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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:

Leesa Laymance (signature on file)	6/22/2021
UCOR Classification & Information Control Office	Date

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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

Date Issued—June 2021

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

UCOR LLC
under contract DE-SC-0004645

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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 to present the public with the selected remedy for the disposal of waste expected to be generated by cleanup of the Oak Ridge 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 Remedial Investigation/Feasibility Study (DOE 2017a) and the Proposed Plan (DOE 2018a).

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ACRONYMS

ARAR	applicable or relevant and appropriate requirement
BCBG	Bear Creek Burial Grounds
BCV	Bear Creek Valley
CBCV	Central Bear Creek Valley
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	*Code of Federal Regulations*
CO_2e	carbon dioxide equivalent
COC	contaminant of concern
CROET	Community Reuse Organization of East Tennessee
CWA	Clean Water Act of 1972
D	drainage
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
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
LDR	land disposal restriction
LLW	low-level (radioactive) waste
LWTS	landfill wastewater treatment system
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act of 1969
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
OREM	Oak Ridge Office of Environmental Management
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act of 1976
RDL	radiological discharge limit
RER	Remediation Effectiveness Report
RI	Remedial Investigation
ROD	Record of Decision
S&M	surveillance and maintenance
SARA	Superfund Amendments and Reauthorization Act of 1986

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SSAB	Site Specific Advisory Board
TDEC	Tennessee Department of Environment and Conservation
TSCA	Toxic Substances Control Act of 1976
VOC	volatile organic compound
W	west
WAC	waste acceptance criteria
WBCV	West Bear Creek Valley
Y-12	Y-12 National Security Complex

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PART 1. DECLARATION

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1.1 SITE NAME AND LOCATION

Environmental Management Disposal Facility (EMDF)
Oak Ridge 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 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, about 200,000 waste shipments have been made to the facility (as of October 2020), and nearly 78 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) 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. To evaluate and select a comprehensive remedy for disposal of the Oak Ridge NPL Site CERCLA waste, 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 requires updating the basis of remediation goals for the area 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. 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 a long-term disposal facility. This now makes the land use basis of Zone 2 consistent with that of Zone 3, the area closest to the Y-12 National Security Complex (Y-12).

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. 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 proximity of the area to the EMDF. This land use term, restricted recreational, is newly established to define recreational use that is limited in some way. For Zone 1, this limited use is with regard to fishing. The state of Tennessee has established advisories against fish consumption for Bear Creek from Highway 95 to the mouth of the creek west of Highway 95 (this DOE property is west of Zone 1). Additionally, BCV from Highway 95 east to the Y-12 National Security Complex (areas including Zones 1, 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 is prohibited within the whole Bear Creek Watershed.

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To further discourage the possibility of fishing in Bear Creek, beavers and their habitat, which cause pooling that could enhance fishing, are removed (as necessary) as a best management practice.

These land use modifications, which are necessary based on this new CERCLA decision, 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."

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 developed to provide 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 the Tennessee Department of Environment and Conservation (TDEC), to 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 Oak Ridge Reservation (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).

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.

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 permanent 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 30 *CFR* 300.430(f)(1)(ii) to (1) be protective of human health and the environment, (2) attain those applicable or relevant and appropriate requirements (ARARs) that are identified at the time of ROD signature or provide grounds for invoking a waiver under 30 *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

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the EMDF waste acceptance criteria (WAC), for example the land disposal restrictions (LDRs), before onsite disposal.

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. Timely and cost-effective cleanup requires onsite disposal of most building demolition debris and soil, while waste that does not meet WAC will be disposed offsite. The selected remedy meets the remedial action objectives (RAOs) 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} ECLR 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[1] 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 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.

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 for construction of EMDF. The components of the selected remedy include the following:

- Maintain a 15-ft unsaturated zone beneath the base of emplaced wastes. 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;

---

[1] 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 concurrence of the FFA parties (DOE, EPA, and TDEC).

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however, for higher elevations in the site – particularly in the area of the knoll feature in the proposed CBCV site 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. 2.14.3) 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) waste and Toxic Substances Control Act of 1976 (TSCA) 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.
- The design, construction, and operation of EMDF at the CBCV site to satisfy design-based and performance-based requirements of DOE and ARARs.
- The construction of EMDF for approximately 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 multilayer cover to reduce infiltration and permanently isolate the waste from human and environmental receptors. 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, as needed, to ensure long-term protection of human health and the environment and to be consistent with 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.
- 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[2] 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 after operations are complete, consistent with ARARs.

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[2] 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.

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- Routine performance monitoring during operation of EMDF and post-closure monitoring of EMDF, consistent with ARARs.
- 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.

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. There is no Principal Threat Waste to be addressed as part of this action. The selected remedy complies with federal and state ARARs. A waiver for TSCA 40 *CFR* 761.75(b)(3) is invoked for the selected Onsite Disposal Alternative under 40 *CFR* 761.75(c)(4). An exemption to TDEC 0400-20-11-.17(1)(h) is invoked for the selected Onsite Disposal Alternative under TDEC 0400-20-04-.08. Bases for the waiver and exemption are provided in Sect. 2.13.2 of this ROD.

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.

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 (Sect. 2.7); reference is made to waste generation project COCs.
- Baseline risk represented by the COCs (Sect. 2.7); no baseline risk assessment was conducted for the disposal decision, instead reference is made to waste generation project risk assessments.
- Remediation levels established for the COCs and the basis for the levels (Sect. 2.12); WAC are established for CERCLA waste.
- Current and future land use assumptions used for the baseline risk assessment and the ROD (Sect. 2.6); for a disposal decision, there is no baseline risk assessment, but there are land use assumptions used in the decision.
- 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).

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- 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 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

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June 2021

John A. Mullis II, Manager Oak Ridge Office of Environmental Management U.S. Department of Energy	Date
David W. Salyers, P.E. Commissioner Tennessee Department of Environment and Conservation	Date
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 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)[3], 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 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 (Fig. 2.2). 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.

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

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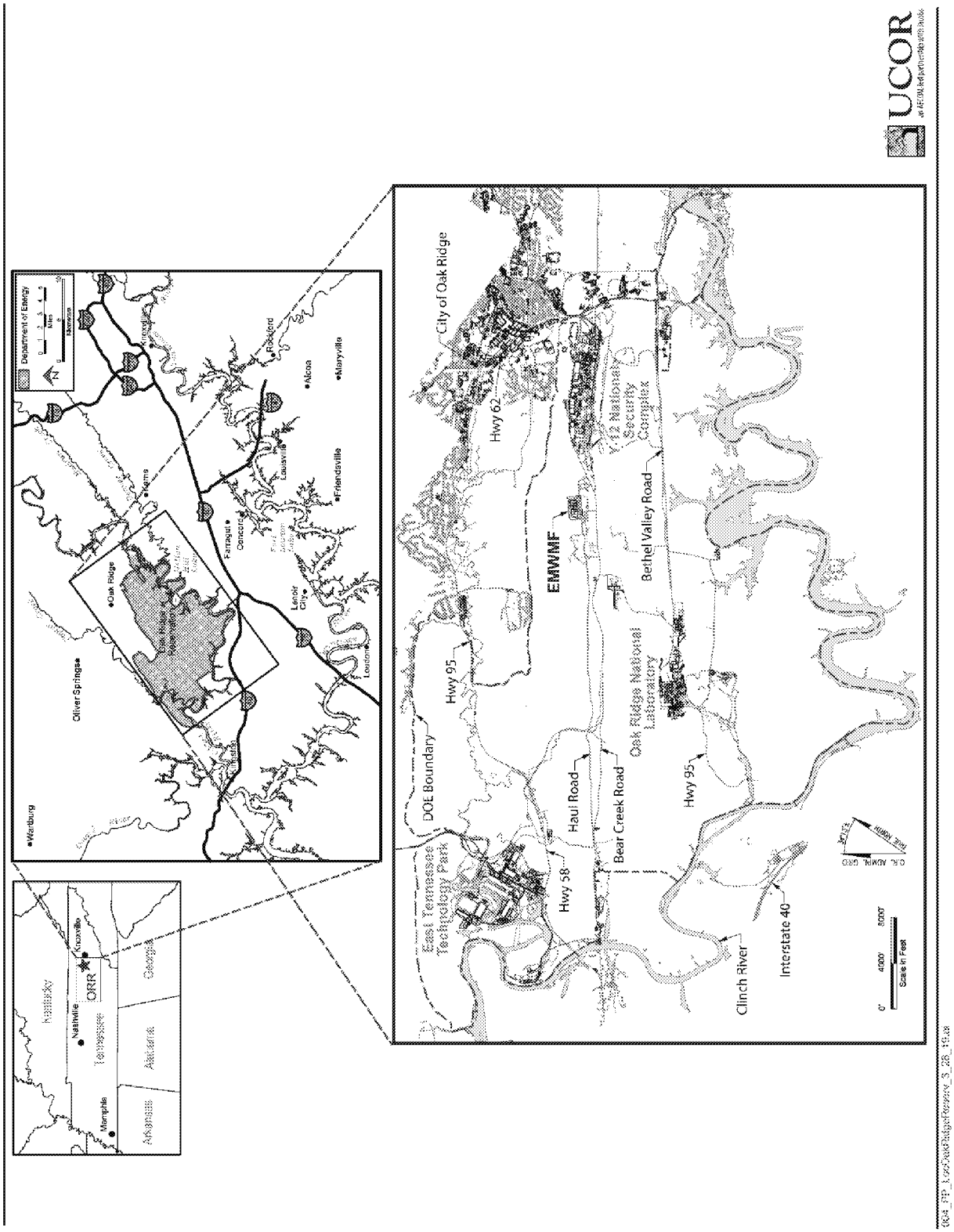

Figure 2.1. Oak Ridge Reservation.

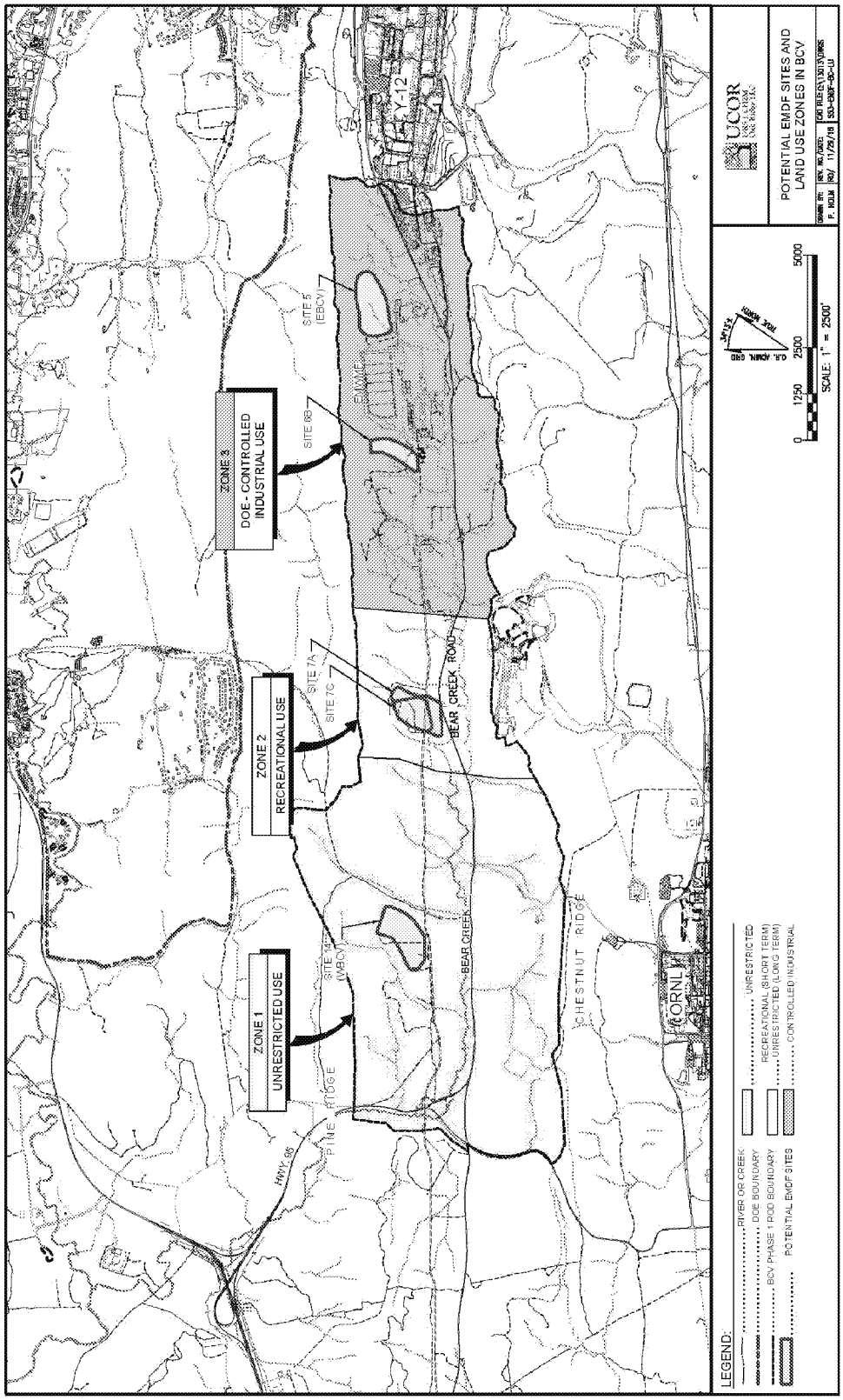

Figure 2.2. Land use (from Phase I BCV ROD) and disposal sites evaluated in Bear Creek Valley.

The land uses supporting site-specific remediation goals for Zone 2 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 that 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. 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, geology, and groundwater flow conditions. Multiple sites for EMDF were evaluated in BCV (Fig. 2.2).

