

**Analysis of US Department of Energy Record of Decision
Onsite Disposal Alternative
Environmental Management Disposal Facility
Site 7c
Central Bear Creek Valley
For
The City of Oak Ridge, TN**



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Analysis of US Department of Energy Record of Decision

Onsite Disposal Alternative - Environmental Management Disposal Facility

Site 7c

Central Bear Creek Valley

For

The City of Oak Ridge, TN

Executive Summary

On June 22, 2021, the US Department of Energy (DOE) issued its Record of Decision (ROD) for the disposal of low-level nuclear and hazardous wastes expected to be generated from the remediation of the Oak Ridge National Priorities List (NPL) site. DOE has selected to construct a 2.2. million cubic yard (cy) landfill at Site 7c in the Central Bear Creek Valley (CBCV) – Please See Figure 1 for the location of Site 7c.

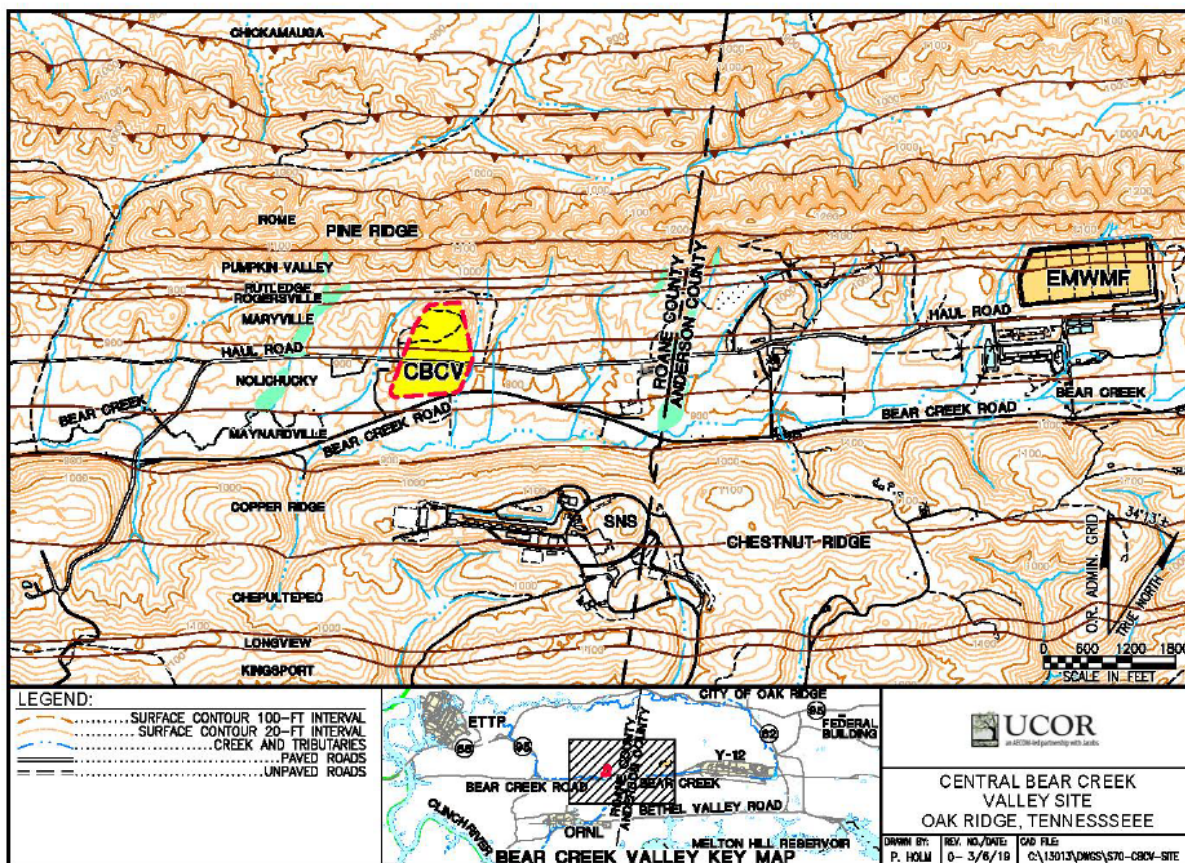


Figure 1. Location of Site 7c in the Central Bear Creek Valley, Oak Ridge, TN

The ROD documents the remedial action plan for a site or operable unit and serves the following three basic functions:

- It certifies that the remedy selection process was carried out in accordance with the Comprehensive Environmental Response Compensation Liability Act (CERCLA) and, to the extent practicable, with the National Contingency Plan (NCP).
- It describes the technical parameters of the remedy, specifying the methods selected to protect human health and the environment including treatment, engineering, and institutional control components, as well as cleanup levels.
- It provides the public with a consolidated summary of information about the site and the chosen remedy, including the rationale behind the selection.

The following provides an overview of the ROD for the Environmental Management Disposal Facility (EMDF) at site 7c which is located in the CBCV. This Executive Summary also provides an assessment of the most important elements in the ROD as it pertains to the City of Oak Ridge.

Record of Decision for EMDF

The DOE selected remedy is the Onsite Disposal Alternative - EMDF at Site 7c in the CBCV. The remedial plan includes the following components:

- DOE is required to maintain a 15-foot unsaturated zone beneath the base of emplaced wastes. The 15-foot unsaturated zone will include a 10-foot geologic buffer composed of low permeability material and a 5-foot multilayer composite liner system. The geologic buffer would consist of earthen soil (i.e., in situ soil or rock) or an engineered structure (e.g., compacted fill) that has a low-permeability of less than $1-10^{-5}$ cm/sec. The composite liner system will consist of 3 ft of clay with a permeability $\leq 1 \times 10^{-7}$ cm/sec placed between two impermeable high-density polyethylene liners that are each specified as at least 60-mil thickness for a total 120-mil thickness 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.

The ROD specifies that the 15-foot separation zone will be measured from the seasonal high-water table of the post-construction groundwater table elevation. The 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, across the EMDF footprint, and with the concurrence of the Federal Facility Agreement (FFA) parties which are the Department of Energy (DOE), US Environmental Protection Agency (EPA) and the Tennessee Department of Environmental Control (TDEC). **The ROD states that both TDEC and EPA expressed concern that predicted post-construction groundwater conditions used for preliminary design might not be achievable. Therefore, a post-ROD field demonstration 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.**

- The EMDF will be constructed to have an approximate capacity of 2.2 million cubic yards (cy) of disposal space. The conceptual design included in the ROD shows that four waste cells would be constructed to accept CERCLA waste. The EMDF will be completed in phases as remediation at the Oak Ridge Reservation progresses. The

landfill will include a clean-fill dike, 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 Resource Conservation and Recovery Act (RCRA) and Toxic Substances Control Act (TSCA) **substantive requirements**.

- DOE shall construct groundwater and surface water drainage features, as needed, to ensure long-term protection of human health and the environment and to be consistent with Applicable Relevant and Appropriate Rules (ARAR). 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.
- After closure of the landfill facility, a 11-ft final cover system will be installed that includes geosynthetic layers. DOE expects this system will limit surface water infiltration into the landfill 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.

A graphical depiction of both the proposed EMDF Liner System and Cover System are provided from the Proposed Plan for the Disposal of Oak Ridge Reservation Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Waste September 2018, DOE/OR/01-2695&D2/R1, from which the ROD is based upon.

