the Environmental Management Disposal Facility, Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.b Secondary Reports

Order number: F.0615.029.0194 Report number: UCOR-5094/R2
Published: April 2020
Document Title: Performance Assessment for the Environmental Management Disposal Facility at the Y-12 National Security Complex, Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.c Secondary Report Correspondence

Order number: F.0615.029.0017
Published: December 4, 2013
Document Title: [Letter to Jeffrey L. Crane, U.S. EPA, Region IV, and Roger Petrie, TDEC, DOE Oversight Division, from John Michael Japp, U.S. DOE-ORO, and Laura Wilkerson, U.S. DOE-ORO, re: Management of Contact Water and Leachate]

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.c Secondary Report Correspondence

Order number: F.0615.029.0018
Published: January 15, 2014
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Roger Petrie, TDEC, DOE Oversight Division, re: Management of Contact Water and Leachate]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.7 Feasibility Study Reports
Subcategory: 4.7.e Document References

Order number: F.0615.029.0173
Published: September 17, 2019
Document Title: [E-mail to Susan DePaoli, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Response to TDEC Data Requests (8/24/19 and 8/28/19) and Proposed Errata Changes FFS for Water Management]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans

Order number: F.0615.030.0096 Report number: DOE/OR/01-2695&D1
Published: June 2016
Document Title: Proposed Plan for the Disposal of Future Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act of 1980 Waste

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans

Order number: F.0615.030.0100 Report number: DOE/OR/01-2695&D2
Published: June 2018
Document Title: Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans

Order number: F.0615.030.0104 Report number: DOE/OR/01-2695&D2/R1
Published: September 2018
Document Title: Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0095 Report number: DOE/OR/01-2695&D1
Published: June 28, 2016
Document Title: [Letter to Jeffrey L. Crane, U.S. EPA, Region IV, and Randy Young, TDEC, DOE Oversight Division, from Thomas Morgan, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of the Proposed Plan for the Disposal of Future Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act of 1980 Waste (DOE/OR/01-2695&D1)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0097 Report number: DOE/OR/01-2695&D1
Published: July 7, 2016
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Jeffrey L. Crane, U.S. EPA, Region IV, re: D1 Proposed Plan for CERCLA Program Waste Disposal (DOE/OR/01-2695&D1; June 2016) DOE Oak Ridge Reservation, Oak Ridge, Tennessee]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0098 Report number: DOE/OR/01-2695&D1
Published: August 31, 2016
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy Young, TDEC, DOE Oversight Division, re: Federal Facility Agreement Extension Request for the Review of the D1 Proposed Plan at the Environmental Management Disposal Facility Project (DOE/OR/01-2695&D1)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0099 Report number: DOE/OR/01-2695&D2
Published: June 5, 2018
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste, Oak Ridge, Tennessee (DOE/OR/01-2695&D2)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0101 Report number: DOE/OR/01-2695&D2
Published: July 6, 2018
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste (DOE/OR/01-2695&D2)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0102 Report number: DOE/OR/01-2695&D2
Published: July 10, 2018
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Constance A. Jones, U.S. EPA, Region IV, re: Letter Indicating EPA is Invoking Dispute Regarding the Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste, Oak Ridge, Tennessee (DOE/OR/01-2695&D2) (DT)