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 EDMF 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.

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 the BCV historic data provided, 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).

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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. 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 one 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 eight pairs of shallow and deep piezometers to measure groundwater surfaces and obtain detailed subsurface information on bedrock and groundwater (Fig. 2.3). Installation of continuous downhole monitors to better predict responses to rainfall, determine high and low groundwater levels, and provide input into groundwater models used to predict groundwater levels after the landfill is constructed.
- Subsurface material tests to obtain design data for selecting the appropriate materials to develop the engineering design for the landfill.

Results of the Phase 1 site characterization confirmed the acceptability of the CBCV site for a new, low-level (radioactive) waste (LLW) landfill and support final site selection. Surface water walkovers determined the Nolichucky Shale contact with the Maynardville Limestone.

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 found to be typical of other BCV wells in similar settings and were similar to the groundwater elevations predicted in the RI/FS (DOE 2017a). 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.

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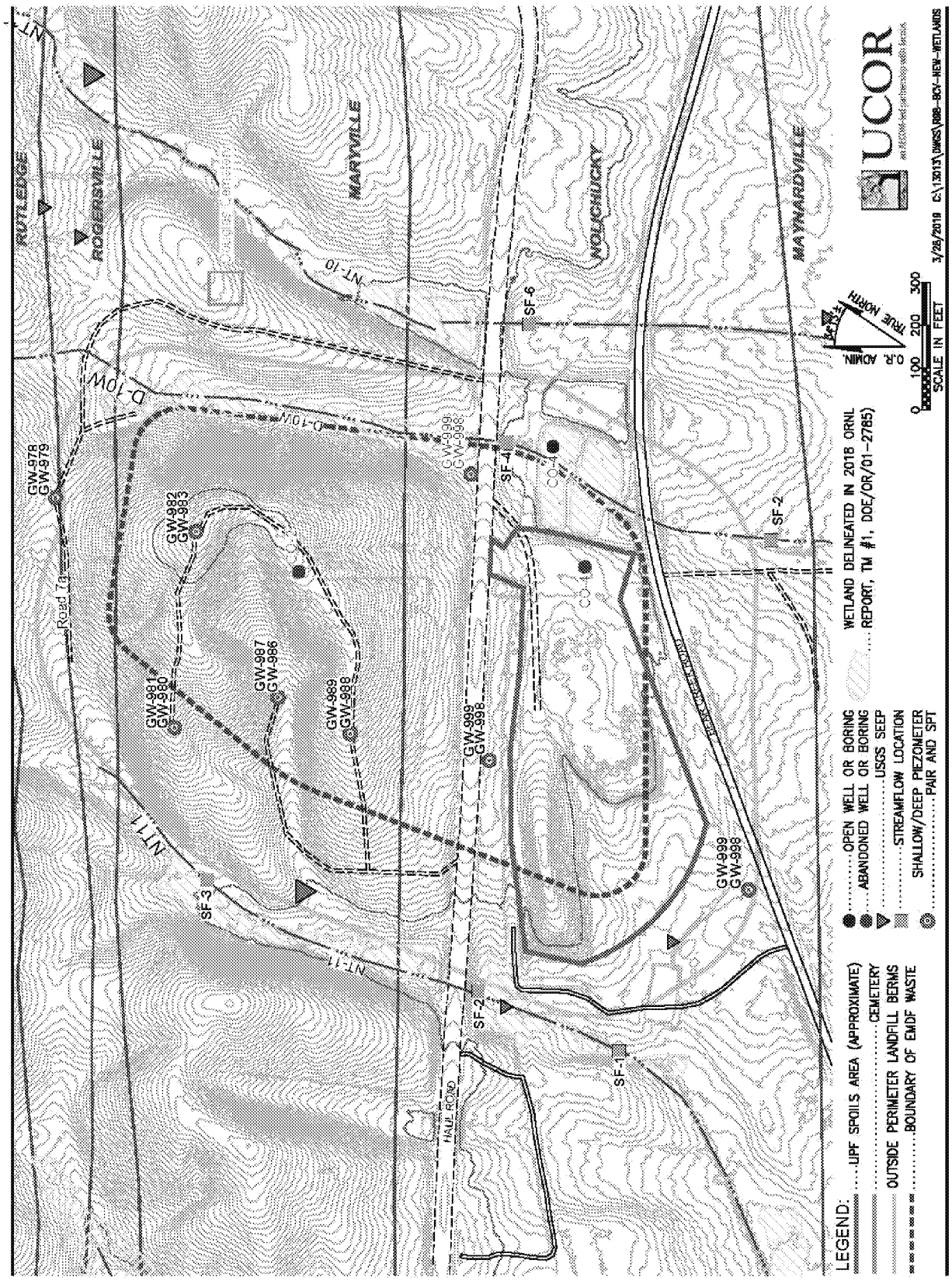

Fig. 2.3. Phase I characterization and site characteristics of the EMDF site.

Per the first formal Dispute Resolution Agreement between 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 2019), 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 and associated sites. This facility, EMWMF, has been constructed and is accepting CERCLA cleanup wastes. 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 Remedial Design Report addendum (DOE 2017b).

A widening of the OREM Program scope has occurred since the original waste estimates were made in the RI/FS that led to the construction of EMWMF (referred to herein as the EMWMF RI/FS) (DOE 1998a). Extensive, new excess facility scope at ORNL and Y-12 identified in 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). The added cleanup scope forecasted to occur over the next 3 decades significantly increased the volume of CERCLA waste projected to be generated from the original 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 selected for EMDF.

The 2020 Remediation Effectiveness Report (RER) for the ORR (DOE 2020) illustrates the existing contaminant source areas, extent of groundwater contaminant plumes, 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. The RER indicates that contaminant concentrations in the valley have improved as a result of the actions taken, but that final remediation goals have not yet been met.

The CBCV site 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 2020). 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 surpassed 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

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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 Oak Ridger [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 have attended public meetings with the city of Oak Ridge (March 22, 2016) as well as meetings specifically with concerned residents in the Scarboro community (June 24, July 21, September 24, and December 16, 2015).

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 Oak Ridger, the Knoxville News-Sentinel, the Loudon County News-Harriman Record, the Rockwood Times, and other local newspapers within the region. 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 information 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.

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 2016)
- *Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste* (DOE 2018a).

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 Oak Ridge NPL Site CERCLA cleanup program scope 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 that would be generated during ongoing and future cleanup of the Oak Ridge NPL Site.

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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 were evaluated in the RI/FS for various siting options in BCV.

This ROD documents the decision to construct EMDF at the CBCV site to provide onsite disposal capacity for CERCLA waste being generated at the Oak Ridge NPL Site. Operation of EMDF, management of associated clean water and wastewater, and post-closure monitoring and maintenance of the facility is within the scope of this remedial action.

This action scope 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 sanitary 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.

CERCLA decisions for removal or remedial actions that generate waste include actions such as treatment that are necessary to ensure that CERCLA waste targeted for onsite disposal meets the EMDF WAC. Any treatment of CERCLA waste 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 the cleanup efforts planned for contamination originating from Oak Ridge NPL Site activities. If at some future time DOE CERCLA waste from original Oak Ridge NPL Site activities is generated within the state that requires disposal, and it is determined by the FFA parties that EMDF is the appropriate place for disposal, then the FFA parties will agree that those waste streams may be disposed of within EMDF consistent with the project-specific Waste Handling Plan.

In 1997, based on a State of Tennessee recommendation to expand community involvement, DOE sponsored the establishment of the End Use Working Group (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 1998b), recommendations were made on the end use of BCV and for siting an onsite CERCLA waste disposal facility. The end use recommendation for BCV included the establishment of a restricted waste disposal zone in the area of existing long-term waste disposal areas. 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. The selection of the remedial action involving onsite disposal at EMDF in BCV is consistent with the recommendations made by EUWG; however, the EUWG recommendation favored those areas already contaminated or near areas of contamination. For a variety of technical reasons discussed under Sect. 2.12.1, the FFA parties believe that CBCV is the preferred location for the landfill.

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.

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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. 2.3). 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 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

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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. 2.3). All other wells pairs have gradients of less than 0.03 ft/ft at all times – essentially flat. Monitoring of EMDF water levels continued for over a year to ensure seasonal high groundwater measurements were captured (DOE 2018a). Piezometric surface elevations are typical of other BCV wells in similar settings and are similar to the piezometric surface elevations predicted in the RI/FS. 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. The gradients and piezometric surface confirms 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 (BCBG) 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); however, the VOC plume emanating from BCBG indicates downgradient, southerly contaminant migration toward Bear Creek and not along strike in the less permeable Maryville and Nolichucky Formations. The plume then 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 current BCBG groundwater contamination plume configuration confirms that groundwater flows from the ridge towards Bear Creek and does not flow laterally across the tributaries.

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. 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. 2.3). 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 surface water systems are fed by precipitation, surface runoff and shallow stormflow, and both shallow and deeper groundwater that discharges via springs and seeps.

The tributary streams are first or second order streams characterized by primarily low-flow, shallow pools and riffles, and low-to-no flow during dry periods. Stream substrates are composed of small-sized silt, sand, and gravel. These streams often have losing reaches where flow is below ground for certain sections and reappears as the topography changes. Road crossings (culverts) present physical barriers for upstream migration of aquatic fauna and often create wetlands with meandering stream channels filled with sediments not typical of other higher gradient streams found across the ORR (ORNL 2018).

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 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

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pulsed flow associated with significant storm rainfall events. Flow monitoring for Bear Creek downstream of the CBCV site 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 (ORNL 2018) 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, which included NT-9 and Bear Creek. 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 were conducted in 2018 in the tributary streams that 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. 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 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 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. 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 threatened by 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

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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 BCV 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 that is estimated to require a disposal decision. Higher contamination waste streams or uncontaminated waste streams already have a disposal option (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 from the RI/FS are based on the estimates provided in the OREM Waste Generation Forecast available at the time.

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 quantities of some fission products (e.g., cesium-137 and strontium-90), lower quantities of other fission products (e.g., technetium-99 and iodine-129), and trace quantities of transuranic radionuclides (e.g., plutonium and americium). This difference is important for estimating the EMDF radiological inventory because Y-12 waste accounts for approximately 70 percent of the forecast 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 forecast 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 stream. 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 polychlorinated biphenyls (PCBs), are anticipated to be similar across waste lots. However, one notable

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difference is that a few of the waste streams from Y-12 are anticipated to contain more mercury than ORNL waste streams.

2.6 CURRENT AND ANTICIPATED LAND USES

While the EUWG Stakeholder Report on Stewardship (DOE 1998b) included recommendations on the end use of BCV and for siting an onsite CERCLA waste disposal facility, there are no formal land use plans for ORR.

2.6.1 Current Land Use

The EMDF planned location is at CBCV, which is 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. Since publication of the Phase I ROD, uncontaminated 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 identification in Zone 2 through this disposal decision to be consistent with the presence of a permanent waste disposal facility. Land usage for purposes of setting remediation goals in Zone 1 of BCV, directly west of and adjacent to Zone 2, 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 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.

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 site risks for 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 on the material that eventually is generated as waste is conducted in the waste generation project documents. 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 generator project. Decisions on how or where to dispose of each CERCLA waste stream would be determined on a

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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).

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.

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} ECLR 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).

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 document was prepared. Any revisions to an alternative or additional evaluation conducted since the RI/FS 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 area available.

2.9.2 Alternative 2 – Onsite Disposal Alternative

The Onsite Disposal Alternative provided consolidated disposal for high volume, low-contaminated future-generated CERCLA waste exceeding the capacity of the existing EMWMF in a newly constructed,

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engineered facility(ies). Sites 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. 2.2. Sites were identified as follows:

- East Bear Creek Valley (EBCV) site, just east of the existing EMWMF
- West Bear Creek Valley (WBCV) site, located approximately 2.5 miles west of the existing EMWMF
- 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
- CBCV, expansion of one of the dual sites.

The Onsite Disposal Alternatives included a requirement for a final WAC for EMDF that includes administrative and analytical waste limitations for the protection of human health and the environment. 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 RI/FS onsite alternatives provided 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 multilayer liner system with a leachate collection/detection system to isolate waste from the environment, and a RCRA-compliant multilayer cover system to reduce infiltration and isolate the waste from human and environmental receptors. A geologic buffer layer would be 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).

There would be 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 defined as an engineered feature under the landfill or berms that controls groundwater flows post-closure. Some alternatives also contain temporary drainage features. 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 included support facilities adjacent to the footprint of the landfill, such as operations/support trailers; staging/laydown areas; stockpile areas; parking areas; leachate storage tanks; truck loading stations; contact water tanks and basins; electrical, water, and communication utilities; truck weigh scale; guard stations; wastewater and stormwater management systems; material stockpile areas; and spoil areas. An ARAR-compliant LWTS was part of the Onsite Disposal Alternatives.

These alternatives encompassed the closure of EMDF after operations were 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 were 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

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starting waste volume for the Hybrid Disposal Alternative was 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) in Nevada 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 any 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 waste LLW and LLW/TSCA waste would be shipped by rail, followed by truck transport to NNSS using a trans-load facility in Kingman, Arizona (Option 1).
- All classified waste LLW shipments to NNSS would be by truck transport and LLW/RCRA (mixed) waste would be shipped by rail for treatment and disposal at a commercial facility (Option 1 or 2).
- Non-classified waste LLW and LLW/TSCA waste also could be shipped to a commercial facility for disposal (Option 2).

For CERCLA actions that treat, store, or dispose of waste offsite, 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.

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- 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 indeed the receiving facility is acceptable for CERCLA waste.

All waste would be transported from the generating project to a trans-loading facility. This onsite transportation 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 intermodals 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 intermodals 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 evaluated the relative ability of the alternatives to meet the nine CERCLA evaluation criteria and the evaluation of NEPA values. A summary of the comparative analysis is presented in Table 2.1.