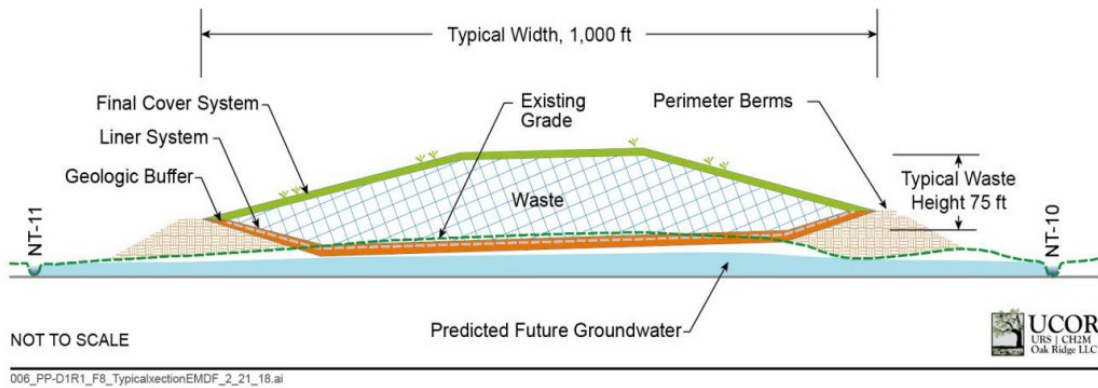
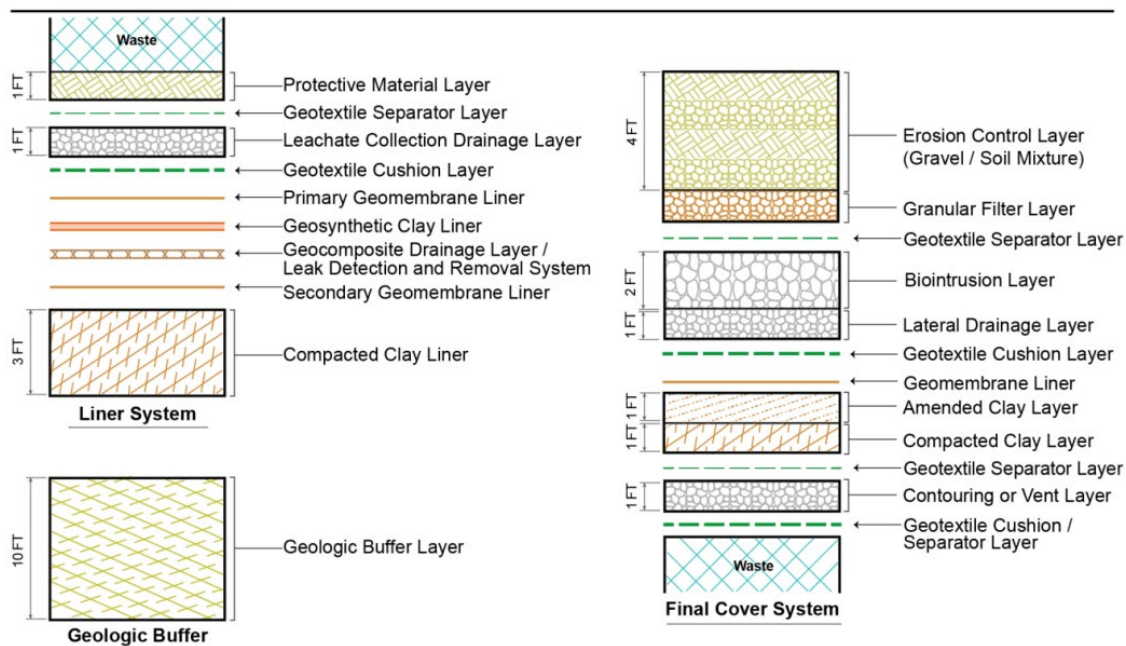


Figure 8. Typical cross section of EMDF.



- DOE will construct support facilities adjacent to the landfill that 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.

- DOE will construct and operate a landfill wastewater treatment system (LWTS) consistent with ARARs. However, the ROD 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.

- With respect to the treatment of mercury contaminated material, DOE has agreed that 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 the 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. Storage capacity will be provided where practicable in order to manage water during storm events.

- Engineered perimeter structures, such as mechanically stabilized earth walls or similar structures, will be constructed if needed. These structures may be necessary and would be constructed to help meet the required separation distance of 15 feet between landfill waste and the seasonal high groundwater elevation.
- DOE will perform routine performance monitoring during operation of the EMDF and post-closure monitoring of the EMDF, consistent with ARARs.
- DOE will perform long-term maintenance, surveillance, and monitoring of the 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.
- DOE will implement Institutional Controls at the EMDF. DOE will maintain surveillance at the 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, consistent with ARARs.
- **DOE has changed the initial land use designations {from the Bear Creek Valley (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.**

Off-Site Disposal Option (Not Accepted by DOE)

- As part of the Feasibility Study for the EMDF and the Proposed Plan that was issued in September 2018, DOE evaluated the remedial option of off-site disposal. DOE determined that this remedial alternative was not the preferred option because it cost more than the construction and operation of the EMDF and that it would result in greater short-term risk being posed from the transport of low-level nuclear and hazardous waste to DOE approved disposal sites in either Texas or Nevada. According to DOE, the off-site disposal alternative would meet all Remedial Action Objectives (meaning that no waivers of law or regulations would be required to implement this remedy); be protective because waste would be disposed in a landfill designed for long-term containment, it would be 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; but it would be less protective in the short term because of increased transportation risks. According to DOE, the difference in cost between on-site and off-site disposal alternatives were \$537.2 million for the EMDF and \$1,315 – \$1,494 million for the off-site disposal option. Two commercial operators of low-level and hazardous waste disposal facilities submitted comments to the Proposed Plan that disputed DOE's cost estimates for off-site disposal. According to Waste Control Strategies (WCS) which operates a DOE approved low-level nuclear and hazardous waste landfill facility in Texas, 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, WCS believes the true cost of the off-site option at WCS compares favorably with the \$276 estimated cost of the preferred alternative and provides the DOE with a fully constructed, fully licensed, and readily available alternative.

Waste Acceptance Criteria

- Waste Acceptance Criteria (WAC) for EMDF will include administrative and analytical waste limitations. The remedy requires that wastes not meeting the EMDF WAC will either be treated to meet the WAC or sent off-site for disposal. Additional operational-based constraints on the size, weight, dimensions and similar physical characteristics as well as radionuclide inventory will be established to ensure waste can be safely received and disposed.

DOE further describes the basis for the WAC will be described in the WAC Compliance Plan that has not yet been prepared. The WAC Compliance Plan will specify how sample analyses are completed and how they are applied to incoming waste streams. DOE's WAC Compliance 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."

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Pursuant to the Administrative WAC criteria listed in the ROD, the following material from disposal in the EMDF:

- Transuranic waste
- Greater than C waste
- Pyrophoric/detonatable/explosive wastes
- Free liquids
- 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.
- 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

Analytic WAC for the EMDF are based on:

- 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
- exposure due to a hypothetical inadvertent human intrusion into the waste 100 to 1000 years post-closure (intrusion scenario) (UCOR LLC 2020).

DOE estimates that about 10% of the waste from tearing down buildings and digging up dirt is projected to not meet waste acceptance criteria and will be disposed of off-site by either truck or train.

Safety-based WAC will also be developed that takes into consideration nuclear criticality issues. This WAC will be documented outside of the ROD.

Remedy Selection

DOE states in the ROD that the selection of the preferred alternative was based, in part, on the increased transportation risks associated with the off-site shipment of waste for disposal. 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. In addition, DOE's selection was based on a lower cost to construct and operate the EMDF than to ship wastes off-site to licensed facilities in Nevada or Texas.

DOE noted in the responsiveness summary that "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."

Multiple commenters stated that DOE's off-site disposal cost analysis was flawed. *EnergySolutions* stated that it was confident that it could support DOE with off-site disposal at significantly lower costs than estimated by DOE for off-site disposal. Waste Control Specialists (WCS) stated that the preferred remedy should be re-evaluated in light of the availability of existing commercial disposal options such as the WCS facility in Andrews, Texas. They noted that if DOE had conducted a fuller examination of their facilities, a more realistic cost for off-site disposal would be established.

The proposed plan states that the cost of off-site disposal would range from \$675-\$767 per cubic yard in present worth 2016 dollars. WCS 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, the true cost of the off-site option at WCS compares favorably with the \$276 estimated cost of the preferred alternative and provides DOE with a fully constructed, fully licensed, and readily available alternative.

WCS noted that "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, WCS does not believe that the transportation statistics that were used are truly indicative of the US experience with safe transportation of radioactive waste."

Site 7c Environmental Studies

In support of the ROD, DOE completed two environmental investigations of site 7c in 2018 and 2019. The investigations are entitled,

- Technical Memorandum (TM) #1, Environmental Management Disposal Facility, Phase 1 Field Sampling Results, Oak Ridge, Tennessee, July 2018
- Technical Memorandum #2, Environmental Management Disposal Facility Phase 1 Monitoring, Oak Ridge, Tennessee, May 2019

The TM's document the limited and incomplete field and laboratory studies undertaken to better understand the surface hydrology, the surface and subsurface geology, the groundwater, and the geotechnical characteristics of subsurface soil and rock at site 7c.