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0107 Report number: DOE/OR/01-2695&D2
Published: July 10, 2018
Document Title: [Letter to David G. Adler, U.S. DOE-ORO, Franklin Hill, U.S. EPA, Region IV, and Tisha Calabrese Benton, TDEC, DOE Oversight Division, from Mark Watson, City of Oak Ridge, re: Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste DOE/OR/01-2695&D2]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0103 Report number: DOE/OR/01-2695&D2
Published: July 30, 2018
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Formal Dispute; Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste (DOE/OR/01-2695&D2)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0108 Report number: DOE/OR/01-2695&D2/R1
Published: August 10, 2018
Document Title: [Letter to Shari Meghreblian, TDEC, DOE Oversight Division, and Onis Trey Glenn, III, U.S. EPA, Region IV, from, Jay A. Mullis, U.S. DOE-ORO, re: Forwarding Statements of Formal Dispute Concerning the Failure to Complete the Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0109 Report number: DOE/OR/01-2695&D2
Published: August 24, 2018
Document Title: [Letter to Shari Meghreblian, TDEC, DOE Oversight Division, and Jay A. Mullis, U.S. DOE-ORO, from, Onis Trey Glenn, III, U.S. EPA, Region IV, re: Comments on EPA's Position Relative to the Formal Dispute During the 8/22/2018 Videoconference (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0110 Report number: DOE/OR/01-2695&D2
Published: August 24, 2018
Document Title: [Letter to Jay A. Mullis, U.S. DOE-ORO, and Onis Trey Glenn, III, U.S. EPA, Region IV, from Shari Meghreblian, TDEC, DOE Oversight Division, re: TDEC Comments on the Three Issues That Need to be Resolved Prior to Issuance of a Proposed Plan (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0111 Report number: DOE/OR/01-2695&D2
Published: August 24, 2018
Document Title: [Letter to Shari Meghreblian, TDEC, DOE Oversight Division, and Onis Trey Glenn, III, U.S. EPA, Region IV, from, Jay A. Mullis, U.S. DOE-ORO, re: Follow-Up to Senior Executive Committee Meeting Held August 22, 2018]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0112 Report number: DOE/OR/01-2695&D2
Published: August 30, 2018
Document Title: [Letter to Shari Meghreblian, TDEC, DOE Oversight Division, and Onis Trey Glenn, III, U.S. EPA, Region IV, from, Jay A. Mullis, U.S. DOE-ORO, re: Redrafted Proposed Plan for the Environmental Management Disposal Facility in Oak Ridge, Tennessee]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0113 Report number: DOE/OR/01-2695&D2/R1
Published: September 7, 2018
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act of 1980 Waste, Oak Ridge, Tennessee (DOE/OR/01-2695&D2/R1)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0149
Published: March 4, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy Young, TDEC, DOE Oversight Division, re: TDEC Position Regarding Long-Term Financial Assurance for the Proposed Environmental Management Disposal Facility]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.a Correspondence

Order number: F.0615.030.0205 Report number: DOE/OR/01-2695
Published: March 15, 2021
Document Title: [Letter to John A. Mullis, II, U.S. DOE-ORO, from Mark Gilbertson, Associate Principal Deputy Assistant Secretary for Regulatory and Policy Affairs, re: Issuance of the Preliminary Disposal Authorization Statement for the Proposed Environmental Management Disposal Facility, Oak Ridge]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.b Secondary Reports

Order number: F.0615.029.0063 Report number: DOE/OR/01-2739&D1
Published: August 2017
Document Title: Phase 1 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.b Secondary Reports

Order number: F.0615.029.0073 Report number: DOE/OR/01-2739&D2
Published: March 2018
Document Title: Phase 1 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.b Secondary Reports

Order number: F.0615.029.0091 Report number: DOE/OR/01-2785
Published: July 2018
Document Title: Technical Memorandum #1, Environmental Management Disposal Facility Phase 1 Field Sampling Results Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.b Secondary Reports

Order number: F.0615.029.0158 Report number: DOE/OR/01-2819&D1
Published: May 2019
Document Title: Technical Memorandum #2,
Environmental Management Disposal Facility
Phase 1 Monitoring,
Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.b Secondary Report Correspondence

Order number: F.0615.030.0197 Report number: NAC-0131-R1
Published: October 15, 2020
Document Title: [Letter to Justin Marble, U.S. DOE-HQ, and Sherri Ross, U.S. DOE-HQ, from Randy C. Young, TDEC, DOE Oversight Division, re: Review of Performance Assessment and Composite Analysis for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.029.0064 Report number: DOE/OR/01-2739&D1
Published: October 4, 2017
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of Phase 1 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2739&D1)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.029.0065 Report number: DOE/OR/01-2739&D1
Published: November 8, 2017
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Carl R. Froede, Jr., TDEC, DOE Oversight Division, re: EPA Comments on the Phase 1 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act, Oak Ridge, Tennessee (DOE/OR/01-2739&D1) (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.029.0066 Report number: DOE/OR/01-2739&D1
Published: November 9, 2017
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Phase 1 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee DOE/OR/01-2739&D1, October 2017]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.029.0070 Report number: DOE/OR/01-2739&D2
Published: January 16, 2018
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: TDEC Comment Letter - Phase 1 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee - DOE/OR/01-2739&D2, December 2017]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.029.0078 Report number: DOE/OR/01-2739&D2
Published: April 26, 2018
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of Errata Pages for the Phase I Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2739&D2)]