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.

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Table 2.1. 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 not accomplished due to extended time frames to complete remediation and increased in 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. • More protective than the Onsite or Hybrid Disposal Alternatives in preventing releases on the ORR because waste would be permanently removed and disposed in unpopulated regions with greater depths to groundwater. • Less protective in the short term because of increased transportation risks.	• 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 ~ 300 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) for all alternatives and of TSCA 40 *CFR* 761.75 (b)(5) for EBCV would be requested under 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 2.1. 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. Temporary drainage features.	• 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. • Temporary drainage features are not expected to be used long term. Temporary drainage features.		• 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		• All onsite facilities require management of landfill wastewater through collection in the leachate collection system. • 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 it 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.
Implementability		• Implementation is technically feasible; landfill design and construction of the type presented in this conceptual design is commonly carried out. • 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.				• 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.
		• Greater use of underdrain system required at this site. • Construction on steeper slopes. • Some 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.	• 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.		

Table 2.1. 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 (cont.)			• Slopes less pronounced than those at EBCV, so construction easier. • New construction is required, including support facilities.		• Some new construction is required for support facilities and through construction of two landfills.		• 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.
Cost		• Cost per cubic yard of as-generated waste disposed is $276 (present worth 2016 dollars). • Total cost $538.3M (present worth 2016 dollars).	• Cost per cubic yard of as-generated waste disposed is $276 (present worth 2016 dollars). • Total cost $537.2M (present worth 2016 dollars).	• Cost per cubic yard of as-generated waste disposed is $284 (present worth 2016 dollars). • Total cost $553.3M (present worth 2016 dollars).	• Cost per cubic yard of as-generated waste disposed is $343 (present worth 2016 dollars). • Total cost $667.4M (present worth 2016 dollars).	• Cost per cubic yard of as-generated waste disposed of is $675–$767 (present worth 2016 dollars). • Total cost is $1315–$1494M (present worth 2016 dollars).	• Cost per cubic yard of as-generated waste disposed is $587 (present worth 2016 dollars). • Total cost is $1145M (present worth 2016 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 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	Was not evaluated in the Remedial Investigation/Feasibility Study as the information was not available.						

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
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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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 waiver of a TSCA requirement (50 ft to groundwater) 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. An exemption of a TDEC requirement (concerning connection of surface water and groundwater within the site) for all onsite alternatives would be 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 No Action Alternative may or may not have been effective, as it would depend on multiple future individual waste disposal decisions. Because the decisions would be under CERCLA, they would be required 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 multilayer 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 contained. During operation when landfill wastewater is generated, that wastewater would be treated as required for removal of contaminants above discharge criteria. Upon closure, when the landfill cover would be placed, landfill wastewater generation would cease.

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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.

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 Clean Water Act of 1972 (CWA) that address hazardous chemicals and ARARs addressing radiological discharges. That treatment would reduce contaminants to levels required for discharge to Bear Creek or its tributaries.

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.

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.

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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.

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 likely to arise. 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 onsite disposal capacity 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.

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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 between 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 2.2. The estimated total project costs for onsite disposal ranged from $732–$928 million, the Offsite Disposal Alternative ranged from $1567–$1799 million, and the Hybrid Disposal Alternative was in between at $1391 million. Both costs have the same assumed uncertainty of 25 percent in waste volumes and account for cost uncertainties.

Table 2.2. Estimated costs for disposal alternatives

	$ million (Fiscal Year 2016)					
Cost element	**East Bear Creek Valley**	**Central Bear Creek Valley**	**West Bear Creek Valley**	**Dual Site**	**Hybrid**	**Offsite**
Capital cost (construction, operation, to closure)	733.6	732.0	750.4	928.0	1391	1567–1799
Long-term maintenance[a]	45.7	45.7	46.1	74.4	34.3	NA
Present worth[b]	538.3	537.2	553.3	667.4	1145	1315–1494

[a]Long-term maintenance includes 100 years of maintenance, surveillance, and monitoring.
[b]Present worth calculations use a discount rate of 1.5 percent per the *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, Circular A-94* (OMB 2016).

NA = not applicable
OMB = Office of Management and Budget

Selection of two smaller sites together (Dual Site Disposal Alternative) is the high range ($928 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 2.2 are given in Fiscal Year 2016 dollars along with present worth values.

2.10.8 State Acceptance

The State of Tennessee recognized DOE's concerns with the No Action Alternative that it would require each cleanup project to select a separate disposal option for its waste. The State supported the Offsite

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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
- Agreement on the final list of ARARs, including justification of any waivers/exemptions to the ARARs
- Evaluation of realistic information on the amounts and types of waste to be disposed, including the WAC
- Independent verification that the WAC comply with the law and protect human health and the environment over the long term
- Verification that the amounts of hazardous and radioactive constituents that DOE may discharge to Bear Creek is consistent with CERCLA
- Independent verification of DOE's assessments, to the extent that they inform the State's CERCLA decisions, including evaluation of potential long-term risks associated with hazardous contaminants like mercury and the toxic effects of uranium.

Since the Proposed Plan, DOE and the State have worked together to resolve these issues. The State supports construction of the EMDF at the CBCV site.

2.10.9 Community Acceptance

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 Oak Ridge NPL Site CERCLA waste in EMDF. 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 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 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 the EMDF.

Consistent through the supportive comments were the following topics:

- Onsite disposal is a safe, secure, protective, and offers timely disposal of waste.
- There is an economic benefit to the area through jobs.

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- 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, 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.

2.10.10 NEPA Values

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 2.3 for the Onsite Disposal Alternatives.

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Table 2.3. 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.

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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.

Environmental justice is the fair treatment and meaningful involvement of all communities with respect to the planning, development, and siting of the preferred alternative for onsite CERCLA waste disposal. Environmental justice concerns have been raised regarding communities immediately north of the main Y-12 industrial area. Based on the proposed locations for alternatives, coupled with the proximities of these proposed locations when compared with surrounding communities, it was demonstrated that no community is disproportionately affected by the potential environmental consequences presented by the onsite alternatives.

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.

Because 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, 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 Oak Ridge NPL Site CERCLA waste will address the potential for principal threat waste.

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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, has been selected for the permanent disposal of remediation waste generated by future CERCLA actions on the Oak Ridge NPL Site. The selection of the CBCV site also includes the need to update the potential land use captured in the BCV Phase I ROD (DOE 2000) that is used to set land use controls 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 land use controls and setting remediation goals is modified to restricted recreational. Land usage in Zone 2, the area proposed for construction of EMDF, 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 land use controls and determining remediation goals both near- and long-term, with approval of this ROD. Figure 2.4 illustrates these revised land usage 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."

Restricted recreational use is selected because the public is restricted from entering the BCV area where Highway 95 borders Zone 1 (*No Trespassing* is posted at the road), and advisories against fish consumption exist for Bear Creek from Highway 95 to the mouth of the creek west of Highway 95. Limited turkey and deer hunting is allowed in some surrounding DOE areas and portions of BCV; however, fishing is prohibited in the Bear Creek watershed, Bear Creek, or its tributaries from Highway 95 and east to its headwaters. The 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. To further discourage the possibility of fishing in Bear Creek, beavers and their habitat, which cause pooling that could enhance fishing, are removed (as necessary) as a best management practice.

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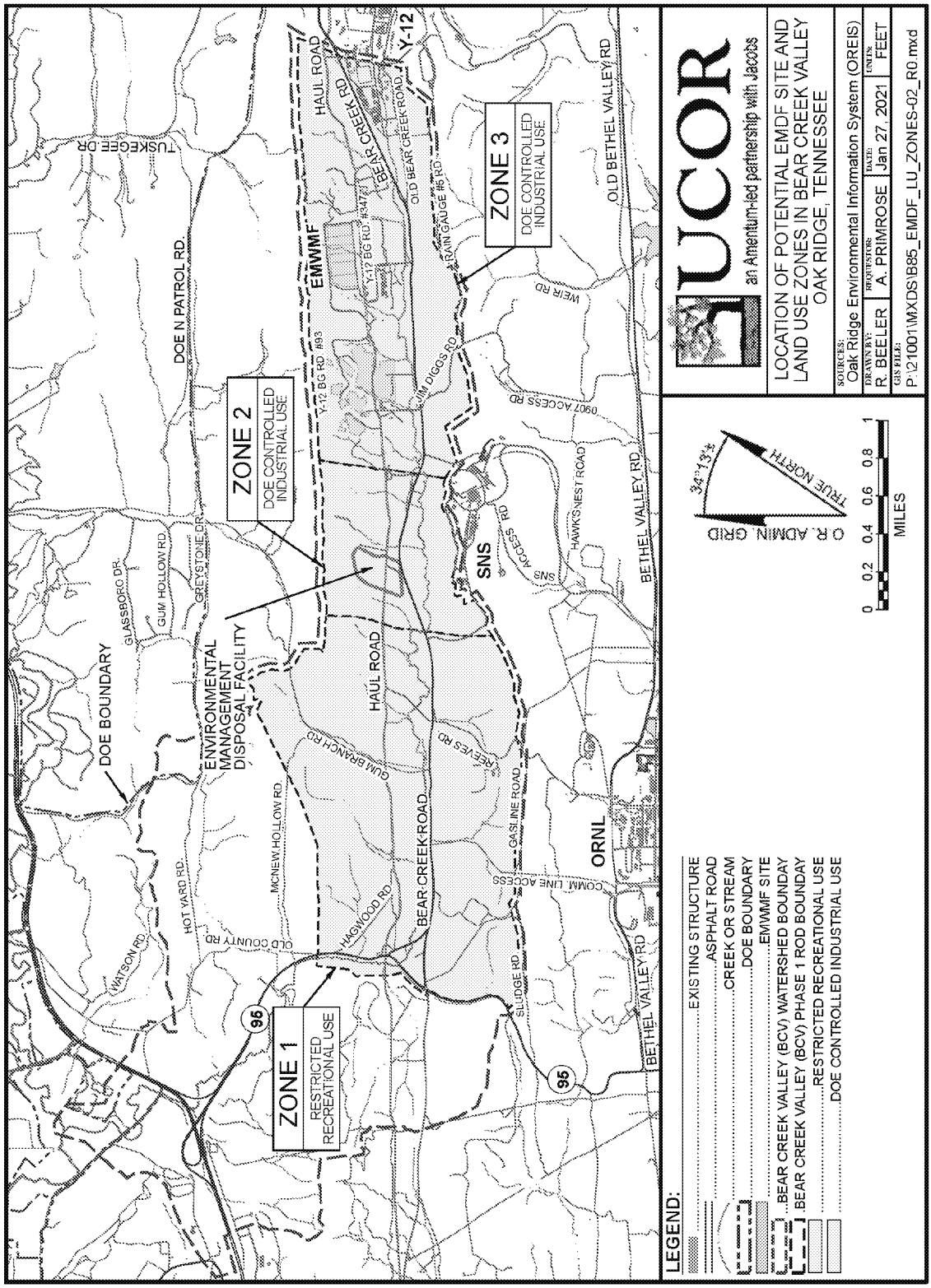

Figure 2.4. Revised Bear Creek Valley land use designations.

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. While Element 5 is not germane to a disposal decision, it will be addressed through treatment required on individual waste lots generated under other CERCLA decision documents, as needed, to meet the EMDF WAC before onsite disposal. For example, waste containing mercury above regulatory limits must be treated to meet ARARs prior to disposal.

DOE selected onsite disposal with the CBCV site 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 adjacent to an existing area designated as a CERCLA waste management area (i.e., EMWMF) along with several other CERCLA disposal areas in BCV.
- The overall terrain is not as steep as other proposed locations and there is room for collocated support systems installation as there are no other activities nearby.
- The need for underdrains is limited to consideration under berms. Any/all groundwater intercepts in use during disposal operations are conceptualized as not necessary or operational following closure and will not be under the waste.

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 Oak Ridge NPL Site 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 also will be designed and constructed as part of EMDF. 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 also are part of the selected remedy. While not ARARs under CERCLA, the remedy will also comply with all appropriate internal DOE Directives. Figure 2.5 presents a conceptual layout of the landfill and its supporting features. The footprint and supporting features could change during the design of the landfill.