DOE has noted in TM #1 that the geology of site 7c is,

“typical of BCV with steeply dipping, fractured bedrock, and there are no major karstic features in the Maryville, Nolichucky, or Rogersville formations underlying the CBCV site. 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.... Precipitation primarily runs off as surface water and shallow groundwater in the stormflow zone.... Flumes record higher stream flows following precipitation, indicating that most precipitation is running off as stormwater. Flow rates rapidly decrease when precipitation is over, indicating a smaller influence from groundwater.... Groundwater elevations are typical of other BCV wells in similar settings. Groundwater levels measured in both deep and shallow piezometers during the Phase 1 characterization confirmed that prior to landfill construction, groundwater discharges as seeps in the valleys and drainages. Mirroring topography, groundwater is higher beneath knolls/ridges. However, the groundwater elevation beneath the largest knoll in the site is deeper below ground surface than predicted in the RI/FS. Groundwater levels show responses to rainfall events and downward gradients beneath the knoll, indicating minor recharge is occurring on the site.”

DOE presents a fair and reasoned analysis of the surface hydrology, geology and shallow groundwater flow regime at Site 7c. This analysis includes the application of groundwater and landfill leachate modeling to substantiate DOE's position that the proposed engineered landfill system will lower the groundwater level to at least 15 feet below the elevation of waste placement. The modeling results are then used as the basis for requesting waivers to applicable state and federal landfill siting regulations that cannot be met at site 7c under current conditions.

An alternative fair and reasoned analysis of the hydrogeologic conditions at Site 7c is that it is not a good location for siting a low-level nuclear and hazardous waste landfill. The validation of groundwater modeling is dependent on the quality and quantity of available data. The data collected in support of the modeling undertaken by DOE for the EMDF site 7c site is insufficient to confidently predict the groundwater condition with the proposed engineered landfill systems. DOE has collected groundwater data from eight sets of paired monitor well nests with two of the paired well nests located outside of the planned landfill area (one upgradient and another downgradient). This reasoning is reaffirmed by EPA and TDEC's decision to require DOE to complete additional environmental studies at the EMDF to substantiate DOE's position that the engineered landfill will achieve the 15-foot groundwater separation to waste placement.

DOE's groundwater elevation data from the TM's reveals that only one well nest location (GW 983/982) fulfills the ROD requirement to maintain a 15-foot groundwater separation standard to waste placement. DOE believes that the construction of a berm around the perimeter of the landfill which is underlain by a drainage system will in combination with a 11-foot low-permeability landfill cover system and a 10-foot low-permeability geologic buffer material and the 5-foot multi-layer composite liner system will result in lowering the seasonal high water table elevation to at least 15 feet from waste placed in the EMDF.

While it is possible that the DOE landfill design specifications will achieve the 15-foot separation, it appears that the only way to prove or disprove this claim will be to construct the landfill and determine if the landfill system lowers the water table or if DOE will need to add fill material to elevate the landfill bottom to meet the 15-foot separation requirement.

GW 983/982 is the highest elevation on the EMDF. Topographic high areas are generally groundwater recharge areas where the distance from land surface to the water table is commonly larger than in discharge areas, or generally topographic low areas.

Site 7c is located downhill from Pine Ridge. Pine Ridge has a general elevation of approximately 1,180 feet. GW 983/982 has an elevation of 1,015 feet. The EMDF site is a groundwater discharge area to the Pine Ridge which is reflected in the DOE measured depths to groundwater at the EMDF. At GW 983/982 the depth to the water table is 58 feet, however, at GW 998/999 the groundwater discharges at the ground surface under artesian conditions. All other well nests at site 7c have recorded measured depths from land surface to water table elevations of less than 15 feet.

The steep topographic relief from the Pine Ridge to the EMDF (1,180 feet to 1,015 feet and lower elevations) produces a groundwater pressure head at site 7c. There is over 165 feet of elevation displacement which creates the hydrologic pressure head {i.e., Force (Pressure Head) = mass (groundwater) x gravity (165 feet of displacement)}. Pressure is defined as Force/Area.

DOE asserts in Technical Memorandum #2 that there is preferential movement of groundwater laterally than a vertical component of groundwater flow. However, five of the eight well nests on site 7c demonstrate an upward vertical hydraulic gradient meaning that the measured groundwater elevation of the deeper monitor well in the well nest pair has a higher groundwater elevation than the shallow nested well. Please see Table 1 below.

Piezometer	Mid-point of screen (ft bgs)	Total depth (ft bgs)	Vertical gradient during dry conditions, September 2018 (ft/ft)	Vertical gradient direction during dry conditions, September 2018	Vertical gradient during wet conditions, February 2019 (ft/ft)	Vertical gradient direction during wet conditions, February 2019
GW-978	64.5	80.0	0.12	Down	<0.01	Down
GW-979	31.3	37.8				
GW-980R	64.95	74.4	0.19	Down	0.28	Down
GW-981	27.1	34.0				
GW-982	107.1	126.5	<-0.01	Up	0.03	Down
GW-983	84.2	92.2				
GW-986	43.5	59.6	-0.01	Up	-0.02	Up
GW-987	21.1	27.9				
GW-988	66.9	78.5	0.02	Down	0.08	Down
GW-989	38.6	45.0				
GW-992R	41.85	55.5	-0.02	Up	-0.07	Up
GW-993	28.0	35.5				
GW-994	47.0	55.0	-0.07	Up	<-0.01	Up
GW-995	27.1	34.0				
GW-998	31.6	45.0	-0.01	Up	-0.03	Up
GW-999	15.3	22.0				

CBCV = Central Bear Creek Valley.
ft bgs = feet below ground surface.

GW = groundwater well.
R = replacement borehole.

Table 1. Vertical Gradients at Site 7c

Because additional environmental studies will be conducted post-ROD, findings that do not support DOE's position would not change the siting decision, but they could result in reduced capacity in the landfill. The loss of capacity probably would be small (maybe on the order of 10%), but it could result in more waste being sent off-site for disposal than DOE currently plans or increasing the chance that DOE will decide to site a third CERCLA landfill in Oak Ridge.

Compliance with Clean Water Act

DOE states that the EMDF wastewater treatment system will meet ARARs, including portions of the Clean Water Act (CWA) that address hazardous chemicals and ARARs addressing radiological discharges. Treatment would reduce contaminants to levels required for discharge to Bear Creek or its tributaries.

The ROD 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.

DOE has complied with the City of Oak Ridge's request to discharge treated wastewater to CWA and TDEC requirements.

Waivers to Applicable Regulations Governing Landfill Siting

DOE recognizes that based on the hydrogeology at 7c the siting of a low-level nuclear and hazardous waste landfill will require receiving waivers of applicable state and federal regulations.

DOE has received a waiver of Toxic Substances Control Act (TSCA) 40 CFR 761.75(c)(4) which is the requirement to have waste in the landfill no closer than 50' to the seasonal high groundwater table. A TSCA waiver under 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:

- More stringent liner and leachate detection and collection requirements under RCRA.
- Low permeability vadose zone geologic buffer material as committed to in this ROD.

DOE has received an exemption of TDEC 0400-20-11-.17(1)(h), which is also a Nuclear Regulatory Commission (NRC) Low-Level Waste Siting criterion, which states that “the hydrogeologic unit used for disposal shall not discharge groundwater to the surface within the disposal site.” DOE states that the engineering design 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.

Mercury Treatment and Disposal

DOE will meet all regulatory requirements pertaining to mercury treatment and onsite disposal of waste, including the Resource Conservation and Recovery Act (RCRA) requirements that dictate WAC for mercury.

All recovered elemental mercury will not be disposed in any Oak Ridge landfill and will eventually be shipped off-site, 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 off-site for treatment and disposal.

The wastewater discharge limits for mercury will be 51 nanograms/liter (ng/L) which is also parts per trillion (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).

The City of Oak Ridge request for more robust treatment of Mercury contamination was addressed by DOE in the ROD.

Land Use Designation Change for Zone 2 in the Bear Creek Valley

As part of the ROD, DOE unilaterally changed the land use designation for the CBCV site from residential to industrial. DOE’s basis for changing the land use designation is the BCV Phase I ROD (DOE 2000) that was 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.

DOE unilaterally changed the land use designation in Zone 2 to industrial without engaging with the City of Oak Ridge. Land use is typically determined at the local government level. The change in land use from recreational in Zone 2 to industrial should result in an increase in the DOE Payment in Lieu of Taxes (PILT) to the city of Oak Ridge and Roane County based on a higher value use. DOE has indicated that they will not support changes to PILT payments.