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EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.029.0081 Report number: DOE/OR/01-2739&D2
Published: May 7, 2018
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Carl R. Froede, Jr., U.S. EPA, Region IV, re: EPA Approval of the D2 Phase 1 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2739&D2) (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.029.0082 Report number: DOE/OR/01-2739&D2
Published: May 7, 2018
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: TDEC Approval Letter - Phase 1 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee DOE/OR/01-2739&D2, April 2018]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.029.0090 Report number: DOE/OR/01-2785
Published: July 26, 2018
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Pre-Published Technical Memorandum #1 (TM-1) for the Proposed Environmental Management Disposal Facility (EMDF)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.029.0092 Report number: DOE/OR/01-2785
Published: August 16, 2018
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Carl R. Froede, Jr., U.S. EPA, Region IV, re: EPA Comments on the Pre-Published Technical Memorandum #1 (TM-1) for the Proposed Environmental Management Disposal Facility (EMDF) (DT)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.030.0166 Report number: DOE/OR/01-2819&D1
Published: June 7, 2019
Document Title: [Letter to Constance A. Jones, U.S. EPA Region IV and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO and John Michael Japp, U.S. DOE-ORO, re: Transmittal of Technical Memorandum #2, Environmental Management Disposal Facility Phase I Monitoring, Oak Ridge, Tennessee (DOE/OR/01-2819&D1) and Responses to Comments on Technical Memorandum #1, Environmental Management Disposal Facility Phase I Monitoring, Oak Ridge, Tennessee (DOE/OR/01-2785)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.030.0167 Report number: DOE/OR/01-2785&D1
Published: June 7, 2019
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of Technical Memorandum #2, Environmental Management Disposal Facility Phase I Monitoring, Oak Ridge, Tennessee (DOE/OR/01-2819&D1) and Responses to Comments on Technical Memorandum #1, Environmental Management Disposal Facility Phase I Monitoring, Oak Ridge, Tennessee (DOE/OR/01-2785)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.030.0176 Report number: DOE/OR/01-2819&D1
Published: August 27, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Technical Memorandum #2 (TM-2) for the Proposed Environmental Management Disposal Facility (EMDF) (DOE/OR/01-2819&D1)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.030.0177 Report number: DOE/OR/01-2819&D1
Published: August 29, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Carl R. Froede Jr., U.S. EPA, Region IV, re: EPA Comments on Technical Memorandum #2, Environmental Management Disposal Facility Phase 1 Monitoring, Oak Ridge, Tennessee (DOE/OR/01-2819&D1) (DT)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.030.0188 Report number: DOE/OR/01-2819&D1
Published: November 25, 2019
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Response to U.S. Environmental Protection Agency Comments Received August 29, 2019 on Technical Memorandum #2, Environmental Management Disposal Facility Phase I Monitoring Oak Ridge, Tennessee (DOE/OR/01-2819&D1)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.009.0191 Report number: DOE/OR/01-2819&D1
Published: December 9, 2019
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Response to Tennessee Department of Environment and Conservation Comments Received August 27, 2019 on Technical Memorandum #2, Environmental Management Disposal Facility Phase 1 Monitoring Oak Ridge, Tennessee (DOE/OR/01-2819&D1)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Reports

Order number: F.0615.030.0198 Report number: NAC-0131-R1
Published: October 12, 2020
Document Title: A Review of the Performance Assessment and Composite Analysis for the Proposed Environmental Management Disposal Facility, Oak Ridge, Tennessee

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.030.0204
Published: February 4, 2021
Document Title: [Letter to David W. Salyers, TDEC DOE Oversight Division, from John A. Mullis II, U.S. DOE-ORO, re: Response to the Tennessee Department of Environment and Conservation Letter Regarding Performance Assessment and Composite Analysis for the Proposed Environmental Management Disposal Facility]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.c Secondary Report Correspondence