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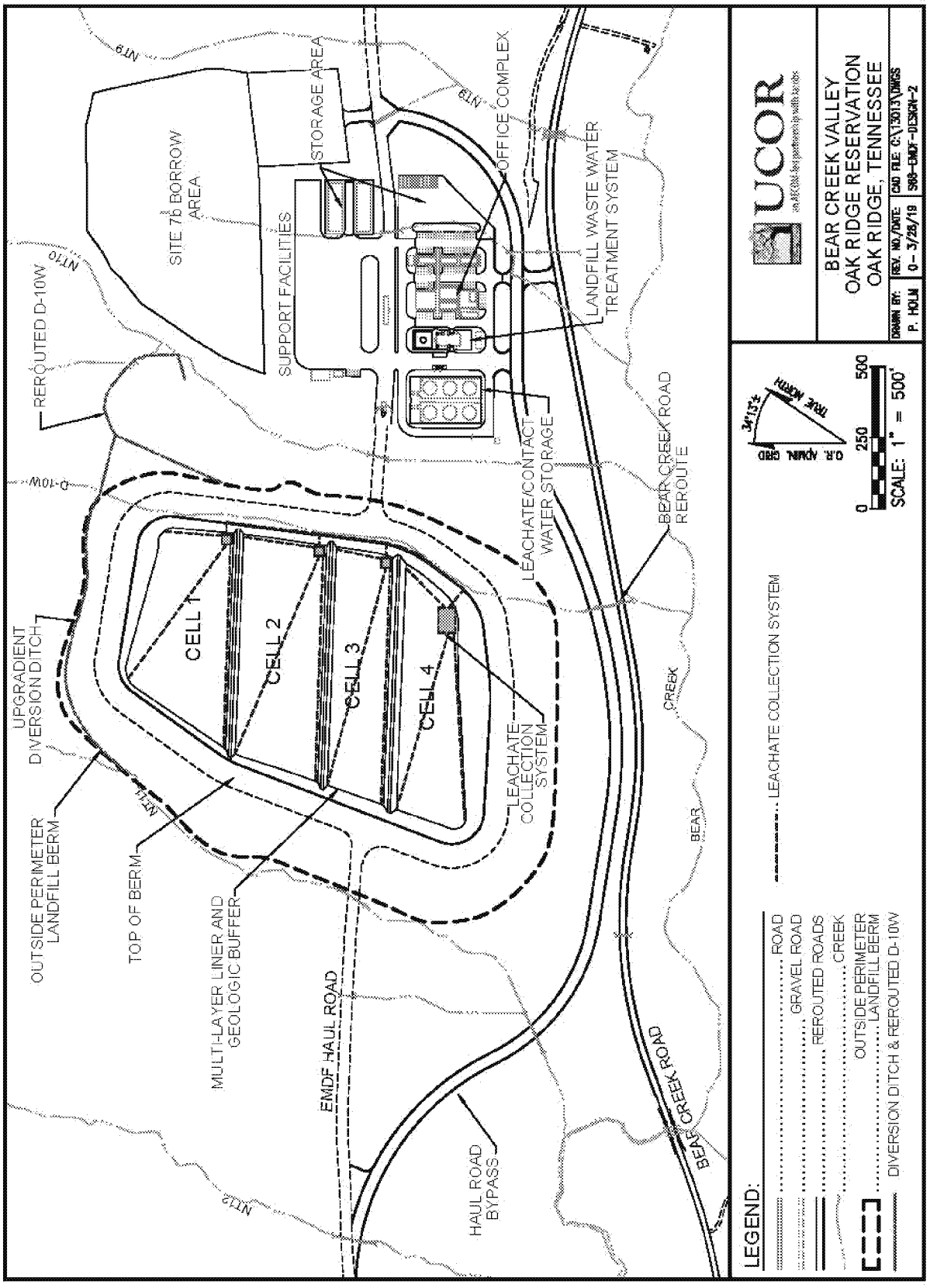

Figure 2.5. EMDF conceptual site layout.

The components of the selected remedy include the following:

- Maintain a 15-ft unsaturated zone beneath the base of emplaced wastes. 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 proposed CBCV site 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. 2.14.3) 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.
- A 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 over the disposal of RCRA waste and TSCA waste. The remedy requires that wastes not meeting the EMDF WAC will be treated and/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.
- The design, construction, and operation of EMDF at the CBCV site to satisfy design-based and performance-based requirements of ARARs.
- The construction of EMDF for approximately 2.2 million cy of disposal capacity, with multiple waste cells to accept CERCLA waste. 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 multilayer cover to reduce infiltration and permanently isolate the waste from human and environmental receptors. 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 as needed to ensure long-term protection of human health and the environment and to comply with ARARs for this action.
- 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.
- 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.
- Closure of EMDF after operations are complete 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.

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- Routine performance monitoring during operation of EMDF and post-closure monitoring of EMDF consistent with ARARs.
- 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 designation used to set remediation goals in BCV Zone 2 to future DOE-controlled industrial land use of the area.

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 2.5 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 multilayer liner system will be designed to provide an unsaturated vertical barrier between the bottom of the liner system and the top of the seasonal high water table.

The multilayer 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 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.

The landfill wastewater storage, collection systems, and associated mechanical equipment for landfill wastewater management; conveyance systems for transferring wastewater; and the new LWTS will be constructed to manage both the leachate and contact water generated at the landfill.

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 for transport waste to the EMWMF until the Phase 1 construction begins. Borrow material for EMDF will

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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.

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 (both leachate and contact water) 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 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 or dose limits and design elements in regulatory-based laws and guidance, as well as constraints on waste acceptance that are established through discussion and agreement among the FFA parties (DOE, EPA, and TDEC). The WAC will be implemented through the WAC Compliance Plan, a primary document that will provide details regarding the acceptance of waste at the EMDF through the application of these WAC limits, ARARs, and FFA agreements, along with more extensive information regarding generating, accepting, and tracking the waste. The WAC are established to protect the public and environment over the long term after EMDF closure.

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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 (DOE, EPA, and TDEC). Approval of this ROD memorializes these agreements.
- Analytic WAC are numeric limits derived from the work presented in the *Performance Assessment for the Environmental Management Disposal Facility Oak Ridge, Tennessee* (UCOR LLC [an Amentum-led partnership with Jacobs] 2020) performed under DOE Directives (DOE 2001, 2011, 2013).

These two elements of the WAC (along with additional procedures for implementing those WAC) must be met before waste may be placed in the EMDF for disposal. Each waste stream 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, who is required to provide the treatment and responsible for obtaining any necessary approvals through Waste Handling Plans or other CERCLA documents, would provide evidence of that treatment and that it meets the applicable requirement(s). The WAC Acceptance 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 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, public, and environment during transportation, handling, and placement of waste into EMDF (i.e., during operations). These constraints are in addition to the administrative and analytic WAC and 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.

The two categories of WAC are discussed in the following paragraphs.

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 between the FFA parties (DOE, EPA, and TDEC). 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. 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 2.4. Note that agreements by the FFA parties that form the basis for some of the administrative WAC are memorialized by approval of this ROD.

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Table 2.4. 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 or at sites within the State of Tennessee where contamination can be directly related to Oak Ridge NPL Site releases.	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. Note: NRC Class C limit 1.0E+05 pCi/g is the limiting concentration WAC for Am-241, Am-243, Cf-250, Cf-251, Pu-238, Pu-239, Pu-240, Pu-242, Cm-243, Cm-244, Cm-245, and Cm-246. Pu-241 has a Class C limit of 3.5E+06 pCi/g.	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.	Triparty agreement[a] TDEC 0400-20-11-.17(7)(a)(4) 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.	Triparty agreement[a]
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 it 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 does not meet LDR treatment requirements or alternative treatment standards for hazardous debris or soil are prohibited.	TDEC 0400-12-01-.10(3)(a) TDEC 0400-12-01-.10(3)(f)(1) TDEC 0400-12-01-.10(3)(j)(2)
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 and decisions/agreements reached for the given prohibition/limitation between the three FFA parties regarding the specific WAC given here, which are memorialized by the approval of this ROD.

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
TDEC = Tennessee Department of Environment and Conservation
TSCA = Toxic Substances Control Act of 1976
WAC = waste acceptance criteria

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Analytic WAC. Analytic WAC are numerical limits for radiological contaminants present in waste proposed to be disposed that, in combination with the application and attainment of a sum-of-fractions analysis at closure, would be in compliance with the 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 for EMDF are based on: (1) the analysis of release of radionuclides beneath the EMDF that could expose a hypothetical future human receptor 100 to 1000 years post-closure (release scenario), and (2) exposure due to a hypothetical inadvertent human intrusion into the waste 100 to 1000 years post-closure (intrusion scenario) (UCOR LLC 2020).

For the DOE-approved Performance Assessment (UCOR LLC 2020), fate and transport modeling applied to a conservatively estimated radionuclide inventory[4] was used to predict potential exposures (radiological dose) to future hypothetical receptors resulting from release or intrusion, based on dominant contaminant transport and exposure pathways to the receptor. The Performance Analysis demonstrated that based on the estimated EMDF inventory, site characteristics, and assumptions regarding the long-term performance of engineered barriers, doses (which include dose contributions from progeny) to maximally exposed individuals remain well below regulatory ARAR dose limits (TDEC 0400-20-11-.16(2); 10 *CFR* 61.41) within the compliance period of 1000 years post-closure. The release and transport scenario model results show that out of 42 radionuclides modeled, only tritium, carbon-14, and technetium-99 have the potential to be released within (or immediately after) the 1000-year post-closure compliance period. The estimated inventories of these three radionuclides at facility closure (also expressed as a facility average concentration) and the dose-based analytic inventory limits (WAC) are presented in Table 2.5. The inventory (WAC) limits are the maximum values allowed per the ARAR dose for protection of the public, which has been deemed protective under CERCLA by EPA.[5]

Table 2.5. Estimated EMDF radionuclide inventories and inventory limits for highly mobile radionuclides

	Estimated based on projected inventory at closure		Estimated based on achieving ARAR[b]
Nuclide	**Estimated total activity[a] (Ci)**	**Estimated facility average activity concentration at closure (pCi/g)**	**Dose-based total activity limit[a] (Ci)**
Tritium	15	4.6	3.31E+13
Tc-99	5.0	1.6	1070
C-14	1.7	0.54	47.3

[a]Total activity inventories 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).
[b]Limits based on 1000-year post-closure compliance period maximum dose per TDEC 0400-20-11-.16(2) [10 *CFR* 61.41] ARAR.

ARAR = Applicable or Relevant and Appropriate Requirement
CFR = *Code of Federal Regulations*
EMDF = Environmental Management Disposal Facility
TDEC = Tennessee Department of Environment and Conservation

[4] The inventory provided in the Performance Assessment estimates the top five radionuclide activity inventories are uranium-234 and -238, nickel-63, cesium-137, and strontium-90 (UCOR LLC 2020). Seventy potential radionuclides were considered (multiple additional radionuclides were not considered based on a less than 1-year half-life), and screening (e.g., for half-life under 5 years, minimal drinking water impacts, or lack of evidence/data) reduced the total number modeled in the release scenario to 42, but the inclusion of intrusion-based concentration limits resulted in a total of 53 radionuclides being limited by analytic or administrative WAC as given in Tables 2.4, 2.5, and 2.6.
[5] EPA Administrator, *Dispute Resolution Decision on radiological discharge limits for the Oak Ridge Reservation*, December 31, 2020.
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 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.

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WAC limits on activity concentrations for radionuclides given in Table 2.6 are based on the intrusion scenario examined in the Performance Assessment. This analysis of a maximally exposed individual is similar to analyses performed by the NRC in developing LLW Class limits.

Analysis of the inadvertent human intrusion scenario provides radionuclide concentration limits (WAC, Table 2.6) applicable to individual waste lots or smaller units such as disposal packages. The intrusion-based WAC protect human health in the case of future hypothetical inadvertent intrusion into the disposal facility, whereby an exposed individual 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 is considered. Due to the thickness of the cap, there is no direct exposure to the waste under any evaluated future residential scenario, including constructing a basement.

Table 2.6 provides the EMDF inadvertent intrusion-based concentration limits (WAC) and compares these to the NRC Class C concentrations (10 *CFR* 61.55, *Waste Classification*). The more restrictive of these two values must be met for each radionuclide; Table 2.4 lists those radionuclides administratively limited by Class C limits because they are more restrictive than EMDF intrusion-based limits. Note that these concentration limits alone do not dictate the amount of the particular radionuclide allowed for disposal. Methods such as sum-of-fraction analyses, which consider multiple radionuclides in a waste stream, must also be performed to limit quantities of contaminants disposed for individual waste lots as well as the landfill as a whole.

Based on the Performance Assessment results, the CERCLA threshold criteria and RAOs for protection of human health and the environment are achieved for the EMDF projected mobile radionuclide inventories in Table 2.5. EMDF projected inventories for radionuclides in Table 2.6 also meet the CERLCA threshold criteria and RAOs for protection of human health and the environment, for the inadvertent human intrusion scenario. 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. Maintaining a sum-of-fractions at 1 for the entire facility thus ensures the CERCLA risk range is met at closure.

The basis for WAC use and implementation will be detailed in the WAC Compliance Plan. The sum-of-fractions for the landfill inventory as a whole at closure, based on the WAC limits, will not exceed 1, thus limiting the overall radionuclide inventory that can be placed in the EMDF. The WAC Compliance Plan will specify how these analyses are completed and how they are applied to incoming waste streams. This plan will develop details regarding implementation of the WAC, roles and responsibilities of the generator versus the disposal facility, and how the sum-of-fractions analyses are to be completed and applied as well as how inventory limits would be tracked. 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.

DOE will maintain the EMDF, including active and passive institutional controls (see Sect. 2.12.2.7), 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.

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Table 2.6. EMDF intrusion-based activity concentration limits and NRC Class C limits

Nuclide	EMDF waste concentration limit[a,b] (pCi/g)	NRC Class C limit (pCi/g)	Nuclide	EMDF waste concentration limit[a,b] (pCi/g)	NRC Class C limit (pCi/g)
Ac-227	1.3E+06	None	Np-237	1.0E+05	1.0E+05
Ba-133	5.5E+07	None	Pa-231	4.1E+04	None
Be-10	6.0E+06	None	Pb-210	2.1E+04	None
C-14	3.1E+04	4.2E+06[c]	Pm-146	9.6E+09	None
Ca-41	2.3E+06	None	Pu-244	6.3E+04	1.0E+05
Cf-249	7.9E+04	1.0E+05	Ra-226	8.8E+02	None
Cm-247	6.8E+04	1.0E+05	Ra-228	7.2E+08	None
Cm-248	1.6E+04	1.0E+05	Re-187	No Limit	None
Co-60	4.7E+09	None	Sr-90	3.5E+05	3.70E+09[c]
Cs-137	2.3E+05	2.4E+09[c]	Tc-99	4.8E+04	1.60E+06[c]
Eu-152	3.6E+06	None	Th-228	No Limit	None
Eu-154	6.3E+07	None	Th-229	6.3E+04	None
Tritium	5.7E+08	None	Th-230	2.4E+03	None
I-129	6.1E+03	4.2E+04[c]	Th-232	4.8E+03	None
K-40	1.8E+04	None	U-232	1.2E+04	None
Mo-93	5.5E+04	None	U-233	3.9E+04	None
Nb-93m	1.6E+10	None	U-234	3.9E+04	None
Nb-94	1.6E+04	1.1E+05[c]	U-235	3.5E+04	None
Ni-59	7.6E+07	1.2E+08[c]	U-236	4.5E+04	None
Ni-63	6.4E+07	3.7E+08[c]	U-238	4.1E+04	None

[a]EMDF intrusion-based activity concentration limits are presented for key radionuclides that are lower than or equal to NRC Class C limits. The remaining radionuclides of concern with EMDF WAC limits administratively set to NRC Class C limits are provided in Table 2.4.