The land use designations for purposes of cleanup were developed some two decades ago through a consultative process (the End-Use Working Group) that involved DOE, local citizens, and local government representatives. DOE has pointed with pride to the End-Use Working Group as a successful initiative and a model to be emulated elsewhere. The unilateral change in land use designation is an indication to citizens and local government that DOE is not an honest broker and should not be trusted in future initiatives of this nature.

Economic Impact of On-Site Disposal

DOE has maintained the position that the construction and operation of the EMDF will have a positive impact on the local economy. DOE cites the analysis completed by the University of Tennessee (University of Tennessee 2015) which indicated that construction and operation of this facility were estimated to have a significant positive economic impact on the Anderson, Roane (including the city of Oak Ridge), and Knox Counties region as measured by personal income, sales and use tax revenue, and employment.

DOE also asserts that a waste rail loading facility would be needed at the former K-792 area at the East Tennessee Technology Park (ETTP) to support off-site disposal. According to DOE, this option would have negative impacts to reindustrialization at ETTP and is inconsistent with future development goals of the site. The current rail spurs at ETTP that would be needed for future rail transportation of waste traverse through the heart of the ETTP site.

Both Roane County and the City of Oak Ridge governments have expressed the belief that the EMDF will do more economic harm than good in and around the city. They point to a stagnant population growth since 1990 while the outlier areas are projecting a 34% population growth rate. In addition, many city officials view the rail facility as a potential benefit. There is a rail line to the industrial park area, but it is almost never used, and addition of facilities for loading and unloading railcars would make the rail line useful to industry. It is ironic that DOE believes a rail freight-handling facility would be deleterious to economic development, while they are insisting that there is no adverse effect from hosting a radioactive and hazardous waste landfill.

Payment in Lieu of Taxes

DOE states in the ROD that 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. According to DOE, CERCLA remedial action decisions cannot play a role in the determination of PILT payments.

Natural Resource Damage Assessment

DOE notes that the Natural Resource Damage Assessment (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.

NEPA

DOE believes that it has complied with National Environmental Policy Act (NEPA) requirements through incorporation of NEPA data into the CERCLA RI/FS. DOE has undertaken an assessment of socio-economic impact on a regional scale and chooses not to consider the negative economic impact that has been ongoing in the City of Oak Ridge and Roane County for decades from the placement of the EMWMF and now the future EMDF.

Recommendations

- The City should continue to advance arguments to compel DOE to pay natural resource damages for injuries sustained from the construction of the EMDF.
- The City should consider seeking Congressional assistance to appropriate additional PILT funds as a consequence of the negative socio-economic impact the EMDF will have on recruiting and retaining business investment and in attracting new residents.
- The City should monitor and comment on the post-ROD field demonstration studies that 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 landfill design.
- The City should insist that DOE, EPA and TDEC continue to provide meaningful opportunities to comment on major investigations and decisions associated with the EMDF. Specifically, the City will want to comment on:
 - The Final WAC Compliance Plan,
 - The design and operation of the Landfill Wastewater Treatment System,
 - Any contemplated land use designations, and
 - The EPA Administrator required fish study. This study will 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 Preliminary Remediation Goals (PRG) for radionuclides at this site.

Table Summary of DOE Responsiveness Summary

The following table includes text from the ROD from DOE on various issues of importance to Oak Ridge. It includes comments from the Oak Ridge community to the Proposed Plan; comments on the positions taken by DOE on issues of importance to the City; and a fourth column that describes how the City's comments were either accepted or rejected by DOE.

ROD Issue	DOE Decision	Oak Ridge Request/Concern	Comment	Disposition of City Comments
CERCLA Definition of Site	<p>Page 2-50. 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.</p> <p>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.</p>		<p>A fair reading of the DOE’s definition of site indicates that the entire Oak Ridge Reservation is considered part of the Superfund Site.</p> <p>With the approval of this ROD, the change in land use designation for the CBCV is from recreational use in the near-term and unrestricted in the long-term to DOE-controlled industrial use (same as for Zone 3) and Zone 1 will also have a change in land use designation.</p> <p>DOE has established these land use designations without the City of Oak Ridge’s engagement and agreement for the purpose of determining remediation goals both near- and long-term for the EMDF. Therefore, Zones 2 and 3 have been brought into the Superfund Site and Zone 1 was previously in the Superfund sphere by virtue of the siting of the EMWMF.</p> <p>In addition, DOE states that the land use designation captured in the BCV Phase I ROD (DOE 2000) that was used to set land use controls and remediation goals for Zones 1 and 2 will need to be changed. 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. Zone 2, as stated above will be designated industrial use.</p>	Not Accepted. DOE unilaterally changed the land use designation for Zone 2 in the CBCV.
Application of the Superfund Law to	Page 2-16. Unlike a RI/FS for a typical remediation project, the purpose of the EMDF RI/FS was not to evaluate alternatives	Page 3-70 – 3-73. From Ellen Smith. The proposed siting, construction, and	DOE intends to use the CERCLA process for the cleanup of other areas of the ORR.	Not Accepted. The decision to apply CERCLA for the

approve the siting, design and construction of a Low-Level Nuclear Waste Landfill on a Greenfield “clean site	<p>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.</p> <p>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.</p> <p>Page 3-54. 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).</p>	<p>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.</p> <p>Page 3-122. 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</p>	<p>Both Federal and State environmental statutes and regulations include siting requirements for new landfills in greenfields (TSCA, RCRA C and D). These sitings for new landfills in a greenfield area have never been based on the development of a CERCLA remedial action plan.</p>	<p>construction of the EMWMF set precedent for invoking the CERCLA process for the EMDF.</p>
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		(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.		
Adequacy of Remedial Investigation	<p>Page 3-106. 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.</p> <p>Page 3-118 and 3-119. DOE disagrees that the Proposed Plan is incomplete. The CERCLA process requires that DOE issue a</p>	<p>Page 3-105. 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”</p>	<p>DOE issues a Proposed Plan and presents it to the public. DOE then indicates in the ROD that additional investigations will be required to support their Plan. This approach is analogous to “putting the cart before the horse,” and is clearly out of order in the decision-making process on an issue of such significance to the citizens of Oak Ridge.</p> <p>The Technical Memorandum was completed after the Proposed Plan was issued. Therefore, DOE has not complied with the CERCLA process if the RI/FS did not include the investigation undertaken post issuance of the Proposed Plan.</p> <p>DOE has indicated that additional studies will be required to be completed prior to implementation of the Remedial Design and Remedial Action which is the construction and filling of the EMDF. DOE is required by agreement from both TDEC and EPA to finalize WAC, undertake additional groundwater studies to determine the conditions necessary to maintain a minimum 15-foot separation from the groundwater to waste disposed in the EMDF, complete the design</p>	<p>Partially Accepted. DOE has agreed to complete additional groundwater elevation studies and modeling to insure that the waste disposed at the EMDF will meet a 15 foot separation from the seasonal high-water table. DOE will undertake an aquatic study of Bear Creek, and evaluate fish consumption, exposure and risk assessment data, to help inform the development of PRGs for radionuclides at this site.</p>

	<p>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.</p> <p>Page 3-156. 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.</p>	<p>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.</p> <p>3-145. From Mark Watson. 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</p>	<p>requirements of the on-site wastewater treatment system, and complete studies on the impact of nuclear material on fish in Bear Creek.</p>	
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		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.		
EMDF Remedial Action Objectives	<p>Page 2-17.</p> <ul style="list-style-type: none"> • Prevent exposure of people to CERCLA waste (or contaminants released from the waste into the environment) through meeting chemical-, location-, and action-specific ARARs, and by preventing exposure that exceeds a human health risk of 10-4 to 10-6 ELCR or HI of 1. • Prevent adverse impacts to water resources (surface water and groundwater) from CERCLA waste or contaminants released from the waste through meeting chemical-, location-, and action-specific ARARs, and by preventing exposure that exceeds a human health risk of 10-4 to 10-6 ELCR or HI of 1 • Prevent unacceptable exposure to ecological receptors from CERCLA waste contaminants through meeting chemical-, location-, and action-specific ARARs • Maintain a 15-ft separation between the bottom of emplaced waste and the seasonal high-water table of the uppermost unconfined aquifer, which includes 5 ft of liner system and 10 ft of geologic buffer consistent with TDEC 0400-11-01-.04(4)(a)(2). 		<p>Per the ROD, DOE is required to maintain a 15-foot unsaturated zone beneath the base of emplaced wastes and the seasonal high water table elevation. This requirement has been added as an RAO in order to assure protectiveness during landfill operation and post-closure.</p> <p>October 9, 2019, Letter from EPA Region IV and TDEC to DOE (Jay Mullis), “Using direct groundwater elevation measurements from on-site groundwater monitoring wells, EPA, the State, and the Department of Energy shall determine the minimum elevation for facility construction that ensures a perpetual 15-foot unsaturated zone (RAO) between the zone of groundwater fluctuation and emplaced wastes. If the results of the groundwater study or demonstration as implemented and approved by the FFA parties indicate earthen fill materials must be imported to elevate areas of the site to comply with the added RAO for minimum separation of wastes and groundwater, these requirements will be incorporated into final facility RDWP and RD/RA WP and approved by EPA and TDEC before implementation. Mechanically stabilized earth (MSE) walls will be evaluated as a design option if groundwater measurements indicate that elevating the facility</p>	Accepted. The DOE proposed remedy satisfies Remedial Action Objectives.