Order number: F.0615.029.0074 Report number: DOE/OR/01-2739&D2
Published: Arpil 9, 2018
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Transmittal of the Phase 1 Field Sampling Plan for the Proposed Environmental Management Disposal Facility for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal, Oak Ridge, Tennessee (DOE/OR/01-2739&D2)]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.g Record of Communication

Order number: F.0615.029.0076 Report number: DOE/OR/01-2739&D2
Published: March 21, 2018
Document Title: [E-mail Comments from EPA Regarding DOE/OR/01-2739&D2]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.g Record of Communication

Order number: F.0615.029.0089
Published: July 20, 2018
Document Title: [E-mail to Franklin Hill, U.S. EPA, Region IV, from David Adler, U.S. DOE-ORO, re: July 20 Formal Dispute Statement Issuance]

Category: 4.0 Remedial Response
Subcategory: 4.8 Proposed Plans
Subcategory: 4.8.g Record of Communication

Order number: F.0615.030.0168 Report number: DOE/OR/01-2695
Published: September 12, 2018
Document Title: [E-mail Comments to John Michael Japp, U.S. DOE-ORO, from Kelley Smith, Public Citizen, Regarding Proposed Plan for the Disposal of Oak Ridge Reservation Cmoprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste (DOE/OR/01-2695)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision

Order number: F.0615.031.0206 Report number: DOE/OR/01-2794&D1
Published: June 2021
Document Title: 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)

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision

Order number: F.0615.031.0243 Report number: DOE/OR/01-2794&D2
Published: July 2022
Document Title: 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

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0144
Published: February 14, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Agreements by the FFA Parties for the Proposed Environmental Management Disposal Facility Record of Decision]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0169
Published: July 25, 2019
Document Title: [Letter to John A. Mullis, U.S. DOE-ORO, from Franklin E. Hill, U.S. EPA, Region IV, re: EPA Request to Delay Issuance of the D1 Environmental Management Disposal Facility Record of Decision (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0170
Published: July 30, 2019
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Federal Facility Agreement Milestone Extension Request for Environmental Management Disposal Facility Record of Decision]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0171
Published: July 31, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Constance A. Jones, U.S. EPA, Region IV, re: EPA Response to the DOE Request for Extension of the D1 Record of Decision for the Environmental Management Disposal Facility (DT)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0172
Published: August 12, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: DOE Federal Facility Agreement (FFA) Milestone Extension Request for the Environmental Management Disposal Facility (EMDF) Record of Decision (ROD)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0207 Report number: DOE/OR/01-2794&D1
Published: July 12, 2021
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian Henry, U.S. DOE-ORO, and Roger B. Petire, U.S. DOE-ORO, re: Submittal of the Record of Decision for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee (DOE/OR/01-2794&D1)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0215 Report number: DOE/OR/01-2794&D1
Published: August 16, 2021
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Constance A, Jones, U.S. EPA, Region IV, re: EPA Notification of Additional 30-day Review of the CERCLA Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee (DOE/OR/01-2794&D1) (DT)