[b]Limits based on 1000-year post-closure compliance period maximum annual intruder dose per DOE Order 435.1 chronic performance measure.

[c]Equivalent to NRC Class C volumetric concentration limit given an assumed bulk density of 1.9 g/cm^3.

DOE = U.S. Department of Energy
EMDF = Environmental Management Disposal Facility
NRC = U.S. Nuclear Regulatory Commission
WAC = waste acceptance criteria

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 provide daily protection to workers, the public, and the environment.

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,

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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 the FFA parties. These Physical Waste Requirements and Safety Basis Requirements, which require extensive DOE-Headquarters 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 the EMDF; upon final agreement of the approach, this ROD will be modified to incorporate the decision:

- The following will be incorporated in the EMDF WAC in this ROD:
  - All recovered elemental mercury will not be disposed in any Oak Ridge landfill and will eventually be shipped offsite, subject to availability of a disposition pathway.
  - All mercury hazardous waste as determined under RCRA (waste code D009, as determined by the method specified in 40 *CFR* 261.24.) will be shipped offsite for treatment and disposal.
- This ROD will also incorporate the following:
  - The wastewater discharge limits for mercury will be 51 ng/L (ppt) as a monthly average concentration (numeric recreational water quality criteria) and 1400 ng/L (ppt) maximum daily limit (numeric fish and aquatic life water quality criteria).
  - All discharge water from EMDF will be treated as necessary to meet the most stringent applicable instream water quality criteria, including recreational, with consideration of the stream mixing zone at the point of discharge.
  - The LWTS will be constructed and operated to accommodate anticipated wastewater volumes and potentially elevated levels of mercury. It may include the following:
    - Modular design will be provided to enable an adaptive management approach and adjustments to the treatment train to maximize efficiency of contaminant removal (i.e., allows primary iron co-precipitation/membrane microfiltration treatment to be augmented with ion exchange and/or carbon filtration if needed).
    - Water management practices will be evaluated and implemented to reduce the volume of water needing treatment where practicable.
    - Storage capacity will be provided where practicable in order to manage water during storm events.
- The use of other potential design and/or operational approaches in the landfill that might further reduce mercury mobility will be evaluated.

2.12.2.4 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 water and stormwater, and providing environmental monitoring.

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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.

Landfill wastewater from EMDF will be stored and sampled. If sampling results indicate that water quality complies with the discharge criteria, then the water can be directly discharged without treatment to Bear Creek or a tributary. If the sampling results indicate the water quality is unacceptable for discharge, then the staged water will be treated prior to release.

The selected remedy includes compliance with the CWA and associated requirements as ARARs for non-radiological chemical constituents. The CWA typically controls the direct discharge of pollutants to surface waters through the National Pollutant Discharge Elimination System (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) [equivalent to 10 *CFR* 61.41] and TDEC 0400-20-11-.16(4) [equivalent to 10 *CFR* 61.43]. These ARARs, developed by the NRC, provide and refer to dose limits for protecting the public. Compliance with the ARARs is required at the nearest point of public exposure, which is downstream from the facility. Radiological discharge limits (RDLs) are in compliance with the 10^{-5} risk specified in the Dispute Resolution Decision[6] and consistent with TDEC 0400-40-03-.03(4)(j) Footnote C, as determined based on site-specific exposure assumptions. Compliance with these discharge limits will assure human health and the environment are fully protected to the requirements of CERCLA. Discharge limits will be implemented where waters are discharged from the landfill operation, prior to mixing with proximate surface water. See Sect. 2.13.2.3 for more information.

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 projected to exceed discharge criteria. The construction and operation of the wastewater treatment system for EMDF will be per ARARs included in Appendix A.

2.12.2.5 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.

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[6] The Dispute Resolution Decision was signed by the EPA Administrator on December 31, 2020. It addressed the dispute between 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.

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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.

2.12.2.6 Maintenance activities and environmental monitoring

Surveillance and maintenance (S&M) and performance monitoring will be implemented during operation and after facility closure. 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 the ARARs included in Appendix A.

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. Details concerning operational and post-closure monitoring will be specified in future post-ROD CERCLA documents. 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.

2.12.2.7 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 (waste management) and restrict access and use of groundwater except for monitoring purposes.

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, institutional land use controls 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 land use controls during operation and after closure include the following:

- Prevent unauthorized excavation into EMDF
- Restrict access to the EMDF site from unauthorized entry
- Preclude alternate use of the EMDF site or underlying groundwater.

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The type and purpose of controls, implementation, and affected areas for all of the Onsite Disposal Alternatives are provided in Table 2.7. Land use controls will be maintained to ensure long-term protectiveness and maintain integrity of the landfill.

Table 2.7. 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.	Access controls (e.g., signs, fences, gates, portals, etc.)	Control and restrict access to the public in perpetuity	Maintained by federal government and its contractors	EMDF landfill and site

[a]Affected areas – Specific locations 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
TCA = Tennessee Code Annotated

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 was estimated at $732 million (Table 2.8). 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, 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.

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 1.5 percent according to the Office of Management and Budget (OMB) Circular No. A-94 (OMB 2016).

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Table 2.8. Total estimated project costs

Cost element	Cost $ (FY 2012)
CAPITAL COSTS	
Phase I includes Cells 1 and 2:	
Engineering	$22,598,980
Site Development	$13,116,173
Support Facilities	$19,354,977
Construction of Cells	$72,500,471
Phase II includes Cells 3 and 4:	
Engineering	$2,102,442
Construction of Cells	$41,613,368
Phase III includes Cell 5:	
Engineering	$2,102,442
Construction of Cells	$32,766,352
Final cap (for Dual Site includes both landfills):	
Engineering	$2,046,565
Quality Assurance	$6,498,415
Construction of Final Cap	$54,805,605
TOTAL CAPITAL COST (FY 2012 $)	**$269.5 M**
OPERATIONS COSTS	
Base Operations	$266,218,662
Leachate System Operations	$28,640,275
Security Operations	$3,657,045
OTHER COSTS	
Pre-Construction Costs (e.g., Characterization)	$10,463,741
Perpetual Care Fee and Post-closure Care	$45,736,249
Support Structure Demolition/Removal	$3,680,000
Subtotal (Capital, Operations, Other)	$627.9 M
Contingency (22% Capital, 5% Operations)	$72.2 M
TOTAL (FY 2012 $) LIFE CYCLE COST	**$700.1 M**
TOTAL (FY 2016 $) LIFE CYCLE COST	**$732.0 M**
PRESENT WORTH (FY 2016 $)	**$537.2 M**

FY = fiscal year
M = million

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 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 Oak Ridge NPL Site 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.

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.

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2.13 STATUTORY DETERMINATIONS

2.13.1 Overall Protection of Human Health and the Environment

As required by 30 *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 safe 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.

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 or unless the State of Tennessee has primacy over the requirement (such as with RCRA).

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 Oak Ridge NPL Site and associated sites outside the NPL boundary, but within the State of Tennessee, that have been contaminated by the receipt or transport of material from past Oak Ridge NPL Site operations conducted by DOE and its predecessors. No out-of-state waste will be accepted at the proposed disposal facility.

The following NRC-based TDEC regulations are relevant and appropriate: TDEC 0400-20-11-.16(2) [equivalent to 10 *CFR* 61.41] and TDEC 0400-20-11-.16(4) [equivalent to 10 *CFR* 61.43]. These ARARs are used along with site-specific parameters to develop limits on radiological discharges during operations that ensure protection of human health and the environment.

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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.

2.13.2.1 Waiver to TSCA 40 *CFR* 761.75(c)(4)

DOE is seeking a waiver to a TSCA siting requirement for the selected Onsite Disposal Alternative under TSCA 40 *CFR* 761.75(c)(4). 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 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."* This waiver may be used in situations where equivalent or better results could be achieved using an alternative design or method of operation.

DOE justifies a waiver of the TSCA hydrologic conditions requirement on the basis that the EMDF will be at least as protective due to the following design elements, which provide protectiveness exceeding that provided through the siting requirements (please note that floodplains and shorelands are being avoided and that the site will have monitoring wells and leachate collection):

- 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), 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).

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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.

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 conditions 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.

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.

Likewise, the requirement for no flowing or standing water at the surface is not a performance standard for a disposal facility. Unlike 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 groundwater 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 any large structure is installed. Following construction of the disposal facility, conditions will be such that water is well separated from the waste, the objective of the requirement is thus met.

This waiver is requested based on the ability of engineered features to fulfill the intent of the siting criterion, and, therefore, not result in undue hazard to public health and safety or property. The design achieves the level of performance compared to that specified in the ARAR and provides a degree of protection of health, welfare, and the environment that is equal to that under the original ARAR. Waivers of this requirement were granted for the existing EMWMF and many other chemical waste landfills constructed in the southeastern United States.

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

This TDEC requirement, 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.*"

Onsite locations proposed for an onsite disposal facility do 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 these sites, including the CBCV 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.

All sites proposed for consideration 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 (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, 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 three features (geologic buffer, liner, and geosynthetics within 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.

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The preliminary design for the EMDF at the CBCV site incorporates a minimum 15-ft vadose (unsaturated) zone, comprised of the liner and geobuffer 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.

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. 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.

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.

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

2.13.2.3 Radiological Discharge Limits

The Dispute Resolution Decision regarding assignment of RDLs 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 [preliminary remediation goals] PRGs for water discharged from CERCLA landfills to waterways at ORR to ensure that risk does not exceed the 10-5 level.*"

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.*"

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Additionally, the Dispute Resolution Decision 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.

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 for construction, operation, and presentation of EMDF in CBCV is $732 million. Although the costs of the project are significant, the remedy will ensure that the Oak Ridge NPL Site CERCLA waste 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.

Selection of alternative treatment technologies or resource recovery is not germane to this decision. The decisions concerning treatment or recycling are the responsibility of the waste generating projects.

2.13.5 Preference for Treatment as a Principal Element

Treatment of the CERCLA waste is not a component of this remedy. 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) outlining requirements for toxic, ignitable, reactive, and

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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 leachate and contact wastewaters from EMDF, however, is a key component of the remedy and will reduce the toxicity of the waste.

2.13.6 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. Because waste that could pose a threat under unrestricted exposure will remain at the Oak Ridge NPL Site under this remedy, 5-year reviews will be required for this remedial action.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

Since the Proposed Plan was released, 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, but it 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.

As a result of comments received during the 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 re-evaluated costs and then 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). 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 are approximately double the onsite disposal costs. Both cost estimates were determined to be higher due to ongoing delays in a decision for waste disposal (resulting in significant estimate escalation). The additional evaluations are addressed in this section along with a summary of the impacts to the remedy evaluation and selection from the additional information.

2.14.1 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,

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CROET would have to agree since they own much of the property that would be needed to execute the proposed alternative.

If K-792 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. 2.6). 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.

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. 2.6. 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. The spurs intersect and are adjacent the main roadways. 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 all 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, DOE Orders require that DOE control/own the land immediately adjacent to waste transportation corridors in order to keep it out of public commerce and avoid the additional costs and resources required to comply with U.S. Department of Transportation requirements. 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.

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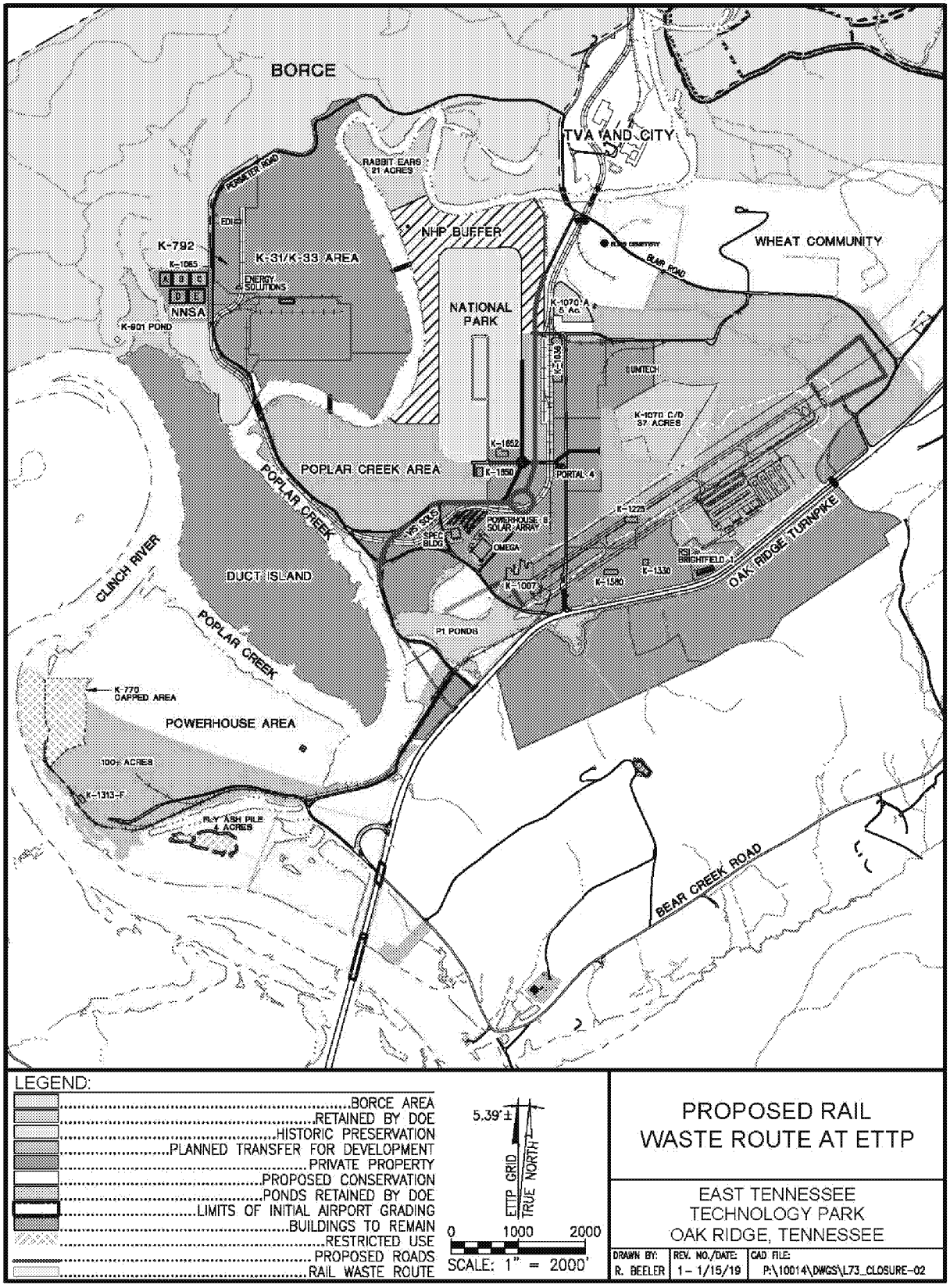

Figure 2.6. Proposed Rail Waste Route at ETTP.