			is necessary. If the added RAO cannot be achieved by design, then there will be no approval of onsite waste disposal under this ROD and the selected remedy shall be modified.”	
DOE Approved Waivers to Environmental Regulations	<p>Page 3-6. DOE has received 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). This is the requirement to have the waste in the landfill no closer than 50’ to the seasonal high groundwater table.</p> <p>Page 3-6. DOE has received an exemption of TDEC 0400-20-11-.17(1)(h), which is also an NRC Low-Level Waste Siting criterion, which states that “the hydrogeologic unit used for disposal shall not discharge groundwater to the surface within the disposal site.” DOE states that the engineering design 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.</p> <p>Page 3-69. 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.</p>	<p>Page 3-106 and 3-107. 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</p>	<p>A TSCA waiver under 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:</p> <ul style="list-style-type: none"> -More stringent liner and leachate detection and collection requirements under RCRA - Low permeability vadose zone geologic buffer material as committed to in this ROD. 	<p>Partially Accepted. While DOE has granted itself waivers under TSCA for siting a low-level nuclear and hazardous waste landfill in an area where the seasonal high-water table is less than 50 feet to the placement of waste, and they have granted themselves a waiver from the TDEC and NRC requirement to not site this type of landfill where the groundwater discharges to surface water, the Department has been required to demonstrate that it will be able to engineer a landfill system that will meet the performance standard of a 15-foot separation from the seasonal high-water table and the placement of waste.</p>

		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, 3-107 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.”		
Principal Threat	Page 2-32. 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.		Principal Threat Waste: The National Contingency Plan (NCP) defines a Principal Threat Waste to be highly toxic or highly mobile material that generally cannot be reliably contained or would present a significant risk to human health, or the environment should exposure occur. They include liquids and other highly mobile materials (e.g., solvents) or materials having high concentrations	Accepted. All Principal Threat Wastes such as liquid wastes High-Level Nuclear Waste, and Greater than C Nuclear Wastes will be disposed off-site.

			<p>of toxic compounds. No "threshold level" of toxicity/risk has been established to equate to "principal threat." However, where toxicity and mobility of source material combine to pose a potential risk of 10⁻³ risk or greater, generally treatment alternatives should be evaluated. EPA expects to use treatment to address the principal threats posed by a site, wherever practicable.</p> <p>DOE has indicated in the ROD (Page 3-112) that liquid waste will be excluded from disposal at the EMDF because it would not meet waste acceptance criteria. Other highly toxic waste, as defined by the WAC, will also be excluded from disposal at the EMDF.</p>	
Remedy Selection (On-Site EMDF versus Off-Site Disposal)	<p>Page 3-58. Selection of the DOE preferred alternative was based, in part, on the increased transportation risks associated with the off-site shipment of waste for disposal. 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.</p> <p>Page 3-117. 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</p>	<p>Page 3-116 and 3-117. 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.</p> <p>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</p>	<p>DOE states in the ROD that 10% of waste will be shipped off-site. This added risk is not incorporated into the remedy selection analysis that ultimately resulted in the Department selecting on-site disposal.</p> <p>Comment from Council Member Smith - A summary of the modeled short-term transportation risk to be avoided is that a few people would have their lives shortened because of their exposures to air emissions from highway vehicles used, and there would be about one fatality from a vehicle accident during the campaign, plus a few injuries from vehicle accidents. The differences between alternatives may be statistically significant, but these are not risks that most people would see as significant.</p>	Not Accepted.

	<p>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.</p> <p>Page 3-109. The current contracts between DOE and the off-site 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 Off-site Disposal Alternative. This evaluation concluded that off-site 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 off-site disposal costs.</p> <p>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.</p>	<p>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.</p> <p>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.</p>	<p>The claim of equivalent or better results is not substantiated. It is based on engineering judgment and modeling, with a modeling approach that is unvalidated and may not be validated.</p>	
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		<p>3-124. Comment from the City of Oak Ridge's Environmental Quality Advisory Board (EQAB) -Onsite disposal is not safer. DOE-EM's Preferred Choice is predicated on the idea that onsite disposal is safer than off-site (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, off-site disposal at a dry unpopulated site is safer.</p>		
EMDF Groundwater Modeling	<p>Page 3-208. 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</p>	<p>Page 3-115. 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</p>	<p>The validation of groundwater modeling is dependent on the quality and quantity of available data. The data collected in support of the modeling undertaken by DOE for the EMDF site 7c site is insufficient to confidently predict</p>	<p>Accepted. DOE has been convinced that the Remedial Investigation they undertook was inadequate to determine if the EMDF can be constructed</p>

	<p>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.</p> <p>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.</p> <p>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.</p>	<p>multi-layer protective design. The modeling would be used to predict the concentration of contaminants at Points of Compliance.</p> <p>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</p>	<p>the groundwater condition with the proposed engineered landfill systems.</p> <p>DOE has collected groundwater data from 8 sets of paired monitor well nests with two of the paired well nests located outside of the planned landfill area (one upgradient and another downgradient).</p> <p>DOE's groundwater elevation data reveal that only one location fulfills the ROD requirement to maintain a 15-foot groundwater separation standard to land surface distance requirement (GW 983/982). DOE believes that the construction of a berm around the perimeter of the landfill which is underlain by a drainage system will in combination with a 11-foot low-permeability landfill cover system and a 10-foot low-permeability geologic buffer layer and a 5-foot multi-layer and composite liner system will result in lowering the seasonal high-water table to at least 15 feet from waste placed in the EMDF.</p> <p>While it is possible that the DOE landfill design specifications will achieve the 15-foot separation, it appears that the only way to prove or disprove this claim will be to construct the landfill and determine if the landfill system lowers the water table or if DOE will need to add fill material to elevate the landfill bottom to meet the 15-foot separation requirement.</p>	<p>to provide for a minimum 15-foot separation from the seasonal high-water table and the placement of waste. Additional investigation and modeling will occur during the Remedial Action phase. If the investigation does not support the placement of waste at the EMDF, DOE will likely need to request a ROD modification.</p>
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		<p>COPCs are identified for applicable potential receptors.</p> <p>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</p>	<p>GW 983/982 is the highest elevation on the EMDF. Topographic high areas are generally groundwater recharge areas and the distance from land surface to the water table is commonly larger than in discharge areas, or generally topographic low areas.</p> <p>Site 7c is located downhill from Pine Ridge. Pine Ridge has a general elevation of approximately 1180 feet. GW 983/982 has an elevation of 1015 feet. Most of the EMDF site is a groundwater discharge area to the Pine Ridge which is reflected in the DOE measured depths to groundwater at the EMDF varying from 58 feet at GW 983/982 to groundwater being expressed at the ground surface at well nests GW-998/GW-999 under artesian conditions, and all other well nests having recorded measured depths from land surface to water table elevations of less than 15 feet.</p> <p>The severe topographic relief from the Pine Ridge to the EMDF (1180 feet to 1015 feet and lower elevations) will result in the groundwater being under pressure at the EMDF. There is over 165 feet of elevation displacement which creates a hydrologic pressure head. DOE asserts in Technical Memorandum #2 that there is preferential movement of groundwater laterally than a vertical upwelling, although five of the eight well nests demonstrate an upward vertical gradient meaning that the measured groundwater elevation of the deeper monitor well in the well nest pair has a higher</p>	
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		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 both of these documents.	groundwater elevation than the shallow nested well.	
Landfill Cover System	<p>Page 3-108. 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.</p> <p>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.</p>	<p>Page 3-108. 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.</p>	<p>Comment from Council Member Smith - While it is true that the engineered cover does not rely on compacted soil alone, but soil layers are important elements of the engineered system, and they are vulnerable to a wide variety of degradation mechanisms. (Synthetic layers included in the cover system also are vulnerable to damage.) The performance of the cover to limit infiltration into the waste (and particularly to ensure that infiltration does not exceed leakage through the liner) is a critical element in the long-term performance of the proposed landfill, but there is no assurance of its performance in the face of the forces that can degrade it.</p> <p>The Neptune and Co. analysis of DOE’s performance assessment modeling points out that the analysis assumes (and depends on the assumption) that infiltration through the cover will increase by no more than a factor of two. The various degradation mechanisms discussed in the paper cited (and other technical publications on this subject) can result in order-of-magnitude increases, not just doubling.</p>	Accepted.