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0214 Report number: DOE/OR/01-2794&D1
Published: August 16, 2021
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Notification of TDEC Extension 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)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0216 Report number: DOE/OR/01-2794&D1
Published: October 6, 2021
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Carl R. Froede, Jr., U.S. EPA, Region IV, re: EPA Comments on the Record of Decision for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee (DOE/OR/01-2794&D1) (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0217 Report number: DOE/OR/01-2794&D1
Published: October 8, 2021
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Randy C. Young, TDEC-DOE Oversight Division, re: 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)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0219 Report number: DOE/OR/01-2794&D1
Published: December 6, 2021
Document Title: [Letter to Samantha Urquhart-Foster, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and Roger B. Petrie, U.S. DOE-ORO, re: Submittal of Federal Facility Agreement Extension Request for 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)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0220 Report number: DOE/OR/01-2794&D1
Published: December 15, 2021
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Federal Facility Agreement (FFA) Extension Request (December 6, 2021) for Environmental Management Disposal Facility (EMDF) Record of Decision (ROD) (DOE/OR-01-2794&D1)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0221 Report number: DOE/OR/01-2794&D1
Published: December 16, 2021
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Samantha Urquhart-Foster, U.S. EPA, Region IV, re: EPA Approval Letter Request to Extend the Federal Facility Agreement (FFA) Milestone Submittal Date for the Record of Decision for CERCLA, Oak Ridge Reservation Waste Disposal at the EMDF, Oak Ridge, Tennessee (DOE/OR/01-2794&D1) (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0222 Report number: DOE/OR/01-2794&D1
Published: December 29, 2021
Document Title: [Letter to Samantha Urquhart-Foster, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and Roger B. Petrie, U.S. DOE-ORO, re: Submittal of Federal Facility Agreement Extension Request for 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)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0223 Report number: DOE/OR/01-2794&D1
Published: January 10, 2022
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Samantha Urquhart-Foster, U.S. EPA, Region IV, re: EPA Approval of Extension Request for the Record of Decision for CERCLA, Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee (DOE/OR/01-2794&D1) (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0224 Report number: DOE/OR/01-2794&D1
Published: February 7, 2022
Document Title: [Letter to Samantha Urquhart-Foster, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and Roger B. Petrie, U.S. DOE-ORO, re: Submittal of Federal Facility Agreement Extension Request for 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)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0225 Report number: DOE/OR/01-2794&D1
Published: February 10, 2022
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Samantha Urquhart-Foster, U.S. EPA, Region IV, re: EPA Approval Letter to Extent the Federal Facility Agreement (FFA) Milestone Submittal Date for the Revised Record of Decision for Comprehensive Environmental Response, Compensation, and Liability Act, Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, TN (DOE/OR/01-2794&D1) (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0226 Report number: DOE/OR/01-2794&D2
Published: February 17, 2022
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Federal Facility Agreement (FFA) Extension Request (February 7, 2022) for Environmental Management Disposal Facility (EMDF) Record of Decision (ROD) (DOE/OR/01-2794&D2) and Remedial Design Work Plan (RDWP)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0228 Report number: DOE/OR/01-2794&D2
Published: March 31, 2022
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Samantha Urquhart-Foster, U.S. EPA, Region IV, re: EPA Approval of Federal Facility Agreement for the Oak Ridge Reservation (FFA) Milestone Submittal Date for the Record of Decision for Comprehensive Environmental Response, Compensation, and Liability Act, Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee (DOE/OR/01-2794&D2 ROD) (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0227 Report number: DOE/OR/01-2794&D2
Published: March 31, 2022
Document Title: [Letter to Samantha Urquhart-Foster, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and Roger B. Petrie, U.S. DOE-ORO, re: Submittal of Federal Facility Agreement Extension Request for Record of Decision for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee (DOE/OR/01-2794&D2)]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0229 Report number: DOE/OR/01-2794&D2
Published: April 7, 2022
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: EPA Approval of Federal Facility Agreement for the Oak Ridge Reservation (FFA) Milestone Submittal Date for the Record of Decision for Comprehensive Environmental Response, Compensation, and Liability Act, Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee (DOE/OR/01-2794&D2D2 ROD) (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0241 Report number: DOE/OR/01-2794&D2
Published: June 29, 2022
Document Title: [Letter to Samantha Urquhart-Foster, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and Roger B. Petrie, U.S. DOE-ORO, re: Submittal of Federal Facility Agreement Extension Request for Record of Decision for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee (DOE/OR/01-2794&D2)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0242 Report number: DOE/OR/01-2794&D2
Published: June 30, 2022
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Samantha Urquhart-Foster, U.S. EPA, Region IV, re: EPA Extension Approval for the Federal Facility Agreement (FFA) Milestone Submittal Dates for the Record of Decision for CERCLA Oak Ridge Reservation Waste Disposal at the EMDF, Oak Ridge, TN (DOE/OR/01-2794&D2) & EMDF Remedial Design Work Plan (DT)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0244 Report number: DOE/OR/01-2794&D2
Published: July 6, 2022
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Federal Facility Agreement (FFA) Extension Request (June 29, 2022) for Environmental Management Disposal Facility (EMDF) Record of Decision (ROD) (DOE/OR/01-2794&D2) and Remedial Design Work Plan (RDWP)]

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EM Disposal Facility
August 31, 2022