2.14.2 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 2.9 (EPA 2018).

Table 2.9. 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 2.10. The estimated emissions for rail transportation to the western commercial facility and truck transportation to the NNSS are included in Table 2.11.

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Table 2.10. 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 2.11. 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).

2.14.3 Groundwater Field Demonstration

As per agreement with the FFA parties, a groundwater field demonstration (GWFD) will be performed post-ROD to determine the seasonal high water table that will control the elevation of the geologic buffer in the knoll area following construction of the EMDF. The 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 effect 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 approved Remedial Design Report will serve as the basis for a landfill design that will meet the RAO stipulating a 15-ft unsaturated zone beneath the base of emplaced wastes.

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 Remedial Design Work Plan 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.

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- 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 does not represent average rainfall; if an adjustment is needed, determination of the method used to calculate the adjustments will be completed by a triparty technical team.
- Evaluations will use linear interpolation between piezometers.

2.14.4 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 added to the lower potential offsite disposal costs to avoid impacting ETTP would be needed if offsite disposal were selected. 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 explanation of significant differences 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

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, 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 Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) public comment periods are only required to span 30 days. 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 UCOR LLC (an Amentum-led partnership with Jacobs) 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.
- 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

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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 members from TDEC 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.

SUMMARY OF COMMENTS AND RESPONSES

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 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 comments 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 to 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.

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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 nearly 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 – Remedial Investigations/Feasibility Studies (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. 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.

Concerns with mercury-contaminated waste – DOE will meet all regulatory requirements pertaining to mercury treatment and onsite disposal of waste, including the 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.

Need for waivers – As required in the EPA guidance document CERCLA Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method

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or approach (CERCLA §121[d][4][D]). Waivers and/or exemptions are available in many circumstances including situations where an applicable or relevant and appropriate requirement stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

A waiver for Toxic Substances Control Act of 1976 (TSCA) 40 *Code of Federal Regulations* 761.75(b)(3) is part of this ROD to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2. The TSCA waiver is part of the statute and is commonly granted.

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 based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

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 Bear Creek Valley (BCV). To further validate this understanding, DOE conducted additional geologic investigations at the proposed 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. 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 falls on the waste will be collected, sampled, and, if it exceeds water discharge limits, treated. When the facility is closed, a final cover will be installed that will prevent rainwater from entering the waste.

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

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associated with construction and operation of the facility, and the acceleration of cleanup enabled by onsite disposal and subsequent opportunities that would present to the 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 the Oak Ridge NPL Site. 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. 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.

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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. Specific analytic WAC were developed for radionuclides. DOE has also completed the Performance Assessment and Composite Analysis, which demonstrate the long-term protectiveness of EMDF as an LLW landfill. The demonstration of the protectiveness of the EMDF has led DOE-Headquarters to issue a preliminary Disposal Authorization Statement, which allows for the construction of a radiological disposal facility in East Tennessee.

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.

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

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste

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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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be protective of human health and the environment for waste that is generated from 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be protective of human health and the environment for waste that is generated from 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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

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Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed

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to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge National Priorities List (NPL) Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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

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Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will

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consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste

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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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be protective of human health and the environment for

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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

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Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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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 sample wastewater and treat as necessary 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will

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consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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

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Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be protective of human health and the environment for

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be protective of human health and the environment for waste that is generated from Oak Ridge National Priorities List (NPL) Site activities. The waste

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The

remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed

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to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The

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remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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

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Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed

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to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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

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in this Record of Decision. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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

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Management Disposal Facility (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The

remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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

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Security Complex and Oak Ridge National Laboratory that will meet the limits as documented in this Record of Decision. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will

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consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The

remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The

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remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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).

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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). 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.

- 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: As required in the EPA guidance document CERCLA Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers are available in many circumstances including situations where an ARAR stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

  A waiver for Toxic Substances Control Act of 1976 (TSCA) 40 *Code of Federal Regulations* 761.75(b)(3) is part of this ROD to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2. The TSCA waiver is part of the statute and is commonly granted.

  An exemption to Tennessee Department of Environment and Conservation 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

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- 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 Federal Facility Agreement 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 in 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. There is no discussion of underdrains in the selected remedy portion of this ROD.

- 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 Resource Conservation and Recovery Act of 1976 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.

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- 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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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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 falls on the waste will be collected, sampled, and, if it exceeds water discharge limits, 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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 public comments received, including this one, the U.S. Department of Energy (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 dispose 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 (EMDF) will be a permanent Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) waste disposal facility designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 Central Bear Creek Valley Site is not as steeply sloped 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.

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. 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.

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.

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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:

1. Details of waste acceptance criteria and requirements for waste characterization prior to acceptance.

   Response: Remedial Investigations/Feasibility Studies 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 Record of Decision (ROD). Most of these WAC result from existing state and federal environmental regulations that are included in this ROD as 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.

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: As required in the EPA guidance document CERCLA Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers are available in many circumstances including situations where an ARAR stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

   A waiver for Toxic Substances Control Act of 1976 (TSCA) 40 *Code of Federal Regulations* 761.75(b)(3) is part of this ROD to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2. The TSCA waiver is part of the statute and is commonly granted.

   An exemption to Tennessee Department of Environment and Conservation 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

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.

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).

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.

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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 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.

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 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 in 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 78 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).

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 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. 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.

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 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, there has been the installation of 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization were 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. **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 Central Bear Creek Valley Site is not as steeply sloped 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.

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 land disposal restrictions. The projects generating any waste that cannot meet these requirements would determine if treatment to stabilize the mercury or offsite disposal is more appropriate given the characteristics of their waste stream.

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. 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 designed to the highest engineering standards to be 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 eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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. 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 Central Bear Creek Valley Site is not as steeply sloped 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.

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: As required in the U.S. Environmental Protection Agency guidance document CERCLA Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers are available in many circumstances including situations where an applicable or relevant and appropriate requirement stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

A waiver for Toxic Substances Control Act of 1976 (TSCA) 40 *Code of Federal Regulations* 761.75(b)(3) is part of this Record of Decision (ROD) to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2. The TSCA waiver is part of the statute and is commonly granted.

An exemption to Tennessee Department of Environment and Conservation 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is based on demonstration of an equivalent level of protection. The basis for

the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

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 78 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).

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. 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.

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. 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 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 designed to the highest engineering standards to be 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 eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 applicable or relevant and appropriate requirements. 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.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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

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hydrologic separation from Pine Ridge. The Central Bear Creek Valley Site is not as steeply sloped 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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

Comment 125: Comment from Ann Mostoller

Please add my name to those opposed to the new DOE landfill in Oak Ridge.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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).

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

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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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 and will look for opportunities for future public involvement as the project proceeds.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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.

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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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA

threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA

threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

Comment 141: Comment from Eric T. Johnson

I'm against the new landfill in Tenn.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

Comment 143: Comment from Scott Davis

I am opposed to ANY more landfills in Tennessee!!

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil

and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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)

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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: All existing and new data from nearly 1000 wells in Bear Creek Valley support the conclusion that any contamination in the valley cannot reach residential areas. 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.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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: 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 78 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.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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?

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA

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threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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.

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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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory 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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 designed to the highest engineering standards to be 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. The efficient

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remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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.

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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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Comment 160: Comments from the City of Oak Ridge (as prepared by The Ferguson Group (TFG))

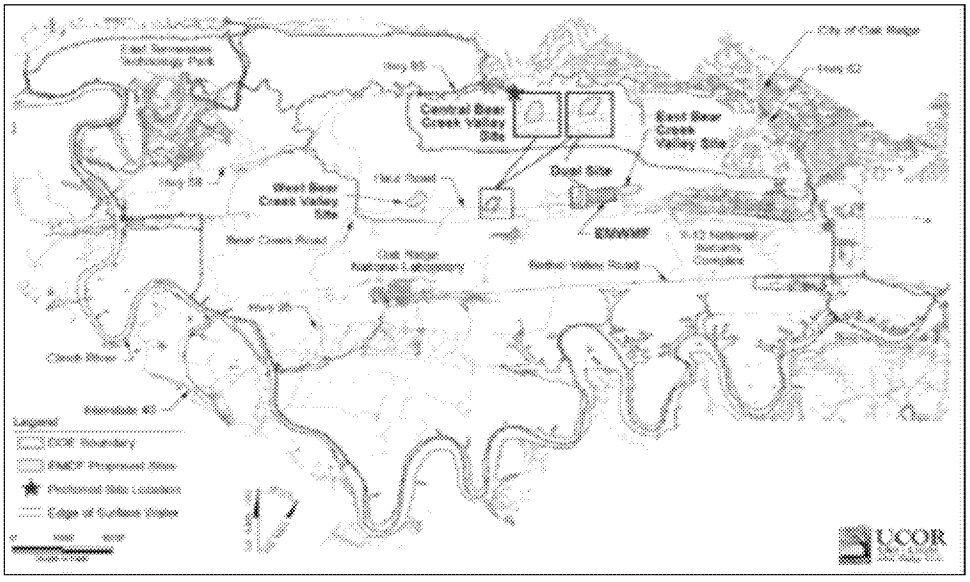
Comment 160.1: Page 4. Land Use Designations. In this section of the Proposed Plan DOE notes that the EMWMF was located in the East Bear Creek Valley per the recommendation of the End Use Working Group (EUWG) – a group composed of citizens from diverse stakeholder organizations who were asked to develop 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 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 in 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 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, there has been the installation of 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization were 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: The remedial action selected by DOE will comply with federal and state applicable or relevant and appropriate requirements (ARARs) and will be protective of human health and the environment. As required in the U.S. Environmental Protection Agency (EPA) guidance document Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers are available in many circumstances including situations where an ARAR stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

A waiver for Toxic Substances Control Act of 1976 (TSCA) 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) is part of this ROD to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2. The TSCA waiver is part of the statute and is commonly granted.

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 based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

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 collected, sampled, and, if needed, treated prior to any releases in compliance with environmental regulations. The Environmental Management Disposal Facility (EMDF) will not negatively affect the quality of Bear Creek water for any contaminant, including mercury.

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 sample wastewater and treat as necessary 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 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, to offsite disposal at another DOE site, to offsite commercial 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 leachate are directly from the waste; therefore, treatment benefits for the leachate do apply directly to the evaluation of alternatives. 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.

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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 Federal Facility Agreement 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 Federal Facility Agreement parties believe there is sufficient information available to support this decision. The concerns mentioned in the comment to be TDEC concerns have been addressed.

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. If DOE decides to pursue a CAMU to support the management and disposal of mercury-contaminated waste or other waste streams in EMDF in the future, additional regulatory approvals will be required.

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. 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. 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.

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: DOE is required to and will meet Land Disposal Restrictions under the Resource Conservation and Recovery Act of 1976 (RCRA) for the disposal of mercury (and all other hazardous wastes). DOE is not requesting any waivers for RCRA ARARs or any mercury cleanup standards.

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 Federal Facility Agreement 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 in 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.

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: 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.

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 also is 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: The comment implies that the need for a waiver means that the alternative is not protective of human health and the environment or compliant with federal and state requirements. DOE disagrees with this comment. As required in the EPA guidance document CERCLA Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers are available in many circumstances including situations where an applicable or relevant and appropriate requirement stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

A waiver for TSCA 40 *CFR* 761.75(b)(3) is part of this ROD to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2. The TSCA waiver is part of the statute and is commonly granted.

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 based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

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.

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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 Federal Facility Agreement parties have agreed that the preferred alternative presents a protective remedy and therefore has been selected.

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 also is 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 78 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).

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: As required in the EPA guidance document CERCLA Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers are available in many circumstances including situations where an ARAR stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

A waiver for Toxic Substances Control Act of 1976 (TSCA) 40 *Code of Federal Regulations (CFR)* 761.75(b)(3) is part of this ROD to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2. The TSCA waiver is part of the statute and is commonly granted.

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 based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

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 Environmental Management Disposal Facility (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.

DOE will meet all regulatory requirements pertaining to mercury treatment and onsite disposal of waste, including Resource Conservation and Recovery Act of 1976 requirements that dictate waste acceptance criteria (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.