			<p>This community has much experience with federal agencies (DOE and its predecessors) making commitments that they could not follow through on – and legal obligations that they could not meet -- due to factors such as insufficient appropriations. DOE already is obligated to long-term institutional control of a number of other sites in Oak Ridge that were determined to be too dangerous to remediate – and that may pose substantial dangers in longer-term control. We would prefer that DOE not add to the long-term burden here when there are other options that would not create long-term challenges.</p> <p>The undependability of federal funding is a reason for requesting a locally controlled fund to assure financial responsibility in the long term.</p> <p>This facility will fail in the long-term, and we don't think we can depend on DOE to clean up the mess.</p>	
Land Use Designation Change for Zone 2 in the Bear Creek Valley from Recreational to	<p>Page 2-33. 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.</p>	<p>Page 3-105. 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</p>	<p>DOE unilaterally changed the land use designation to industrial without engaging with the City of Oak Ridge. Land use is typically determined at the local government level. The change in land use from recreational in zone 2 to industrial should result in an increase in PILT payment to the city of Oak Ridge and Roane County based on a higher value use. DOE has indicated that they will not support changes to PILT payments.</p> <p>Comment from Council Member Smith - “There was never any expectation that the land in Bear Creek Valley would be released by DOE for use by others.” This is true, to an extent. The End Use</p>	Not Accepted.

	<p>Page 3-56.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.</p> <p>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.</p>	<p>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 reuse. This statement contradicts the position of the EUWG and DOE's support of such a position.</p>	<p>Working Group land use designations did not anticipate that land would be released to others within a foreseeable time frame. The land use designations were, however, supposed to indicate the types of uses that land could be suitable for in the long-term – well beyond the careers of current federal employees or city officials. Public participants in the process agreed that substantial areas of the ORR would be permanently sacrificed to waste management or restricted industrial use, and they trusted DOE's commitment to limit the contamination footprint so that other areas would not be similarly sacrificed. Now DOE is saying that federal ownership gives DOE carte blanche to unilaterally declare additional lands as sacrifice areas, that past commitments to the community have no meaning. Public trust is being eroded.</p> <p>"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." These provisions were not part of the EUWG agreements.</p>	
EMDF Property Deed Restrictions	<p>Page 3-177. DOE will maintain the disposal facility forever.</p> <p>DOE intends to retain ownership of the EMDF site in perpetuity. If DOE transfers the EMDF site out of federal control, DOE will 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.</p>	<p>Page 3-73. From Ellen Smith. 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</p>	<p>A deed restriction devalues property value and will have a negative impact on the City's ability to attract and secure outside business investment with two low-level nuclear and hazardous waste landfills within the municipal boundary.</p>	Accepted.

	<p>Page 3-73. 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.</p>	<p>Oak Ridge Reservation that is already permanently dedicated to waste containment due to its past history. 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.</p>		
Landfill Underdrain	<p>Page 3-57. DOE's selected remedy has no reliance on permanent underdrains to intercept the groundwater table.</p> <p>Page 2-35. 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.</p>	<p>Page 3-107. ...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</p>	<p>DOE accepted the City of Oak Ridge request to not include underdrains in the design of the EMDF.</p>	<p>Accepted. DOE understood that based on the poor outcome at the EMWMF with respect to the underdrain system that placement of an underdrain at the EMDF would not be received well and likely would not work as designed.</p>

		viable for placement of a low-level nuclear and hazardous waste landfill.		
Surface Water and Groundwater Management	<p>Page 3-153. The details of wastewater treatment will be developed as part of the design. ... Information on wastewater treatment, WAC, and discharge limits should be available to the public well in advance of any construction planning for EMDF.</p> <p>Page 2-35. 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.</p> <p>Page 2-46. Radiological discharge limits (RDLs) from the EMDF landfill wastewater will comply with the 10-5 Risk specified in the Dispute Resolution Decision and consistent with TDEC 0400-40-03-.03(4)(j) Footnote C, as determined based on site-specific exposure assumptions.</p> <p>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. DOE is required per the EPA Administrator Decision to undertake a “site-specific study, which includes 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.”</p> <p>Page 3-67. 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.</p>	<p>Page 3-143 and Page 3-144. From Mark Watson. 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.</p> <p>Finally, what would the city like to receive out of this? 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</p>	<p>TDEC, (The City of Oak Ridge) 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.</p> <p>Existing piezometers will be supplemented with additional piezometers that will be installed as part of the Groundwater Field Demonstration in the study area of interest. 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.</p> <p>The design will be as necessary to ensure stormflow drains from the demonstration area toward the tributaries; an upgradient trench will adequately move water around the study area. Groundwater monitoring will be required as part of ROD implementation.</p> <p>The ROD does not present a definite plan to build wastewater treatment and interim storage</p>	Accepted.

	<p>Page 3-85. 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.</p> <p>Page 3-177. The Central Bear Creek Valley Site is not as steeply sloped as other sites considered, thereby minimizing the need for surface water diversion.</p>	final order or final agreement that comes along.	<p>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.</p>	
Compliance with Clean Water Act (CWA) Requirements	<p>Page 2-26. Onsite Disposal Alternatives would provide landfill wastewater treatment needed to meet ARARs, including portions of the 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.</p>	<p>Page 3-107. 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.</p>	<p>DOE has complied with Oak Ridge's request to discharge treated wastewater to Clean Water Act and TDEC requirements.</p>	Accepted.
Waste Acceptance Criteria (WAC)	<p>Page 2-39 and 2-40. 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 WAC limits, ARARs, and FFA agreements, along with more extensive information regarding generating, accepting, and tracking the waste.</p> <p>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.</p>	<p>Page 3-146. From Mark Watson. 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</p>	<p>DOE partially fulfilled the City's request to define the WAC criteria.</p> <p>The WAC Compliance Plan has not been completed. However, DOE has included EMDF Administrative WAC criteria on Table 2-4. Material that will be excluded from the EMDF are:</p> <ul style="list-style-type: none"> • Transuranic waste • Greater than C waste • Pyrophoric/detonatable/explosive wastes • Free liquids 	<p>Partially Accepted. DOE, EPA, And TDEC must complete the WAC. DOE has determined that certain nuclear wastes are restricted from disposal at the EMDF.</p>