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.a Correspondence

Order number: F.0615.031.0245 Report number: DOE/OR/01-2794&D2
Published: July 21, 2022
Document Title: [Letter to Samantha Urquhart-Foster, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and Roger B. Petrie, U.S. DOE-ORO, re: Submittal of the Record of Decision for Comprehensive Environmental Response, Compensation, and Liability Act Oak Ridge Reservation Waste Disposal at the Environmental Management Disposal Facility, Oak Ridge, Tennessee (DOE/OR/01-2794&D2)]

Category: 4.0 Remedial Response
Subcategory: 4.9 Records of Decision
Subcategory: 4.9.g Record of Communication

Order number: F.0615.029.0159
Published: July 1, 2019
Document Title: [Letter to Jay Mullis, U.S. DOE-ORO, from Ron B. Woody, Roane County Executive, re: Proposed EMDF Landfill]

Category: 8.0 Community Relations
Subcategory: 8.1 Correspondence

Order number: F.0615.009.0037
Published: April 13, 2016
Document Title: [Letter to Jeffrey L. Crane, U.S. EPA, Region IV, and Randy Young, TDEC, DOE Oversight Division, from John Michael Japp, U.S. DOE-ORO, and Brian Henry, U.S. DOE-ORO, re: Environmental Program Council Meeting and Discussions Regarding Community Involvement and Public Participation Activities]

Category: 8.0 Community Relations
Subcategory: 8.1 Correspondence

Order number: F.0615.009.0038
Published: April 27, 2016
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Jeffrey Crane, U.S. EPA Region IV, re: Public Involvement Plan Draft Modification (DOE/OR/01-2616&D2) Community Outreach Plan for the Environmental Management Disposal Facility (DOE ORR Letter of April 13, 2016; Japp to Crane and Young)]

Category: 8.0 Community Relations
Subcategory: 8.1 Correspondence

Order number: F.0615.009.0039
Published: May 2, 2016
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy Young, TDEC, DOE Oversight Division, re: Environmental Management Disposal Facility (EMDF) Community Outreach Plan]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 8.0 Community Relations
Subcategory: 8.1 Correspondence

Order number: F.0615.035.0042
Published: May 17, 2016
Document Title: [Letter to Mark Watson, City of Oak Ridge, from Sue Cange, U.S. DOE-ORO, re: Department of Energy Responses to the Oak Ridge City Council's Resolution Regarding the Proposed Environmental Management Disposal Facility]

Category: 8.0 Community Relations
Subcategory: 8.1 Correspondence

Order number: F.0615.035.0044
Published: July 5, 2016
Document Title: [Letter to Jeffrey L. Crane, U.S. EPA, Region IV, and Randy Young, TDEC, DOE Oversight Division, from John Michael Japp, U.S. DOE-ORO, and Thomas Morgan, U.S. DOE-ORO, re: Public Involvement Plan Draft Modification (DOE/OR/01-2616&D2) Community Outreach Plan for the Environmental Management Disposal Facility]

Category: 8.0 Community Relations
Subcategory: 8.1 Correspondence

Order number: F.0615.009.0058
Published: November 14, 2016
Document Title: [Letter to Warren Gooch, City of Oak Ridge, from John Mullis, U.S. DOE-ORO, re: DOE Letter in Response to the City of Oak Ridge Mayor's Request for an Update on the Environmental Management Disposal Facility Project Upcoming Schedule of Events (DT)]

Category: 8.0 Community Relations
Subcategory: 8.2 Public Meeting Transcripts

Order number: F.0615.009.0136
Published: August 8, 2018
Document Title: Transcript of Department of Energy Meeting [Commencing on August 8, 2018]

Category: 8.0 Community Relations
Subcategory: 8.2 Public Meeting Transcripts

Order number: F.0615.009.0137
Published: November 7, 2018
Document Title: Department of Energy: Transcript of Public Meeting Held November 7, 2018

Category: 8.0 Community Relations
Subcategory: 8.3 Fact Sheets

Order number: F.0615.071.0230
Published: April 2022
Document Title: Environmental Management Disposal Facility Waste Acceptance Criteria [Fact Sheet]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 8.0 Community Relations
Subcategory: 8.3 Fact Sheets