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: The selected remedy will comply with federal and state ARARs and will be protective of human health and the environment. As required in the EPA guidance document CERCLA Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers are available in many circumstances including situations where an ARAR stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

  A waiver for TSCA 40 *CFR* 761.75(b)(3) is part of this ROD to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2. The TSCA waiver is part of the statute and is commonly granted.

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 based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

- 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 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. 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-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.

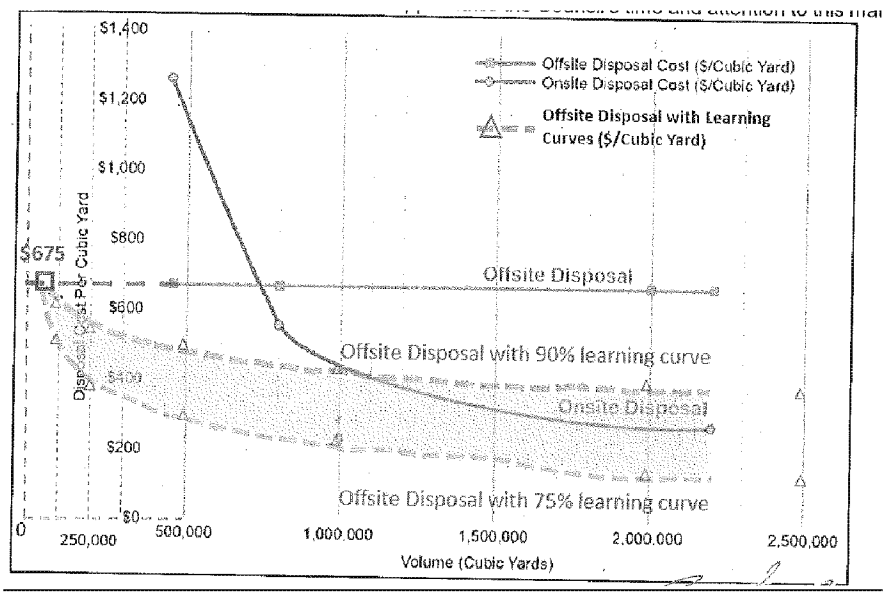
  Response: This selection of DOE's preferred alternative was based in part on the increased transportation risks associated with the offsite shipment of waste. The evaluation of transportation risks as presented in the RI/FS and summarized in the Proposed Plan were based on the latest techniques using 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.

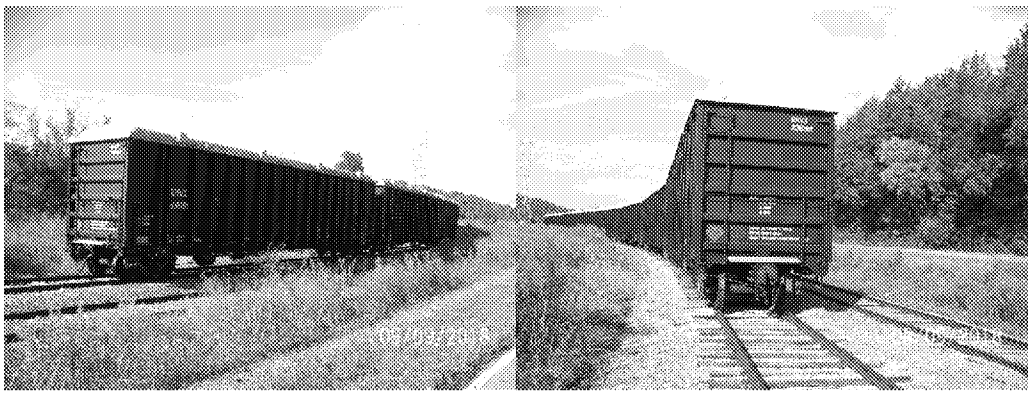
We also looked at the fact that DOE has stated at the outset in the plan, and in other venues, that they will seek waivers for at least three significant elements – reducing required height of water table, restricting maximum permissible uses of surface water and groundwater, an exception with respect 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.

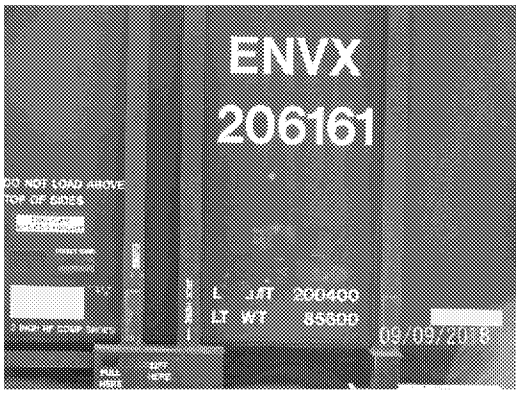
So we just have several issues. We also know that, like you said, there's issues with TDEC and EPA that also need to be resolved. So I'm not even going into that. But we feel like that there are a lot of issues that still need to be addressed. Thank you.

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 9:26 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 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 in 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.

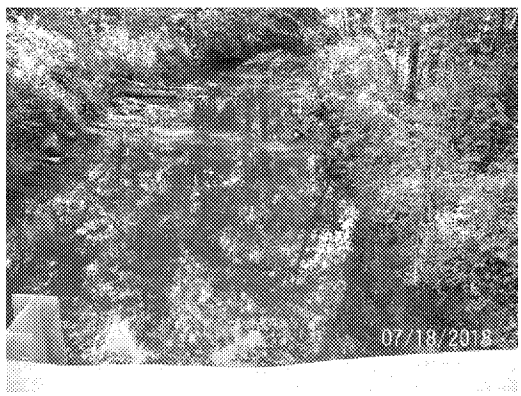
- Current annual rainfall of five to six feet and a changing climate with a warming atmosphere is forecast to result in more frequent and heavier rainfall events.

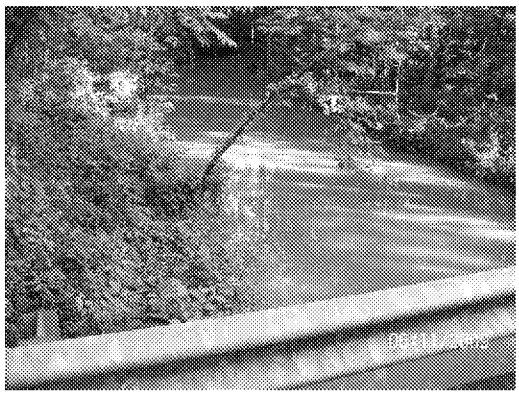
  Response: East Tennessee has annual rainfall varying from 38-77 in. per year as measured at the Y-12 National Security Complex (Y-12) over the last 30 years with an average of 54 in. per year. According to the original Feasibility Study conducted in Bear Creek Valley, approximately 50 percent of the 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 falls on the waste will be collected, sampled, and, if it exceeds water discharge limits, treated. 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, 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.

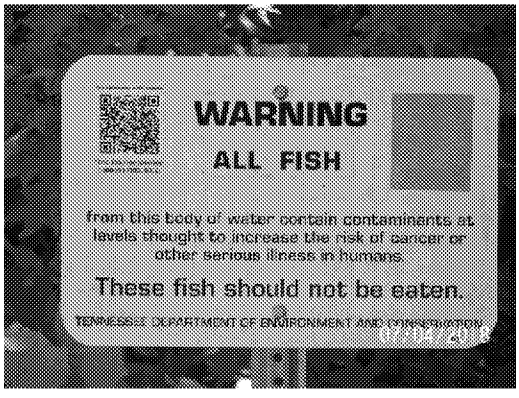
- Damaging impacts to Bear Creek water quality related to EMWMF and supporting operations, have occurred and continue. And another similar landfill will likely cause more. Attached are pictures [see below] of the sedimentation loading of Bear Creek following heavy rainfall runoff events -- July 2009 & 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].

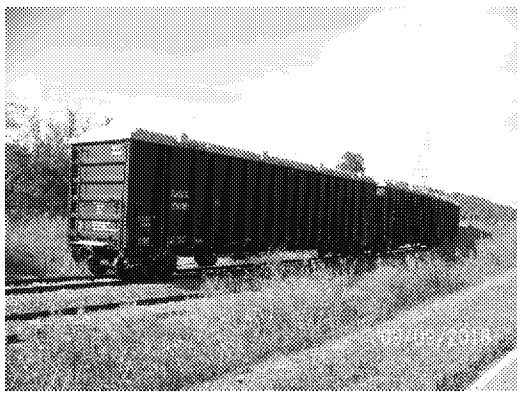
- Contact water (rainfall -- 5' to 6' per year) removed from the landfill cells is also a potential impact to the Bear Creek water quality. This may also explain why the "fish warning" sign was placed at two locations along Bear Creek in late 2016. See attached picture [see below].

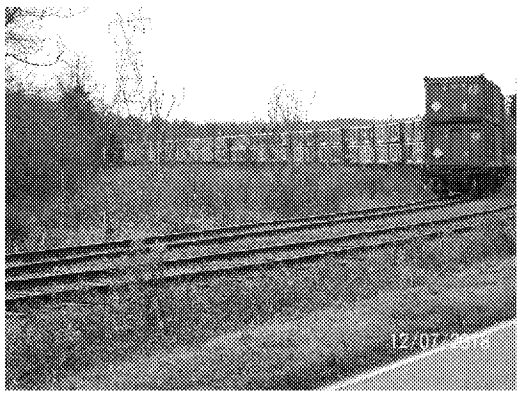


Response: Please note that the mercury warning signs were not placed along Bear Creek because of ongoing waste disposal activities in the valley. Current mercury levels in Bear Creek are on the order of those in reference streams throughout the state. Even so, the

fish in the creek exhibit elevated levels of mercury. DOE will control levels of mercury in landfill wastewater through treatment if necessary to meet Clean Water Act limits, 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.

ED_013967_00000418-00218

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

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.

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.

###

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 falls on the waste will be collected, sampled, and, if it exceeds water discharge limits, treated. When the facility is closed, a final cover will be installed that will prevent rainwater from entering the waste.

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.

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. 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.

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: DOE will meet all regulatory requirements pertaining to mercury treatment and onsite disposal of waste, including Resource Conservation and Recovery Act of 1976 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.

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 designed to the highest engineering standards to be 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 eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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.

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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. One specific Toxic Substances Control Act of 1976 regulation and one specific Tennessee Department of Radiological Health regulation are being waived, as is done for many disposal facilities.

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 Record of Decision (ROD). Analysis of the first phase data confirmed DOE's understanding of the site. Since then, there has been the installation of 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization were 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.

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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). 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.

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 Federal Facility Agreement 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 Federal Facility Agreement parties believe there is sufficient information available to support this decision.

Comment 165: Comment from Mark Watson

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 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 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, there has been the installation of 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization were 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: As required in the U.S. Environmental Protection Agency guidance document CERCLA Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers are available in many circumstances including situations where an applicable or relevant and appropriate requirement stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

  A waiver for Toxic Substances Control Act of 1976 (TSCA) 40 *Code of Federal Regulations* 761.75(b)(3) is part of this ROD to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2. The TSCA waiver is part of the statute and is commonly granted.

  An exemption to Tennessee Department of Environment and Conservation 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

- 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

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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 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. 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.

- 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: DOE will meet all regulatory requirements pertaining to mercury treatment and onsite disposal of waste, including Resource Conservation and Recovery Act of 1976 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.

- 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 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 sample wastewater and treat as necessary to remove contaminants that exceed regulatory discharge limits.

- 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 also is 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 Federal Facility Agreement 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.

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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 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, there has been the installation of 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization were 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 Federal Facility Agreement 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 Federal Facility Agreement 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: As required in the U.S. Environmental Protection Agency guidance document CERCLA Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers may be used in situations where an ARAR stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

A waiver for Toxic Substances Control Act of 1976 40 *Code of Federal Regulations* 761.75(b)(3) is part of this ROD to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2.

An exemption to Tennessee Department of Environment and Conservation 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

- 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.

- 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.

- 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: 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. Information on wastewater treatment, WAC, and discharge limits should be available to the public well in advance of any construction planning for EMDF.

- 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.

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Response: RI/FSs for disposal facilities sometimes contain placeholder 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 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.

- 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 Federal Facility Agreement parties to agree to a final list of ARARs, the final WAC, and discharge limits. These are details that typically are not included in a Proposed Plan. 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 needed. DOE will look for opportunities to keep the public informed as the project progresses.

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. 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.

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 parties to agree to a final list of applicable or relevant and appropriate requirements (ARARs), the final waste acceptance criteria (WAC), and discharge limits. These are details that typically are not included in a Proposed Plan. 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 needed. DOE will look for opportunities to keep the public informed as the project progresses.

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 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 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, there has been the installation of 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization were 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 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 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.

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

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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.

DOE will meet all regulatory requirements pertaining to mercury treatment and onsite disposal of waste, including the 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.

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: 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.

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 in this ROD.

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.

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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 in this ROD.

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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 16 years 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.

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Response: The ROD contains ARARs for wastewater management and discharge limits will be agreed to 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 does contain ARARs for wastewater management and discharge limits will be agreed to 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.

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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 designed to the highest engineering standards to be 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 eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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.

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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: As required in the U.S. Environmental Protection Agency guidance document CERCLA Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers are available in many circumstances including situations where an ARAR stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

A waiver for Toxic Substances Control Act of 1976 (TSCA) 40 *Code of Federal Regulations* 761.75(b)(3) is part of this ROD to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2. The TSCA waiver is part of the statute and is commonly granted. The data and calculations referred to in the comment are available and were used by the regulatory agencies in evaluating the justifications for the waiver.

An exemption to Tennessee Department of Environment and Conservation 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is

based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

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.

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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: No response from DOE needed.

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 78 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.

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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.