	<p>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).</p> <p>Several of the administrative WAC are derived from RCRA and TSCA regulations. For example, hazardous waste must be treated to meet Land disposal Restrictions (ARARs) to be disposed.</p> <p>Page 2-42. Analytic WAC for EMDF are based on modeling that: (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).</p> <p>Page 3-5. 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 off-site for disposal, while the lower contaminated/high volume waste streams remain onsite.</p> <p>Page 3-64 and 3-65. 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. It will go by truck and train. 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.</p>	<p>the public the opportunity to understand and to offer comment on the waste that would be permitted to be disposed in the EMDF. DOE should be required to provide in the Proposed Plan a process for characterizing waste prior to landfill disposal. Specifically, DOE should describe the extent of sampling and testing that would be implemented to verify that waste materials are acceptable for disposal in the EMDF.</p> <p>Page 3-123. 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.</p> <p>Page 3-111. 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.</p>	<ul style="list-style-type: none"> • 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. • 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 <p>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). Based on DOE's modeling the following Analytic WAC limits are imposed for the EMDF:</p> <p>Estimated facility average activity concentration at closure (pCi/g)</p> <ul style="list-style-type: none"> • Tritium 4.6 (pCi/g) • Tc-99 1.6 (pCi/g) • C-14 0.54 (pCi/g) <p>Dose-based total activity limit (Ci)</p>	
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	<p>Page 3-111. 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 DUF6 cylinders or nickel barrier material relevant to the EMDF decision.</p> <p>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.</p> <p>Page 3-112. 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.</p>	<p>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:</p> <ul style="list-style-type: none"> • 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. <p>With respect to the above limitations on waste material handling in a CAMU, DOE would need to secure EPA and</p>	<ul style="list-style-type: none"> • Tritium 3.31E+13 (Ci) • Tc-99 1070 (Ci) • C-14 47.3 (Ci) <p>DUF6 Cylinders were previously stored at ORR. Comment from Council Member Smith - In Oak Ridge, these are wastes historically associated with the ETTP, which supposedly will be cleaned up before the EMDF would begin operation. But it does not hurt to list them as excluded, just in case. DOE is taking credit for excluding some other materials that should never be suggested as possible candidates for disposal in the EMDF, so there should be no good reason not to list these materials as excluded.</p> <p>Comment from Council Member Smith - There has in the past been some concern within DOE and NRC about the possibility that aqueous transport of enriched uranium within a disposal cell, or in groundwater outside the cell, could bring together a large enough quantity of enriched uranium to cause a criticality event. This is a long-term issue. It should be avoidable, but avoidance requires that it be anticipated, and that WAC and facility management criteria are designed to prevent it.</p>	
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		<p>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.</p>		
Maynardville Formation (Karst Geologic Unit)	Page 2-38. The landfill will be sited to provide a minimum 300-ft buffer zone between the waste and the Maynardville Limestone geologic unit.		<p>DOE recognizes that the EMDF cannot be constructed in the Maynardville Formation based on its karst geologic characteristics. DOE acknowledges that the Maynardville is only 300 feet from the southern portion of the EMDF. In the event the EMDF leaks contaminants beyond the containment systems, the Maynardville will be the receiving formation and contaminants will migrate much faster through this highly</p>	<p>Partially Accepted. DOE selected site 7c because the earlier preferred site for the EMDF (adjacent to the EMWMF) had a hydrogeologic connection to the Maynardville. While no site is optimal in the BCV for the construction of a Low-level Nuclear and</p>

			conductive geologic unit and discharge to surface waters.	Hazardous waste landfill, site 7c meets the criterion of not being directly connected to the karst Maynardville Formation.
Waste Prohibited in EMDF	<p>Page 2-41. 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.</p> <p>Transuranic waste, Greater than NRC Class C Waste, pyrophoric/detonatable/explosive wastes, Bulk liquids exceeding 500 ppm PCBs are prohibited, free liquids, and 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.</p>			Accepted. Waste that is not attributable to the remediation at the ORR is prohibited from being disposed at the EMDF.
Mercury Treatment and Disposal	<p>Page 3-5. 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.</p> <p>All recovered elemental mercury will not be disposed in any Oak Ridge landfill and will eventually be shipped off-site, 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 off-site for treatment and disposal.</p> <p>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).</p>	<p>Page 3-142. From Mark Watson. 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.</p>	The City of Oak Ridge request for more robust treatment of Mercury contamination was addressed by DOE in the ROD.	Accepted. Big Win!

	<p>All discharge water from the 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. Storage capacity will be provided where practicable in order to manage water during storm events.</p>	<p>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.</p> <p>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.</p> <p>Page 3-114. 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</p>		
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		<p>radioisotopes and mercury contaminants.</p> <p>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.</p> <p>DOE considers the remediation of Mercury to be a high priority. 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...,</p>		
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		<p>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 ensure 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.</p>		
Post Landfill Closure Long-Term Monitoring	<p>Page 1-7. 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</p>	<p>Page 3-118. DOE has indicated that they will assume long-term stewardship of the EMDF following landfill closure.</p>	<p>The ROD requirement to place institutional controls at the EMDF devalues the landfill acreage.</p>	<p>Accepted. DOE will be responsible for the Operations & Maintenance of the EMDF in perpetuity.</p>

	<p>with the requirements of the CERCLA/NCP and FFA for the Oak Ridge NPL Site.</p> <p>Page 3-118. 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.</p>			
Costs (On-Site Disposal versus Off-Site Disposal)	<p>Page 3-212. In response to public comments received, including this one, DOE has conducted a more recent analysis on the costs associated with the Off-site Disposal Alternative. This evaluation concluded that off-site 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 off-site disposal costs.</p> <p>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.</p> <p>Page 2-56. 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</p>	<p>Page 3-147. From Mark Watson. 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.</p> <p>Page 3-212. <i>EnergySolutions</i> has carefully studied the DOE CERCLA RI/FS reports comparing onsite and off-site waste disposal options. Based on existing <i>EnergySolutions</i> contractual pricing with other DOE sites, our technical experience with waste densities, and quoted railroad costs, <i>EnergySolutions</i> is confident that it can support the DOE with off-</p>	<p>As DOE noted, greenhouse gas emissions are not normally part of a CERCLA analysis. DOE is bringing them up here as an excuse for its decision, not a reason.</p> <p>Comment from Council Member Smith - Regardless of that, the GHG emissions analysis is incorrect in its premise that both the onsite alternatives and the off-site alternatives are equal regarding construction, operation, and short-distance hauling/handling in Oak Ridge, so only the emissions associated with the long-distance hauling of waste need to be considered. The analysis fails to acknowledge that earthmoving and other construction activity here in Oak Ridge would be far more extensive for onsite than off-site disposal – and more extensive than what would be needed at a western disposal site on relatively flat land (far less need for grading) in a setting where it would not be necessary to install complex systems for water control. Also, it fails to account for the greenhouse gas implications of the loss of carbon storage provided by the Tennessee</p>	Not Accepted.

	<p>element of socioeconomic impacts through the NEPA criteria). The re-evaluation of costs resulted in verification of the RI/FS costs, that is, off-site 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).</p>	<p>site disposal at significantly lower costs than estimated by DOE for off-site disposal.</p> <p>Page 3-213. 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) a</p> <p>If DOE had conducted a fuller exploration of our facilities, we could have provided a more realistic picture of off-site disposal costs. The proposed plan states that the cost of off-site disposal would be in a range of \$675-\$767 per cubic yard in present worth</p>	<p>forest land disturbed to create the landfill (permanent removal in the case of the landfill site and possibly just temporary removal in the case of lands disturbed for acquisition of soil and rock for landfill construction and operation.</p>	
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		<p>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 off-site 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.</p> <p>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</p>		
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		do not believe that the transportation statistics that were used are truly indicative of the US experience with safe transportation of radioactive waste.		
Economic Impact of On-Site Disposal	<p>Page 3-4. There is an economic benefit to the area through jobs from the EMDF construction project.</p> <p>Page 3-7. To support off-site disposal, a waste rail loading facility has been proposed for the former K-792 area at ETPP by EnergySolutions. This proposed alternative would have negative impacts to reindustrialization at ETPP and is inconsistent with future development goals of the site. The current rail spurs at ETPP that would be needed for future rail transportation of waste traverse through the heart of the ETPP 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 ETPP 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.</p> <p>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</p>	<p>Page 3-143. From Mark Watson. 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 ETPP without being able to look at those and how our message is conveyed out to neighboring communities.</p> <p>Page 3-149. From Mark Watson. 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</p>	<p>DOE does not agree with the city of Oak Ridge's assessment of negative economic impact from the addition of the EMDF within the municipal boundary.</p> <p>Comment from Council Member Smith - In view of DOE's insistence that the EMDF would not adversely affect economic development in Oak Ridge, it is interesting to see DOE's emphatic claims about the detrimental economic effects of a rail transport support facility (for off-site shipment) that some of us think might have economic benefits to the city. What part of CERCLA gives DOE the authority to unilaterally decide what private land uses are and are not compatible with future development on private land in the city? Regardless, this criticism is out of date, since Kairos Power is now planning a reactor facility on the K-33 site that the Draft ROD says (in Section 2.14.1) needs to be maintained with a campus-like "feel." With or without the Kairos Power project, it is not obvious that active rail operations on the ETPP site would deter other activities, as DOE claims.</p>	Not Accepted.