Order number: F.0615.071.0231
Published: April 2022
Document Title: Environmental Management Disposal Facility Water Quality Protection for Bear Creek [Fact Sheet]

Category: 8.0 Community Relations
Subcategory: 8.3 Fact Sheets

Order number: F.0615.071.0232
Published: April 2022
Document Title: Environmental Management Disposal Facility Site Groundwater Characterization [Fact Sheet]

Category: 8.0 Community Relations
Subcategory: 8.4 Public Notices
Subcategory: 8.4.b Notice to Initiate Public Comment Period on the Proposed Plan

Order number: F.0615.009.0114
Published: September 2018
Document Title: Invitation to Comment on Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste [Public Notice]

Category: 8.0 Community Relations
Subcategory: 8.4 Public Notices
Subcategory: 8.4.b Notice to Initiate Public Comment Period on the Proposed Plan

Order number: F.0615.009.0133
Published: October 1, 2018
Document Title: Invitation to Comment on Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, COmpensation, and Liability Act Waste [Public Notice]

Category: 8.0 Community Relations
Subcategory: 8.4 Public Notices
Subcategory: 8.4.b Notice to Initiate Public Comment Period on the Proposed Plan

Order number: F.0615.009.0134
Published: October 16, 2018
Document Title: Invitation to Comment on Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste, [Printed October 16-18, 2018] [Public Notice]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 8.0 Community Relations
Subcategory: 8.4 Public Notices
Subcategory: 8.4.b Notice to Initiate Public Comment Period on the Proposed Plan

Order number: F.0615.009.0135
Published: October 29, 2018
Document Title: Invitation to Comment on Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste [Printed October 29, 2018, and November 5, 2018] [Public Notice]

Category: 8.0 Community Relations
Subcategory: 8.4 Public Notices
Subcategory: 8.4.b Notice to Initiate Public Comment Period on the Proposed Plan

Order number: F.0615.009.0138
Published: December 14, 2018
Document Title: Invitation to Comment on Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act Waste [Public Notice]

Category: 8.0 Community Relations
Subcategory: 8.5 Community Relations Plan

Order number: F.0615.035.0046 Report number: DOE/OREM-16-2583
Published: September 2016 [DOE/OR/01-2616&D2]
Document Title: Community Outreach Plan for the Environmental Management Disposal Facility

Category: 8.0 Community Relations
Subcategory: 8.5 Community Relations Plan
Subcategory: 8.5.a Correspondence

Order number: F.0615.035.0047 Report number: DOE/OREM-16-2583
Published: September 21, 2016 [DOE/OR/01-2616&D2]
Document Title: [Letter to Jeffrey L. Crane, U.S. EPA, Region IV, and Roger Petrie, TDEC, DOE Oversight Division, from John Michael Japp, U.S. DOE-ORO, and Brian Henry, U.S. DOE-ORO, re: Public Involvement Plan Final Modification (DOE/OR/01-2616&D2) Community Outreach Plan for the Environmental Management Disposal Facility]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 8.0 Community Relations
Subcategory: 8.5 Community Relations Plan
Subcategory: 8.5.a Correspondence

Order number: F.0615.035.0048 Report number: DOE/OREM-16-2583
Published: October 21, 2016 [DOE/OR/01-2616&D2]
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Jeffrey L. Crane, U.S. EPA, Region IV, re: Public Involvement Plan Modification, Environmental Management Disposal Facility (EMDF) Community Outreach Plan (DOE/OREM-16-2583; September 2016) (Letter From Henry/Japp to Crane and Young - September 21, 2016)]

Category: 8.0 Community Relations
Subcategory: 8.5 Community Relations Plan
Subcategory: 8.5.a Correspondence

Order number: F.0615.035.0049 Report number: DOE/OREM-16-2583
Published: October 25, 2016 [DOE/OR/01-2616&D2]
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy Young, TDEC, DOE Oversight Division, re: Community Outreach Plan for the Environmental Management Disposal Facility (DOE/OREM-16-2583; September 2016)]

Category: 9.0 Regulator Coordination
Subcategory: 9.2 Federal Facility Agreement

Order number: F.0615.036.0180
Published: September 30, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Constance A. Jones, U.S. EPA, Region IV, re: EPA Approval of Milestone Extension Request for the Records of Decision for the Environmental Management Disposal Facility (EMDF) (DT)]