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. There is no discussion of underdrains in the selected remedy portion of this ROD.

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 parties to agree to a final list of applicable or relevant and appropriate requirements (ARARs), the final waste acceptance criteria (WAC), and discharge limits. These are details that typically are not included in a Proposed Plan. 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 needed. DOE will look for opportunities to keep the public informed as the project progresses.

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 Central Bear Creek Valley Site is not as steeply sloped 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.

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 78 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.

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 forever.

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 locations 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

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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 Federal Facility Agreement 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, there has been the installation of 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization were 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.

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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. Waste acceptance criteria 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. 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.

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 Oak Ridge Reservation 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 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 Central Bear Creek Valley Site is not as steeply sloped 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.

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.

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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 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 (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 Central Bear Creek Valley Site is not as steeply sloped 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.

As required in the U.S. Environmental Protection Agency guidance document CERCLA Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers may be used in situations where an applicable or relevant and appropriate requirement stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

A waiver for Toxic Substances Control Act of 1976 40 *Code of Federal Regulations* 761.75(b)(3) is part of this Record of Decision (ROD) to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2.

An exemption to Tennessee Department of Environment and Conservation 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

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

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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.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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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 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 Federal Facility Agreement 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 Federal Facility Agreement 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 Federal Facility Agreement 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 Federal Facility Agreement parties to agree to a final list of ARARs, the final waste acceptance criteria, and discharge limits. These are details that typically are not included in a Proposed Plan. 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 needed. DOE will look for opportunities to keep the public informed as the project progresses.

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]

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.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in

their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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). 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.

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. The final WAC is included in this 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 is not required under CERCLA. As required in the U.S. Environmental Protection Agency guidance document CERCLA Compliance with

Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers may be used in situations where an ARAR stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

Only a waiver for Toxic Substances Control Act of 1976 40 *Code of Federal Regulations* 761.75(b)(3) is part of this ROD to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2.

An exemption to Tennessee Department of Environment and Conservation 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

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 2.8).

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, 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, there has been the installation of 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization were 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 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.

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, there has been the installation of 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization were 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 (EMDF) will be protective of human health and the environment both during construction and operation and throughout the post-closure period. DOE collected a full year of groundwater data from the selected site prior to the finalization of this Record of Decision. Groundwater and surface water will be monitored during operation and after closure of the EMDF to demonstrate no contamination is being released from the landfill.

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.

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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 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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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.

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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, Chairman

Terry Frank, County Mayor

ATTEST:

Jeff Cole, County Clerk

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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 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 one Toxic Substances Control Act of 1976 (TSCA) requirement 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 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, there has been the installation of 16 more wells, 32 borings, and 17 test pits as part of a second phase of characterization were 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: As required in the U.S. Environmental Protection Agency guidance document CERCLA Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach (CERCLA §121[d][4][D]). Waivers may be used in situations where an applicable or relevant and appropriate requirement (ARAR) stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

   A waiver for TSCA 40 *Code of Federal Regulations* 761.75(b)(3) is part of this ROD to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2.

   An exemption to Tennessee Department of Environment and Conservation 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

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 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 ARARs. The developed WAC are anticipated to require nearly 90 percent of the

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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.

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. It is consistent with land disposal restrictions that are used across the country under RCRA.

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 wastewater discharge limits will be agreed to 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

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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.

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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 mid-2020s time frame depending on many factors including funding levels for cleanup, types of waste, and sequencing of cleanup work. If there are no further delays to the Environmental Management Disposal Facility (EMDF) decision, the schedule for design and construction should allow a short period of overlapping operation of the two facilities, a necessary condition.

      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?

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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 brownfield. 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.

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 brownfield 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.

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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.

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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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.

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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 designed to the highest engineering standards to be 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. The efficient remediation of the Oak Ridge NPL Site will eliminate the risks associated with contaminated soil and facilities in their current configuration and will consolidate that waste into an engineered facility that can be monitored and maintained. The remedy and selected site meet the CERCLA threshold criteria of protecting human health and the environment and meeting regulatory requirements.

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. 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. A leachate/liner compatibility study has been completed to illustrate that the anticipated waste will not impact the long-term integrity of the liner.

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) except for a distance from groundwater requirement under a Federal law (Toxic Substances Control Act of 1976 [TSCA]). As required in the U.S. Environmental Protection Agency guidance document Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Compliance with Other Laws Manual, the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another

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method or approach (CERCLA §121[d][4][D]). Waivers are available in many circumstances including situations where an applicable or relevant and appropriate requirement stipulates use of a particular design or operating standard, but equivalent or better remedial results could be achieved using an alternative design or method of operation.

A waiver for TSCA 40 *Code of Federal Regulations* 761.75(b)(3) is part of this Record of Decision (ROD) to support the selection of the Onsite Disposal Alternative. The waiver is based on demonstration of an equivalent level of protection. The basis for this waiver has been included in this ROD, Sect. 2.13.2. The TSCA waiver is part of the statute and is commonly granted.

An exemption to Tennessee Department of Environment and Conservation 0400-20-11-.17(1)(h) is part of this ROD to support the selection of the Onsite Disposal Alternative. The exemption is based on demonstration of an equivalent level of protection. The basis for the exemption has been included in this ROD, Sect. 2.13.2. The exemption is part of the statute.

REFERENCES

DOE 1994. *Secretarial Policy Statement on the National Environmental Policy Act*, Hazel R. O'Leary, U.S. Department of Energy, memorandum to Secretarial Officers and Heads of Field Elements, Washington, D.C., June 13.

DOE 1997. *Feasibility Study for Bear Creek Valley at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee Vol I and II,* DOE/OR/02-1525/V1&D2 and V2&D2, U.S. Department of Energy, Oak Ridge, TN.

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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.	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. The hardness of or the mineral compounds contained in the water shall not impair its use for irrigation or livestock watering and wildlife. 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.	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) TDEC 0400-40-03-.03(5)(c) TDEC 0400-40-03-.03(6)(c) 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)

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.)	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.		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)
	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)

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.)	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)
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.	Waters with "unavailable"[as defined in TDEC 0400-40-03-.06(2)] parameters—**applicable**	TDEC 0400-40-03-.06(2)(a)
	No new or increased water withdrawals that will cause additional measurable degradation of the unavailable parameter shall be authorized.		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)

CFR = *Code of Federal Regulations*
DOE = U.S. Department of Energy
TDEC = Tennessee Department of Environment and Conservation
U.S. = United States

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.		
	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)
Presence of jurisdictional wetlands as defined in 40 *CFR* 230.3, 33 *CFR* 328.3(a), and 33 *CFR* 328.4	The discharge of dredged or fill material into waters of the U.S., including jurisdictional wetlands, is prohibited if there is a practical alternative that would have less adverse impact. No discharge shall be permitted that results in violation of state water quality standards, violates any toxic effluent standard, and/or jeopardizes an endangered species or its critical habitat. No discharge will be permitted that will cause significant degradation of waters of the U.S. No discharge is permitted unless mitigation measures have been taken in accordance with 40 *CFR* 230, Subpart H.	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

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Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
	Floodplains		
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)
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. • Erosion prevention and sediment control measures such as fences shall be removed following completion of construction.	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 (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 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.		
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)

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
Presence of floodplain as defined in 10 *CFR* 1022.4 (cont.)	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. • 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.	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.)	• 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. • Except under certain conditions detailed in the permit, length of bank stabilization is limited to 300 linear ft.		
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	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.)	• 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. • 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.		

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.)	• 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: • 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.	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.)	• 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)	The discharge of dredged or fill material into waters of the U.S. is prohibited if there is a practical alternative that would have less adverse impact. No discharge shall be permitted that results in violation of state water quality standards, violates any toxic effluent standard, and/or jeopardizes an endangered species or its critical habitat. No discharge will be permitted that will cause significant degradation of waters of the U.S. No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps in accordance with 40 *CFR* 230.70 et seq. are taken that 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), (b), (c) and (d) 40 *CFR* 230, Subpart H
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)
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).		36 *CFR* 800.4(a)(1)–(2)
	Review existing information on historic properties within the area of potential effects, including any data concerning possible historic properties not yet identified.		
	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)
	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)

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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.)	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. 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.	Excavation activities that inadvertently discover such resources on federal lands or under federal control—**applicable**	43 *CFR* 10.4(c) 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. Disinterment of a corpse that has been buried or otherwise interred, 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) *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**)
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)**

Table A.2. Location-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Location Resource	Requirements	Prerequisite	Citation
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. 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.	Action that is likely to impact migratory birds—**applicable** Federal agency action that is likely to impact migratory birds—**TBC**	16 *USC* 703-704 Executive Order 13186

ARAP = aquatic resource alteration permit
ARPA = Archaeological Resources Protection Act
CFR = *Code of Federal Regulations*
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
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 1-.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 1-.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. *[NOTE: A waiver under TSCA 40 CFR 761.75(c)(4) will be requested for this requirement.]* The landfill site shall be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping.	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.	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.]*		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 1 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. 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.	Existing and new stormwater discharges associated with industrial activity—**applicable** Stormwater discharges associated with industrial activity at hazardous waste treatment, storage or disposal facilities—**TBC**	*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**) *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: ○ 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 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* 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.	Generation of universal waste [as defined in TDEC 0400-12-01-.12] for disposal—**applicable**	40 *CFR* 273 TDEC 0400-12-01-.12
	Must label or mark the universal waste to identify the type of universal waste.		40 *CFR* 273.34 TDEC 0400-12-01-.12(3)(e)
	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**	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)
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)
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)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
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. 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 liquid PCB remediation waste—**applicable** Disposal of non-liquid PCB remediation waste [as defined in 40 *CFR* 761.3]—**applicable**	40 *CFR* 761.61(b)(1) 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)
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)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
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)
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: (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.	Treatment of characteristic hazardous debris—**applicable**	40 *CFR* 268.45(a) TDEC 0400-12-01-.10(3)(f)(1)

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 (cont.)	(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. (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.	Treatment of characteristic hazardous debris—**applicable**	40 *CFR* 268.45(a) TDEC 0400-12-01-.10(3)(f)(1)
	(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: (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.		40 *CFR* 268.45(b)(1) TDEC 0400-12-01-.10(3)(f)(2)(i)
	(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)
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.	Disposal of ignitable or reactive RCRA waste—**applicable**	40 *CFR* 264.312(a) TDEC 0400-12-01-.06(14)(m)(1)
	Must not be placed into a cell unless TDEC 0400-12-01-.06(2)(h)(2) is compiled with (see below).	Disposal of incompatible wastes in a RCRA landfill—**applicable**	40 *CFR* 264.313 TDEC 0400-12-01-.06(14)(n)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
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)
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)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Packaging of LLW for disposal (cont.)	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)
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)
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)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
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.	Disposal of LLW on land—**relevant and appropriate**	TDEC 0400-20-11-.17(3)(d)
	Void spaces between packages must be filled with earth or other material to reduce future subsidence within the disposal unit.	Disposal of LLW on land—**relevant and appropriate**	TDEC 0400-20-11-.17(3)(e)
	Closure and stabilization measures as set forth in the closure plan must be carried out as each disposal unit is filled and covered.	Disposal of LLW on land—**relevant and appropriate**	TDEC 0400-20-11-.17(3)(i)
	Active waste disposal operations must not have an adverse effect on completed closure and stabilization measures.	Disposal of LLW on land—**relevant and appropriate**	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).	Operation of a RCRA landfill—**applicable**	40 *CFR* 264.14 TDEC 0400-12-01-.06(2)(e)
	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.	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)
	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)
	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)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
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)
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)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Inventory requirements (cont.)	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)
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.	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)
	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.		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)

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 (cont.)	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. (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.	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)
	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)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
	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)
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)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
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)
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. 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. Groundwater monitoring program must include sampling and analytical methods that are appropriate and accurately measure hazardous constituents in groundwater samples. Groundwater monitoring program must include a determination of the groundwater surface elevation each time groundwater is sampled.	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) 40 *CFR* 264.97(d) TDEC 0400-12-01-.06(6)(h)(4) 40 *CFR* 264.97(e) TDEC 0400-12-01-.06(6)(h)(5) 40 *CFR* 264.97(f) TDEC 0400-12-01-.06(6)(h)(6)

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.)	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)
	• 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)

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 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)
	• 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)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
Detection monitoring (cont.)	Must determine the groundwater flow rate and direction in the uppermost aquifer annually at a minimum. Must determine whether there is statistically significant evidence of contamination of any specified chemical parameter or hazardous constituent at a specified frequency. 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(e) TDEC 0400-12-01-.06(6)(i)(5) 40 *CFR* 264.98(f) TDEC 0400-12-01-.06(6)(i)(6) 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)
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)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
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)
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)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
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)
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)

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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	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; or 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; or 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. 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).	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) 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.[7]	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*
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*

[7] 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
Compliance with narrative water quality criteria	Interpretation and application of narrative criteria shall be based on available scientific literature and EPA guidance and regulations. *NOTE: For radionuclides, exposure assumptions will be based on site-specific exposures and DOE's reasonable anticipated future land uses.*	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*
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
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
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.* *NOTE: For radionuclides, exposure assumptions will be based on site-specific exposures and DOE's reasonable anticipated future land uses.*	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)

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
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)
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; *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)(i) and (ii) *Monitoring requirements*

Table A.3. Action-specific applicable or relevant and appropriate requirements for selected alternative (cont.)

Action	Requirements	Prerequisite	Citation
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)
	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**	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)

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** if water is released on a non-continuous batch basis rather than continuously	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—**applicable**	TDEC 0400-40-05-.07(2)(l) TDEC 0400-40-05-.07(2)(l) TDEC 0400-40-05-.07(2)(m)
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
BMP = best management practice
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
DOT = U.S. Department of Transportation
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
NGS = National Geodetic Survey
No. = number
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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