	<p>Oak Ridge), and Knox Counties region as measured by personal income, sales and use tax revenue, and employment.</p> <p>Programmatic cost savings in implementing onsite disposal instead of off-site 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.</p> <p>Page 3-6. DOE can find no evidence that expansion of disposal capacity would have negative consequences on property values or economic development in Oak Ridge.</p> <p>Page 3-67. 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.</p> <p>Page 3-123. 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. Off-site 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 the EMDF.</p> <p>Page 3-177. The site selected in the Central Bear Creek Valley</p>	<p>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!</p> <p>Page 3-150. From Mark Watson. <i>DOE should be required to 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 agricultural value for PILT purposes. Communities such as Andrews, Texas are receiving over \$8 million annually in offset fees. Such a requirement</i></p>		
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	<p>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.</p>	<p>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.</p> <p>A requirement that annual financial assurance payments be continued to be paid by the federal government for the lifetime operation of the proposed landfill.</p> <p>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</p>		
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		<p>not allowing normal growth “outside the gates.”</p> <p>Page 3-210. From Ron Woody (Roane County). 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.</p>		
Operation of the EMWMF	<p>Page 3-74. 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</p>	<p>Page 3-120. 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</p>	<p>July 8, 2019, letter from TDEC to DOE (Dave Alder). “Our concerns begin with the design, construction and operation of the DOE-OR Environmental Management Waste Management Facility landfill (EMWMF landfill) that began receiving waste in 2002. The EMDF landfill and the EMWMF landfill are in similar geologic</p>	<p>Not Accepted. It is evident from TDEC’s comments that DOE is the only government entity that believes the EMWMF has been operated well!</p>

	<p>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).</p>	<p>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.</p>	<p>settings with similar physical conditions. TDEC is expressing many of the same concerns for the EMDF landfill site as it expressed for the EMWMF landfill site. These concerns range from the initial site characterization through design, construction and ultimately disposal of waste at the EMDF landfill, if built. The EMWMF landfill site is located in an area with groundwater near the land surface.</p> <p>TDEC was/is concerned that groundwater at the EMWMF Landfill site will be close enough to the ground surface that it has/will affect the EMWMF landfill's geologic buffer. TDEC was concerned that ground water would rise to the level of the landfill liner and above. DOE-OR relied on computer modeling to demonstrate to TDEC and EPA that the construction methods used to build the EMWMF landfill would lower the groundwater levels beneath the site and eliminate any ground water impact on the EMWMF landfill geologic buffer. TDEC and EPA approved the EMWMF landfill site for construction based on results of the DOE-OR ground water modeling. All parties learned during construction that the groundwater levels at the EMWMF landfill site were considerably higher than predicted by the ground water model.</p> <p>Beginning with the construction of the EMWMF landfill continuing through the operation of the EMWMF today, several issues have come to light at the EMWMF landfill:</p>	
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			<ul style="list-style-type: none">• The model forecasted the groundwater elevation under the EMWMF landfill would be below the EMWMF landfill geologic buffer. The computer model used to predict the groundwater level around the EMWMF landfill was not accurate. DOE-OR reports indicate the groundwater level has risen above the design criteria for the geologic buffer for the EMWMF landfill.• Because the groundwater level under the EMWMF landfill was higher than predicted, the engineering design for the EMWMF landfill had to be modified to address the potential for ground water to affect the EMWMF landfill geologic buffer.• To minimize the impact of groundwater upon the EMWMF landfill, an underdrain system was installed beneath the EMWMF landfill to “intercept” groundwater. The goal of underdrain system was to reduce ground water impact to the EMWMF geologic buffer. Using an underdrain in an attempt to permanently lower or “suppress” the groundwater beneath a landfill is not allowed during construction of a permitted Subtitle D landfill in Tennessee because the “underdrain” eliminates the ability to monitor ground water for releases from the landfill. However, TDEC made an exception for this DOE-OR corrective action at the EMWMF landfill to allow DOE-OR to meet its waste disposal needs with the belief the EMWMF landfill geologic buffer would not be impacted and the landfill would not have any releases to ground water.	
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			<ul style="list-style-type: none">• Additional ground water modeling predicted the underdrain system would permanently lower groundwater under the EMWMF landfill. The underdrain discharges groundwater. beneath a portion of the EMWMF landfill, but there is still uncertainty regarding the impact of groundwater levels under other parts of the landfill.• Rainwater that falls into the EMWMF landfill carries waste constituents into Bear Creek. Additionally, TDEC is concerned groundwater discharged through the EMWMF landfill underdrain may send even more contaminated water to Bear Creek.• The existing groundwater monitoring network for the EMWMF landfill has been unable to provide ground water data to determine if the EMWMF landfill groundwater protection standards have been exceeded. TDEC persuaded DOE-OR to add make some necessary ground water monitoring improvements. However, installation of a standard landfill ground water monitoring network for the EMWMF landfill has not been completed.”	
Natural Resource Damage Assessment	Page 3-56. 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.		The city should continue to advance arguments to compel DOE to pay damages for injuries sustained from the construction of the EMDF.	Accepted.

Payment in Lieu of Taxes (PILT)	<p>Page 3-143. 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.</p>	<p>Page 3-144. From Mark Watson. 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.</p>	DOE does not agree with the city of Oak Ridge's assessment that the PILT should be increased based on the changed land use designation from recreational to industrial by the addition of the EMDF within the municipal boundary.	Not Accepted.
NEPA	<p>Page 3-85. 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).</p> <p>Page 3-115. 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.</p>	<p>Page 3-148. From Mark Watson. 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</p>	DOE believes that it has complied with NEPA requirements through incorporation of NEPA data into the CERCLA RI/FS. DOE seeks to assess socio-economic impact on a regional scale and choosing not to consider the negative impact that has been ongoing in the city of Oak Ridge and Roane County for decades from the placement of the EMWMF and now the EMDF.	Not Accepted.

		<p>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.</p> <p>Page 3-115. 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.</p> <p>Page 3-123. 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</p>		
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		undervaluing ORR land applies to PILT, too.)		
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Acronyms

ARAR	applicable or relevant and appropriate requirement
BCV	Bear Creek Valley
BCBG	Bear Creek Burial Grounds
CAMU	Corrective Action Management Unit
CBCV	Central Bear Creek Valley
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COPC	Contaminants of Potential Concern
CSM	Conceptual Site Model
CWA	Clean Water Act
CY	Cubic Yards
D&D	deactivation and decommissioning
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EBCV	East Bear Creek Valley
ELCR	Excess Lifetime Cancer Risk
EM	Office of Environmental Management
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
FFS	Focused Feasibility Study
FS	Feasibility Study
FY	Fiscal Year

GW	Groundwater
HI	Hazard index
K	hydraulic conductivity
LCRS	leachate collection and removal system
LDR	land disposal restriction
LLW	low-level waste
LLWDDD	Low-Level Waste Disposal Development and demonstration
LWTS	Landfill Wastewater Treatment System
MCL	Maximum Contaminant Level
MSE	Mechanically stabilized earth
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
Ng/L	nanograms/Liter = Parts Per Trillion
NEPA	National Environmental Policy Act of 1969
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NRDA	Natural Resource Damage Assessment
NT	Northern Tributary
OMB	Office of Management and Budget
OREM	Oak Ridge Office of Environmental Management
ORERP	Oak Ridge Environmental Research Park
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
ORSSAB	Oak Ridge Site Specific Advisory Board
OSHA	Occupational Safety and Health Administration
POA	Point of Assessment
PILT	Payment in Lieu of Taxes
POC	Point of Compliance

PCB	Polychlorinated biphenyl
PCCR	Phased Construction Completion Report
PRG	Preliminary Remediation Goals
RAO	Remedial action objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act of 1976
RDR	Remedial Design Report
RI	Remedial Investigation
ROD	Record of Decision
RWCM	Radioactive Waste Management Complex
S&M	surveillance and maintenance
SOWA	Safe Drinking Water Act of 1974
T& E	threatened and endangered
TBC	to be considered
TCLP	toxicity characteristic leaching procedure
TDEC	Tennessee Department of Environment and Conservation
TM	Technical Memorandum
TRU	transuranic
TSCA	Toxic Substances Control Act of 1976
TSDRF	treatment, storage, disposal, and recycling facility
UCL	upper confidence limit
UEFPC	Upper East Fork Poplar Creek
UPF	Uranium Processing Facility
U.S.	United States
WAC	Waste Acceptance Criteria
WBCV	West Bear Creek Valley
WCS	Waste Control Specialists LLC
Y-12	Y-12 National Security Complex