Category: 9.0 Regulator Coordination
Subcategory: 9.2 Federal Facility Agreement

Order number: F.0615.036.0181
Published: October 2, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Federal Facility Agreement Milestone Modification Request for the Environmental Management Disposal Facility Record of Decision and Follow-On Documents]

Category: 9.0 Regulator Coordination
Subcategory: 9.2 Federal Facility Agreement

Order number: F.0615.074.0182
Published: October 23, 2019
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Federal Facility Agreement Milestone Extension Request for Environmental Management Disposal Facility Record of Decision and Follow-On Documents]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 9.0 Regulator Coordination
Subcategory: 9.2 Federal Facility Agreement

Order number: F.0615.036.0183
Published: October 28, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Federal Facility Agreement (FFA) Milestone Extension Request for the Environmental Management Disposal Facility (EMDF) Record of Decision (ROD) and Follow-On Documents]

Category: 9.0 Regulator Coordination
Subcategory: 9.2 Federal Facility Agreement

Order number: F.0615.036.0186
Published: October 30, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Constance A. Jones, U.S. EPA, Region IV, re: EPA's Response to Extension Request for Several Environmental Management Disposal Facility Milestones (DT)]

Category: 9.0 Regulator Coordination
Subcategory: 9.2 Federal Facility Agreement

Order number: F.0615.036.0190
Published: December 10, 2019
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and John Michael Japp, U.S. DOE-ORO, re: Federal Facility Agreement Milestone Extension Request for Environmental Management Disposal Facility Record of Decision and Follow-On Documents]

Category: 9.0 Regulator Coordination
Subcategory: 9.2 Federal Facility Agreement

Order number: F.0615.074.0192
Published: December 17, 2019
Document Title: [Letter to John Michael Japp, U.S. DOE-ORO, from Constance A. Jones, U.S. EPA, Region IV, re: EPA Agreement Regarding the Extensions Requested for Several Environmental Management Disposal Facility (EMDF) Milestones (DT)]

Category: 9.0 Regulator Coordination
Subcategory: 9.2 Federal Facility Agreement

Order number: F.0615.036.0195
Published: April 24, 2020
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and Melyssa P. Noe, U.S. DOE-ORO, re: Federal Facility Agreement Milestone Extension Request for Environmental Management Disposal Facility Record of Decision and Follow-on Documents]

AR Database Printout
EM Disposal Facility
August 31, 2022

Category: 9.0 Regulator Coordination
Subcategory: 9.2 Federal Facility Agreement

Order number: F.0615.036.0196
Published: May 4, 2020
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Federal Facility Agreement Milestone Extension Request for Environmental Management Disposal Facility (EMDF) Record of Decision (ROD) and Follow-on Documents (April 24, 2020)]

Category: 9.0 Regulator Coordination
Subcategory: 9.2 Federal Facility Agreement

Order number: F.0615.036.0199
Published: November 25, 2020
Document Title: [Letter to Constance A. Jones, U.S. EPA, Region IV, and Randy C. Young, TDEC, DOE Oversight Division, from Brian T. Henry, U.S. DOE-ORO, and Roger B. Petrie, U.S. DOE-ORO, re: Federal Facility Agreement Milestone Extension for Environmental Management Disposal Facility Record of Decision and Follow-on Documents]

Category: 9.0 Regulator Coordination
Subcategory: 9.2 Federal Facility Agreement

Order number: F.0615.036.0200
Published: December 1, 2020
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Constance A. Jones, U.S. EPA, Region IV, re: EPA Approval of DOE 11-25-2020 Environmental Management Disposal Facility Extension Request Milestone (DT)]

Category: 9.0 Regulator Coordination
Subcategory: 9.2 Federal Facility Agreement

Order number: F.0615.036.0201
Published: December 7, 2020
Document Title: [Letter to Roger B. Petrie, U.S. DOE-ORO, from Randy C. Young, TDEC, DOE Oversight Division, re: Federal Facility Agreement (FFA) Milestone Extension Request for Environmental Management Disposal Facility (EMDF) Record of Decision (ROD) and Follow-On Documents (November 25, 2020)]